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GRADUATE CATALOG

A Message from Our Dean

We welcome you to explore the many offerings of our graduate programs at the University of Florida. The reputation of a research university is, in large part, measured not only by the excellence of its graduate faculty and graduate students but, importantly, by the quality of its academic graduate programs. Through its chosen graduate faculty members, the University of Florida offers graduate programs of the highest quality.

Our catalog is intended to provide information and resources to those interested in graduate education programs at the University of Florida. Our catalog is for our current students as well to assist them to make the best decisions for maintaining and continuing their academic progress while on the way to their professional and personal goals.

Nicole L. P. Stedman, Ph.D.
Associate Provost and Dean of the Graduate School

Contact the Graduate school

For assistance, please reach out using the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>). Updates to this catalog can also be submitted via the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>) or via direct email to grad-catalog@ufl.edu.

Research and Academic Offerings

The University of Florida Graduate School (<https://grad.ufl.edu/>) offers research opportunities in a variety of fields. In collaboration with UF's Office of Research (<http://research.ufl.edu/>), our many colleges and departments (p. 12) offer numerous majors alongside the various Centers, Institutes, and Other Research Facilities (<https://research.ufl.edu/about/centers-and-institutes.html>) and interdisciplinary offerings available to the graduate students here at UF. Explore the many services provided to our graduate students by the Graduate School and other student-oriented service units by visiting the Student Services (<https://gradcatalog.ufl.edu/graduate/student-services/>) section of this catalog. Additionally, the University of Florida Libraries and the University Press of Florida offer extensive collections to guide your research. For information on these services and UF's state-of-the-art computer facilities, art galleries, performing arts centers, museums, and other student offerings, such as UF's Office of Research (<http://research.ufl.edu/>), see the Research Facilities and Other Campus Resources (<https://gradcatalog.ufl.edu/graduate/research-centers/>) section of the catalog.

Accreditation

The University of Florida is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to award associate's, baccalaureate, master's, educational specialist, and doctoral degrees. The University of Florida also may offer credentials such as certificates and diplomas at approved degree levels. Questions about the accreditation of the University of Florida may be directed in writing to the Southern Association of Colleges and Schools Commission on Colleges at 1866 Southern Lane, Decatur, GA 30033-4097, by calling (404) 679-4500, or by using information available on SACSCOC's website (www.sacscoc.org) (<https://www.sacscoc.org/>).

Admission

How to Apply

To apply for admission, go online to the Office of Admissions Graduate Admissions website (<https://admissions.ufl.edu/apply/graduate/>) (<https://admissions.ufl.edu/apply/graduate/>) for basic information and contact the academic unit of interest for specific deadlines, requirements, and procedures. To find websites for academic units, go online to <https://grad.ufl.edu/apply/admission/>. The Office of Admissions refers applications that meet minimum standards to the graduate admission committees of the pertinent academic units for approval or disapproval. Applicants must meet the requirements of both the academic unit and the Graduate School to be admitted for graduate study. Admission to some programs is limited by what resources are available.

Requirements for Admission:

- A recognized baccalaureate, graduate or professional degree from a college, university, or higher education institution accredited by the Higher Learning Commission, the Middle States Commission on Higher Education, the New England Commission of Higher Education, the Northwest Commission on Colleges and Universities, the Southern Association of Colleges and Schools, the Western Association of Schools and Colleges, or a comparable degree from an international institution.
- For applicants with a bachelor's degree only, a minimum grade point average of B (3.0), calculated from all grades and credits after the semester where the applicant reached 60 semester hours or 90 quarter hours is required. Applicants should refer directly to their intended academic units for Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) requirements. If required, academic test scores are used in the context of a holistic credential review process.
- For all international applicants, a minimum score on one of these English Language Skills tests:
 - Test of English as a Foreign Language (TOEFL): 550 paper, or 80 Internet & Home Edition;
 - International English Language Testing System (IELTS): 6 (6.5 Effective: Spring 2026); or
 - Documented successful completion of the University of Florida English Language Institute program.
 - For graduate programs that require a GRE score, the verbal GRE must be a minimum of 140 in addition to TOEFL or IELTS.

** Students from countries where English is the only official language, who have attended non-US institutions where the language of instruction is English or have earned a degree within the United States may qualify for an exemption at the discretion of the academic department.*

- The admissions application must be submitted with a non-refundable \$30.00 application fee.
- Satisfactory conduct record.
- Proof of medical immunization. Visit the following website <http://shcc.ufl.edu/services/primary-care/immunizations> (<http://shcc.ufl.edu/services/primary-care/immunizations/>).
- A complete and up-to-date résumé or curriculum vitae (submitted via CollegeNET) that includes all post-high

school education and employment, plus information about ongoing international affiliations and research funding.

Some academic units require a reading knowledge of at least one foreign language. Exceptions to the above requirements are made only when these and other criteria, including letters of recommendation, are reviewed by the academic unit, recommended by the college, and approved by the Dean of the Graduate School.

Admission to the Graduate School requires a baccalaureate degree from a college, university, or higher education institution accredited by the Higher Learning Commission, the Middle States Commission on Higher Education, the New England Commission of Higher Education, the Northwest Commission on Colleges and Universities, the Southern Association of Colleges and Schools, or the Western Association of Schools and Colleges. Applicants must arrange to send official transcripts from each institution attended to the Office of Admissions. Applicants should reference their academic unit's website as some require that applicants submit an official copy of their transcript from each institution attended directly to their attention as well as the Office of Admissions. These transcripts must be received directly from the registrar of the institution where the work was done. Applicants who currently are enrolled at another institution must send updated transcripts as soon as they are available for any work completed after applying for admission.

Please note: If admitted without final official transcripts or test scores, final test scores or final credentials must be posted by the UF Office of Admissions before the end of the first term of enrollment.

Students failing to meet admission conditions are barred from continued registration after their first semester.

Admission requirements of an academic unit are often more rigorous than the minimum requirements set by the Graduate School. Because of resource limitations, most academic units do not accept all qualified applicants.

All applicants who meet requirements and standards will be considered equally for admission to any academic program, regardless of race, color, religion, gender, marital status, beliefs, age, national origin, sexual orientation or physical or mental disabilities.

Admissions Examinations

Graduate Record Examination (GRE): If stipulated as an admission requirement by the graduate academic program to which they seek acceptance, applicants must submit GRE scores that are acceptable to the program of interest. In addition to the General Test of the GRE, some academic units may encourage applicants to submit scores on one or more advanced subject tests. Applicants with a previous graduate or professional degree or equivalent from a regionally accredited U.S. institution may be exempt from the GRE and undergraduate GPA requirements. Contact the academic unit for specific admission testing requirements.

Graduate Management Admission Test (GMAT): Applicants to some of the M.B.A. programs must submit satisfactory scores on the GMAT for admission into the degree program. For further information on admission requirements to all M.B.A. offerings at UF, please visit <https://warrington.ufl.edu/mba/apply/>.

Graduate Study in Engineering: Some programs may use the Fundamentals of Engineering (FE) examination in lieu of the GRE for admitting students into the non-thesis master's degree programs.

Required Immunizations

The University of Florida requires that all new students show proof of certain immunizations prior to attending UF. The official form and instructions for how to complete it successfully are available at <https://healthcompliance.shcc.ufl.edu/immunization-requirement/immunizations/>. Once received, your completed form will be reviewed by UF Health Compliance Office staff. PLEASE NOTE: Students will not be cleared to register for classes until all immunization requirements are met.

About Health Compliance

Students must comply with the University's immunization and health insurance requirements. More information and submission instructions about both of these prerequisites can be found at <http://healthcompliance.shcc.ufl.edu/> (<https://healthcompliance.shcc.ufl.edu/>).

Immunizations: Vaccine-preventable diseases do still exist, and contracting these illnesses can have an adverse effect on a student's health, well-being, and ability to reach optimal academic performance. Students shall be required to show documentation of specific vaccinations or proof of immunity for Measles/Mumps/Rubella (MMR), Hepatitis B, and Meningitis. Please note that international students and those entering most academic health professions may have additional requirements including tuberculosis screening. Find the immunization form and instructions online at <https://healthcompliance.shcc.ufl.edu/immunization-requirement/>.

Should you need to obtain vaccinations, please contact the UF Student Health Care Center's Call Center regarding appointments and any applicable charges: (352) 392-1161.

Insurance: The University follows an Opt Out system where students who don't opt out by providing documentation of adequate health insurance will be automatically enrolled in the school-sponsored plan. They may either purchase outside health insurance that meets the requirements for comparable coverage or they can be auto-enrolled in the school-sponsored Student Health Insurance Plan.

If a student currently has insurance, they will be required to review their insurance coverage and check that it meets the requirements set forth as comparable coverage. They will then need to submit a waiver with their policy information for verification by the end of drop/add but ideally much earlier. The charge for the school-sponsored Student Health Insurance Plan will be removed once the submission is completed and verified. Once verified, the waiver is good for one year. All this can be done online at <https://healthcompliance.shcc.ufl.edu/health-insurance-requirement/waiver/>

Still, have questions? You can contact the health compliance office for further assistance: healthcompliance@shcc.ufl.edu or (352) 294-2925.

Computer Requirement

Access to and on-going use of a computer is required for all students to complete their degree programs successfully. The University of Florida expects each student to acquire computer hardware and software appropriate to their degree program. The university maintains general computing requirements which can be located at <http://www.it.ufl.edu/policies/student-computing-requirements/>. (<http://www.it.ufl.edu/>)

policies/student-computing-requirements/) However, individual colleges may have specific requirements to ensure students can complete their coursework. A list of each college's requirements, if any, are posted at <https://it.ufl.edu/it-policies/student-computing-requirements/college-specific-requirements/>

Competency in the basic use of a computer is a requirement for graduation. Class assignments may require the use of a computer, academic advising and registration can be done by computer, and official university correspondence is often sent via email.

While the university offers limited access to computers through its computer labs, most students will be expected to purchase or lease a computer that is capable of wireless and wired network connection to the Internet, graphical access to the World Wide Web, and productivity functions such as word processing and spreadsheet calculation. Costs of meeting this requirement will be included in financial aid considerations.

Conditional Admission

Academic units may, at their discretion, grant conditional admission to up to 10% of an incoming class. Conditional admission candidates must have all application materials submitted: a valid prior degree, admission exam scores, English test scores (if required), transcripts, statement of purpose and recommendation letters, along with records of postbaccalaureate grades or work histories of pertinent prior professional experience, if the academic unit is justifying conditional admission on the basis of either. Academic units granting conditional admission must include the terms of admission in the acceptance letter they send to the student.

Conditional admission cases due to graduate admission grade point averages below 3.0, missing or unofficial test scores, and English test scores (if required) below the required minimums (6 for IELTS (6.5 Effective: Spring 2026), 80 for Internet TOEFL must have final approval from the Graduate School. In such cases, no acceptance letter can be sent until the Graduate School gives final approval.

In cases of students conditionally admitted with missing official transcripts, final admission is deferred for two semesters, until required final credentials are posted by the UF Office of Admissions.

Registration holds to block next-term pre-registration will remain on the records of conditionally admitted students until their first-semester grades are posted on their UF transcripts and show that they met the terms of their conditional admission. Students failing to meet any admission conditions are subject to being barred from continued enrollment after their second semester.

Conditional admission based on unofficial language test scores will have holds placed to block first-term enrollment until official scores are posted by the UF Office of Admissions.

International Students

English Language Institute (ELI) Conditional Admission

International applicants, who require additional English language training in order to meet the Graduate School's English language minimum requirements, may be offered English Language Institute (ELI) Conditional Admission. Academic programs will assess an application for ELI Conditional Admission based on all of the materials in an applicant's file. If an applicant has a low or missing score on the IELTS or TOEFL test, or does not have a satisfactory score on the GRE Verbal section, but is

otherwise academically qualified, a program may grant ELI Conditional Admission.

Such an offer of admission does not guarantee an applicant can enroll in graduate coursework. All ELI Conditionally Admitted students must complete one of the following two options before they can enroll:

1. They must complete the ELI Intensive English Program and receive an exit certificate from it, or;
2. They must provide official IELTS or TOEFL scores that meet the required minimums.

An offer of ELI Conditional Admission may also contain additional conditions set by an applicant's prospective academic program. ELI will coordinate with an applicant's academic program, in order to assist in the student's entry into the Intensive English Program and obtain an appropriate visa.

Students with Disabilities

The Disability Resource Center (DRC) in the Division of Student Affairs celebrates disability identity as a valued aspect of diversity. We champion a universally accessible community that supports the holistic advancement of individuals with disabilities.

The DRC offers many student services to students with disabilities. These include setting up accommodation plans to help remove barriers in the learning environment, offering academic coaching, disability management counseling, assistive technology resources, and programs and outreach events that celebrate disability.

The DRC serves more than 3100 students each year. Our testing center proctors over 10,000 exams annually and students from various classifications and areas of study utilize DRC accommodations. We work with graduate students, professional school students such as medical, veterinary, law, nursing, and all other disciplines. We welcome graduate students to connect with our office!

The DRC staff is available for consultation with faculty, families, and students. Please contact the office at (352) 392-8565 or via email at accessUF@ufsa.ufl.edu to schedule an appointment or inquire about our services. If you are a graduate student who requires employment-related accommodations, please contact Ken Osfield in the University's ADA Compliance Office at (352) 392-1591 or kosfield@ehs.ufl.edu.

We look forward to connecting with you! Go Gators!

Disability Resource Center
Reid Hall, 1316 Museum Road
Gainesville FL 32611
<https://disability.ufl.edu/>
352-392-8565
Facebook: UF-DISABILITY-RESOURCE-CENTER
Twitter: @UFDRC
Instagram: @UFDRC

Postbaccalaureate Students

Postbaccalaureate study is for students who have already received a baccalaureate degree and have not been admitted to the Graduate School. Admission for postbaccalaureate enrollment requires a recognized baccalaureate degree (or higher) from a regionally accredited college or university, or an international equivalent based on a 4-year curriculum, a minimum C (2.0) GPA on all junior and senior year

undergraduate work, as computed by UF, and a satisfactory conduct record.

International applicants must submit a satisfactory score on one of the following: TOEFL (Test of English as a Foreign Language: paper=550, Internet=80) or IELTS (International English Language Testing System: 6 (6.5 Effective: Spring 2026)).

Applicants who meet the following conditions may be exempt from the English language test requirements:

- International students whose native language is English
- International students who have spent at least 1 academic year enrolled full-time in a baccalaureate or postbaccalaureate degree program at a college or university in a country where English is the official language prior to your anticipated term of enrollment at UF.

The Postbaccalaureate Application

Applicants must ensure that transcripts are sent to the Office of Admissions from each post-secondary institution attended. Applications will not be referred for a decision until transcripts have been received by the Office of Admissions. Postbaccalaureate applicants may apply for Distance Education programs. Only students who have completed a baccalaureate degree in the College of Education may be admitted to postbaccalaureate status for the purpose of completing a teacher certification program. Other applicants may be admitted to postbaccalaureate status only for a limited time to fulfill prerequisites for admission to a master's program. Applicants with degrees in other fields who are seeking teacher certification should apply for admission to a master's program in the College of Education.

Postbaccalaureate students may enroll in graduate courses, but graduate credit is not generally accepted by the Graduate School for transfer. It is possible to transfer up to 15 semester credits of graduate coursework earned with a grade of A, A-, B+, or B by petition in clearly justified cases and in conformance with regulations on courses and credit.

Proof of immunization for measles and rubella or a tuberculosis skin test is required before registering for coursework.

For more information, visit the Office of Admissions website, <https://admissions.ufl.edu/apply/post-baccalaureate> (<https://admissions.ufl.edu/apply/post-baccalaureate/>)

Nondegree Registration

Nondegree enrollment is restricted to participants in special programs, off-campus programs, University-affiliated exchange programs, and those participants with non-degree educational objectives at UF. Students denied admission to UF for any term are not eligible for non-degree registration. If you previously have attended UF in a degree-seeking status and did not subsequently earn a degree, you are not eligible for non-degree registration. Students need prior approval from the academic unit(s) to take courses in a non-degree status. That coursework normally is not applied toward the graduate degree if the student is admitted to the Graduate School. By petition in clearly justified cases and in conformance with regulations on courses and credit, it is possible to transfer up to 15 credits of graduate coursework earned with the grade of A, A-, B+, or B. A student should not remain in this classification for more than 1 term before being admitted as a post-baccalaureate or graduate student.

For non-degree registration request form information, click on this link: <https://admissions.ufl.edu/apply/non-degree> (<https://admissions.ufl.edu/apply/non-degree/>)

Readmission

This information applies only to students who have previously been enrolled in a graduate, postbaccalaureate, or professional UF program. Former students who do not enroll at the university for three consecutive terms, including any summer term, must apply for readmission to the same program of their previous enrollment. Students who wish to take an academic leave of absence should obtain written approval from their academic unit prior to leaving. For students who have a Graduate Assistantship and/or are here on a student visa, please contact the appropriate office(s) for additional information and requirements. <https://hr.ufl.edu/leave/graduate-assistant-leave-of-absence/> <https://internationalcenter.ufl.edu/f-1-student/f-1-processes/leave-absence-loa-or-withdrawal-uf> (<https://internationalcenter.ufl.edu/f-1-student/f-1-processes/leave-absence-loa-or-withdrawal-uf/>)

All readmission applicants must meet the current admission requirements of the college or school they expect to enter. Readmission is not guaranteed and is subject to availability at the level, college, and major. Consult the appropriate program's admission requirements. Readmission is for a specific term. If you are unable to enroll for the term for which you have been admitted, you must apply for readmission again to a different term.

Applicants must present a satisfactory record of conduct. Regardless of other qualifications, applicants who have experienced major or continuing difficulties with school or other authorities since their last enrollment at the University of Florida may find their application for readmission denied.

The readmission application must be submitted with a non-refundable \$30.00 application fee.

For further information, visit the Office of Admissions website <https://admissions.ufl.edu/apply/readmission> (<https://admissions.ufl.edu/apply/readmission/>)

Faculty Members as Graduate Students

UF faculty members in tenured or tenure-accruing positions, as designated by Regulations of the University of Florida, 7.003, normally may not pursue graduate degrees from this institution. Exceptions are made for the Florida Cooperative Extension Service (IFAS) county personnel, the faculty of the P. K. Yonge Laboratory School, and University Libraries faculty. Graduate Council policies have also established limited exceptions for persons holding faculty positions that do not include tenure or tenure accrual, and for specified degree programs, including the online MBA. Other exceptions to this policy must be approved by the Graduate Council. Such exceptions, if given, are rare and will only be approved if pursuit of the proposed graduate degree program is determined to be in the best interest of the University and the Colleges involved.

Graduate Student Employees

For more information about employing graduate students, please visit the Graduate School website and see Principles for the Employment of Graduate Students at the University of Florida (<https://grad.ufl.edu/work/ga/>).

Residency Status

Florida Residency for Tuition Purposes

For information about Florida residency requirements, please visit the Office of Admission's website (<https://admissions.ufl.edu/cost-and-aid/residency/#establishing-residency>) for the most up-to-date information regarding initial classification as a Florida resident for tuition purposes; currently enrolled students seeking reclassification as a Florida resident for tuition purpose should reference the information available through the Office of the University Registrar's website (<https://registrar.ufl.edu/services/residency/>).

For further information about applying to graduate school, please visit <https://admissions.ufl.edu/apply/graduate>. (<https://admissions.ufl.edu/apply/graduate/>)

Centers, Institutes, and Other Research Facilities

The University of Florida has approximately 180 approved Centers and Institutes (http://www.ir.ufl.edu/centers/Active_Centers.pdf) that have been established over the years to enhance the university's teaching and research functions by facilitating interdisciplinary cooperation and providing campus research instrumentation facilities and services. Ten of these centers and institutes with campus-wide missions report to the Vice President for Research: <https://research.ufl.edu/about/centers-and-institutes.html>

For more information, visit <http://centers.ufl.edu/> and <http://institutes.ufl.edu/> to contact the centers (<http://centers.ufl.edu/>) or institutes (<http://institutes.ufl.edu/>) directly.

Colleges and Departments

Expand the name of the college for their list of departments and contact pages.

College of Agricultural and Life Sciences

Click here (p. 14) for further information about the *College of Agricultural and Life Sciences*.

Departments

- Agricultural and Biological Engineering (p. 15)
- Agricultural Education and Communication (p. 18)
- Agronomy (p. 20)
- Animal Sciences (p. 23)
- CALS Interdisciplinary Program (p. 26)
- Entomology and Nematology (p. 31)
- Family, Youth and Community Sciences (p. 39)
- Food and Resource Economics (p. 43)
- Food Science and Human Nutrition (p. 45)
- Horticultural Sciences (p. 50)
- Microbiology and Cell Science (p. 58)
- Plant Molecular and Cellular Biology (p. 61)
- Plant Pathology (p. 62)
- School of Forest, Fisheries, and Geomatics Sciences (p. 64)
- School of Natural Resources and Environment (p. 71)

- Soil, Water, and Ecosystem Sciences (p. 79)
- Wildlife Ecology and Conservation (p. 81)

College of the Arts

Click here (p. 357) for further information about the *College of the Arts*.

Departments

- College of the Arts Interdisciplinary Program (p. 357)
- Digital Worlds Institute (p. 358)
- School of Art and Art History (p. 360)
- School of Music (p. 369)
- School of Theatre and Dance (p. 376)

Warrington College of Business

Click here (p. 435) for further information about the *Warrington College of Business*.

Departments

- College of Business Interdisciplinary Programs in Business Administration (p. 436)
- Finance, Insurance, and Real Estate (p. 451)
- Fisher School of Accounting (p. 460)
- Information Systems and Operations Management (p. 465)
- Management (p. 472)
- Marketing (p. 483)

College of Dentistry

Click here (p. 85) for further information about the *College of Dentistry*.

- Dental Sciences (p. 86)

College of Design, Construction and Planning

Click here (p. 88) for further information about the *College of Design, Construction and Planning*.

Departments

- DCP Interdisciplinary Programs (p. 89)
- Interior Design (p. 98)
- Landscape Architecture (p. 100)
- M.E. Rinker, Sr. School of Construction Management (p. 103)
- School of Architecture (p. 110)
- Urban and Regional Planning (p. 114)

College of Education

Click here (p. 118) for further information about the *College of Education*.

Departments

- Human Development and Organizational Studies in Education (p. 118)
- School of Teaching and Learning (p. 145)
- Special Education, School Psychology and Early Childhood Studies (p. 177)

Herbert Wertheim College of Engineering

Click here (p. 388) for further information about the *Herbert Wertheim College of Engineering*.

Departments

- Agricultural and Biological Engineering Department (p. 388)
- Chemical Engineering Department (p. 392)
- Civil and Coastal Engineering Department (p. 395)
- Computer and Information Science and Engineering Department (p. 400)
- Electrical and Computer Engineering Department (p. 407)
- Engineering Education Department (p. 411)
- Environmental Engineering Sciences Department (p. 416)
- Industrial and Systems Engineering Department (p. 419)
- J. Crayton Pruitt Family Department of Biomedical Engineering (p. 421)
- Materials Science and Engineering Department (p. 424)
- Mechanical and Aerospace Engineering Department (p. 429)
- Nuclear and Radiological Engineering Department (p. 435)

College of Health and Human Performance

Click here (p. 185) for further information about the *College of Health and Human Performance*.

Departments

- Applied Physiology and Kinesiology (p. 185)
- Health Education & Behavior (p. 188)
- Health and Human Performance (p. 190)
- Sport Management (p. 192)
- Tourism, Hospitality, and Event Management (p. 194)

College of Journalism and Communications

Click here (p. 196) for further information about the *College of Journalism and Communications*.

- Mass Communication (p. 197)

College of Liberal Arts and Sciences

Click here (p. 201) for further information about the *College of Liberal Arts and Sciences*.

Departments

- Anthropology Department (p. 202)
- Astronomy Department (p. 205)
- Biology Department (p. 207)
- Center for Latin American Studies (p. 211)
- Chemistry Department (p. 214)
- Classics Department (p. 217)
- Computer and Information Science and Engineering Department (p. 220)
- Department of Languages, Literatures and Cultures (p. 222)
- Economics Department (p. 225)

- English Department (p. 226)
- Gender, Sexuality, and Women's Studies Department (p. 228)
- Geography Department (p. 231)
- Geological Sciences Department (p. 233)
- History Department (p. 236)
- Interdisciplinary Department (p. 239)
- Linguistics Department (p. 243)
- Mathematics Department (p. 245)
- Philosophy Department (p. 248)
- Physics Department (p. 250)
- Plant Molecular and Cellular Biology Department (p. 253)
- Political Science Department (p. 255)
- Psychology Department (p. 260)
- Religion Department (p. 264)
- Sociology and Criminology & Law Department (p. 266)
- Spanish and Portuguese Studies Department (p. 270)
- Statistics Department (p. 274)

College of Medicine

Click here (p. 276) for further information about the *College of Medicine*.

Departments

- College of Medicine Interdisciplinary Programs (p. 280)
- Biochemistry and Molecular Biology (p. 296)
- Biostatistics (p. 299)
- Epidemiology (p. 302)
- Health Outcomes and Biomedical Informatics (p. 305)
- Molecular Genetics and Microbiology (p. 306)

College of Nursing

Click here (p. 308) for further information about the *College of Nursing*.

- Nursing Sciences (p. 309)

College of Pharmacy

Click here (p. 310) for further information about the *College of Pharmacy*.

Departments

- Medicinal Chemistry Department (p. 311)
- Pharmaceutical Outcomes and Policy Department (p. 314)
- Pharmaceutics Department (p. 318)
- Pharmacodynamics Department (p. 321)
- Pharmacotherapy and Translational Research Department (p. 325)

College of Public Health and Health Professions

Click here (p. 330) for further information about the *College of Public Health and Health Professions*.

Departments

- College of PHHP Interdisciplinary Programs (p. 331)
- Biostatistics (p. 339)

- Clinical and Health Psychology (p. 342)
- Environmental and Global Health (p. 344)
- Epidemiology (p. 347)
- Health Services Research, Management and Policy (p. 351)
- Speech, Language, and Hearing Sciences (p. 353)

College of Veterinary Medicine

Click here (p. 378) for further information about the *College of Veterinary Medicine*.

- Veterinary Medical Sciences (p. 383)

Note

For information about **majors and concentrations**, visit <https://gradcatalog.ufl.edu/graduate/programs-college/>.

Expanding subheadings and printing/saving to PDF: To view all subheadings on a page or to print/save the fully expanded PDF of the page, please use the print options button on the orange toolbar at the top of each page.

Catalog updates: The information on this page is current as of August 2025, with revisions made to the underlying degree table each semester as new programs become available. In the interim, contact individual programs for further updates.

Updates to this catalog should be submitted by the academic units each term via the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>). Please also feel free to report any revisions or discrepancies via email to grad-catalog@ufl.edu. Updates are appreciated throughout the entire year.

College of Agricultural and Life Sciences

Dean: K. Migliaccio

The College of Agricultural and Life Sciences offers academic programs and grants advanced degrees in 14 departments and the Schools of Forest Resources and Conservation, and Natural Resources and Environment. These academic units are all a part of the Institute of Food and Agricultural Sciences (IFAS). Additional components of IFAS include 12 research and education centers located throughout the state and cooperative extension offices in each of the 67 counties of the state.

For more information, please see our website: <http://cals.ufl.edu>.

Departments

- Agricultural and Biological Engineering (p. 15)
 - Agricultural and Biological Engineering (CALS) (p. 16)
- Agricultural Education and Communication (p. 18)
 - Agricultural Education and Communication (p. 18)
- Agronomy (p. 20)
 - Agronomy (p. 21)
- Animal Sciences (p. 23)
 - Animal Molecular and Cellular Biology (p. 23)
 - Animal Sciences (p. 24)
- CALS Interdisciplinary Program (p. 26)
 - Genetics and Genomics (CALS) (p. 28)

- Entomology and Nematology (p. 31)
 - Entomology and Nematology (p. 32)
 - Plant Medicine (p. 34)
- Family, Youth and Community Sciences (p. 39)
 - Family, Youth and Community Sciences (p. 39)
 - Youth Development and Family Sciences (p. 41)
- Food and Resource Economics (p. 43)
 - Food and Resource Economics (p. 44)
- Food Science and Human Nutrition (p. 45)
 - Food Science (p. 46)
 - Food Science and Human Nutrition (p. 48)
 - Nutritional Sciences (p. 49)
- Horticultural Sciences (p. 50)
 - Horticultural Sciences (p. 52)
 - Plant Breeding (p. 55)
- Microbiology and Cell Science (p. 58)
 - Microbiology and Cell Science (p. 59)
- Plant Molecular and Cellular Biology (p. 61)
 - Plant Molecular and Cellular Biology (CALS) (p. 61)
- Plant Pathology (p. 62)
 - Plant Pathology (p. 63)
- School of Forest, Fisheries, and Geomatics Sciences (p. 64)
 - Fisheries and Aquatic Sciences (p. 66)
 - Forest Resources and Conservation (p. 68)
- School of Natural Resources and Environment (p. 71)
 - Interdisciplinary Ecology (p. 77)
- Soil, Water, and Ecosystem Sciences (p. 79)
 - Soil, Water, and Ecosystem Sciences (p. 80)
- Wildlife Ecology and Conservation (p. 81)
 - Wildlife Ecology and Conservation (p. 83)

Faculty

GRADUATE FACULTY APPOINTED TO THE COLLEGE OF AGRICULTURAL AND LIFE SCIENCES

Associate Professor

- Adams, Alison Eve
- Koeser, Andrew K.
- Marble, Stephen Christopher

Assistant Professor

- Barry, Debra Marie-Hope
- Revynthi, Alexandra
- Sidhu, Sudeep Singh

Other

- Zhuang, Yilin

Scientist

- Hendrickx, Saskia Carola

Research Assistant Professor

- Chagaris, David D.

Assistant Extension Scientist

- Toledo, Izabella Maria Michelon

Assistant Research Scientist

- Elborai, Fahiem Elsayeed

For the list of faculty associated with each department within CALS, please consult the faculty tab on each of the individual departmental listings within this catalog.

Agricultural and Biological Engineering Department

Chair: G. Kiker

Graduate Coordinator: TBA

The Master of Science and Doctor of Philosophy degrees are offered, along with graduate programs in agricultural and biological engineering in the areas of agricultural operations management and applied sciences, through the College of Agricultural and Life Sciences. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The Master of Science and Doctor of Philosophy in the agricultural operations management area of specialization provide for scientific training and research in technical agricultural management. Typical plans of study focus on advanced training in environmental systems management, production systems management, construction and process management, and technical sales management.

For students with basic science degrees, the Master of Science and Doctor of Philosophy programs with a specialization in applied sciences through the College of Agricultural and Life Sciences provide advanced training in problem-solving capabilities, interdisciplinary research, and methods for applying science to real-world problems and issues. Typical emphasis is on:

1. the use of engineering methods and approaches, such as mathematical modeling, optimization, and information technologies, in the application of science to problems of various spatial and temporal scales and
2. an interdisciplinary experience in research at the doctoral level.

The requirements for a master's degree normally take 2 years to complete. The time required for the Doctor of Philosophy degree depends partly on the research topic but takes typically 3 to 4 years.

For more information about the program, please visit the program link below and the graduate studies pages on the departmental website at <http://www.abe.ufl.edu>.

Faculty

Professor

- Burks, Thomas Francis
- Dukes, Michael D.
- Fraisse, Clyde William
- Graham, Wendy Dimbero
- Hoogenboom, Gerrit
- Judge, Jasmeet
- Kiker, Gregory A.
- Lee, Won Suk
- Li, Changying
- Migliaccio, Kati White
- Mukhtar, Saqib
- Muneeppeerakul, Rachata
- Shukla, Sanjay
- Welt, Bruce Ari

Associate Professor

- Ampatzidis, Ioannis
- Bayabil, Haimanote Kebede
- Bean, Eban Zachary
- Bliznyuk, Nikolay A.
- Correll, Melanie J.
- Medeiros, Henry Ponti
- Pullammanappallil, P. C.
- Reyes-De-Corcuera, Jose I.

Assistant Professor

- Boz Ozdemir, Ziyne
- Choi, Daeun
- Gorucu, Serap
- Guzman Gutierrez, Sandra Milena
- Hofstetter, Daniel William
- Martin-Ryals, Ana D.
- Najibi, Nasser
- Pavan, Willingthon
- Sharma, Vivek
- Wang, Dengjun
- Wang, Xu
- Watson, Jonathan A.
- Yu, Ziwen
- Zhang, Ying

Distinguished Professor

- Munoz-Carpena, Rafael

Senior Lecturer

- Pelletier, William
- Scholtz, Richard V.

Majors

- Agricultural and Biological Engineering (CALS) (p. 16)

Affiliated Faculty

- De Vries, Albert
Professor
- Her, Young Gu
Associate Professor
- Menezes, Amor
Associate Professor
- Schueller, John Kenneth
Professor
- Zhuang, Yilin
Other

Agricultural and Biological Engineering (CALS)

Program Information

The degrees of Master of Science, Master of Engineering, and Doctor of Philosophy are offered with graduate programs in agricultural and biological engineering through the College of Engineering. Students must have an undergraduate or graduate degree in Engineering or meet specific articulation requirements in order to pursue an advanced degree in engineering.

For students without an engineering degree, The Master of Science and Doctor of Philosophy degrees in agricultural and biological engineering are offered in the areas of agricultural operations management and applied science through the College of Agricultural and Life Sciences. Students must have a degree in a related field or meet specific articulation requirements.

A combination B.S./M.S. or B.S./M.E. for Engineering students program allows up to 12 graduate credits to be double-counted toward fulfillment of both degrees. Contact the graduate coordinator for qualifications and details. A 30-credit, nonthesis master's degree program is also available to students interested in completing the requirements in 1 year.

The Master of Science, Master of Engineering, and Doctor of Philosophy (Engineering) degrees are offered in the following areas of research:

Agricultural production engineering includes development and application of precision agriculture concepts and tools, weather and climate risk in agriculture, decision support systems, food security, pesticide application, post-harvest operations robotics and other machine systems and environmental control systems. Applications to space biology are included in cooperation with NASA at Kennedy Space Center.

Biological engineering includes includes biocomplexity analysis, ecological modeling, risk and decision analysis, bioprocess design, plant biotechnology, process microbiology, food process engineering, environmental biotechnology, bioreactors, and packaging science.

Information systems includes development and application of GIS and remote sensing, communications, mathematical modeling, data solutions, and expert systems techniques to biological and agricultural systems.

Land and water resources includes soil-water-plant relations, irrigation, water quality, watershed hydrology, BMP and TMDL studies, hydrologic modeling, ecological restoration, environmental fate and transport of nanoparticles, waste management, and water reuse.

Students also may choose to participate in interdisciplinary concentrations in hydrologic sciences, geographic information sciences, particle science and technology, and interdisciplinary ecology.

The Master of Science and Doctor of Philosophy (CALS) in the agricultural operations management area of specialization provide for scientific training and research in technical agricultural management. Typical plans of study focus on advanced training in environmental systems management, production systems management, construction and process management and technical sales management.

In addition, for students with basic science degrees, the Master of Science and Doctor of Philosophy programs with a specialization in **applied sciences** through the College of Agricultural and Life Sciences provides advanced training in problem-solving capabilities, interdisciplinary research, and methods for applying science to real-world problems and issues. Typical emphasis is on:

1. the use of engineering methods and approaches, such as mathematical modeling, optimization, and information technologies, in application of science to problems of various spatial and temporal scales; and
2. an interdisciplinary experience in research at the doctoral level.

The requirements for a master's degree normally take 2 years to complete. The length of time required for the Doctor of Philosophy degree depends partly on the research topic, but normally takes 3 to 4 years.

Additional information can also be found on the graduate studies pages on the department website at www.abe.ufl.edu (<http://www.abe.ufl.edu>).

Degrees Offered

Degrees Offered with a Major in Agricultural and Biological Engineering

- Doctor of Philosophy
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Global Systems Agroecology
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Agroecology
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Agricultural and Biological Engineering Departmental Courses

Code	Title	Credits
ABE 5009	Control Methods in SmartAg Systems	3
ABE 5038	Recent Developments and Applications in Biosensors	3
ABE 5152	Fluid Power Circuits and Control	3

ABE 5310	Advanced Controlled Environment Agriculture Systems Design	3
ABE 5442	Advanced Agricultural Process Engineering	3
ABE 5643C	Biological Systems Modeling	3
ABE 5646	Biological and Agricultural Systems Simulation	3
ABE 5648	Modeling Coupled Natural-Human Systems	3
ABE 5653	Rheology and Mechanics of Agricultural and Biological Materials	3
ABE 5663	Advanced Applied Microbial Biotechnology	3
ABE 5707C	Agricultural Waste Management	3
ABE 5805	Advanced Life Cycle Assessment in Water-Energy-Food Systems	3
ABE 5815C	Food and Bioprocess Engineering Design	4
ABE 5936	Writing Grant Proposals for Scholarships and Fellowships	2
ABE 6005	Applied Control for Automation and Robots	3
ABE 6017	Stochastic Modeling in Ecology and Hydrology	3
ABE 6031	Instrumentation in Agricultural Engineering Research	3
ABE 6035	Advanced Remote Sensing: Science and Sensors	3
ABE 6037C	Remote Sensing in Hydrology	3
ABE 6165	Comp Vis Deep Learn Agri Sys	3
ABE 6252	Advanced Soil and Water Management Engineering	3
ABE 6254	Simulation of Agricultural Watershed Systems	3
ABE 6265	Vadose Zone Modeling	3
ABE 6266	Nanotechnology in Water Research	3
ABE 6615	Advanced Heat and Mass Transfer in Biological Systems	3
ABE 6644	Agricultural Decision Systems	3
ABE 6645C	Computer Simulation of Crop Growth and Management Responses	3
ABE 6649C	Advanced Biological Systems Modeling	3
ABE 6654C	Advanced Bio-Based Products from Renewable Resources	3
ABE 6840	Data Diagnostics	3
ABE 6905	Individual Work in Agricultural and Biological Engineering	1-4
ABE 6910	Supervised Research	1-5
ABE 6931	Seminar	1
ABE 6933	Special Topics in Agricultural and Biological Engineering	1-4
ABE 6940	Supervised Teaching	1-5
ABE 6971	Research for Master's Thesis	1-15
ABE 6972	Research for Engineer's Thesis	1-15
ABE 6974	Nonthesis Project	1-6
ABE 6986	Applied Mathematics in Engineering and Agriculture	3
ABE 7979	Advanced Research	1-12
ABE 7980	Research for Doctoral Dissertation	1-15
AGG 5607	Communicating in Academia	3
AOM 5456	Applied Methods in SmartAg Systems	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3
STA 6348	Bayesian Analysis for Machine Learning and Uncertainty Quantification	3
STA 6703	Statistical Machine Learning	3

STA 6709	Spatial Statistics & Hierarchical Modeling for Dependent Data	3

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Agricultural & Biological Engineering (PHD)

SLO 1 Knowledge

Employ mathematics, science and engineering principles to solve problems in the discipline of Agricultural and Biological Engineering

SLO 2 Skills

Apply, analyze, and synthesize content knowledge to plan and conduct scholarly activities that make original contributions to the knowledge base in the field of study by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3 Professional Behavior

Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication.

Agricultural & biological engineering (MS)

SLO 1 Knowledge

Identifies, describes, explains, and applies the mathematics, science and engineering principles of the discipline of Agricultural and Biological Engineering.

SLO 2 Skills

Apply, analyze, and synthesize content knowledge to solve problems by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental,

social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3 Professional Behavior

Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication

Agricultural Education and Communication Department

Chair: B. E. Myers

Graduate Coordinator: J. C. Bunch

The Department of Agricultural Education and Communication offers the degrees of Master of Science and Doctor of Philosophy. Graduate students who obtain a degree in Agricultural Education and Communication will focus their study in one of four areas of specialization. The areas of specialization are agricultural communication, agricultural education, extension education, and leadership development. These degree programs are individually tailored to meet the student's unique needs for professional development. The requirements for each degree are described in the Graduate Degrees (p. 778) section of the University of Florida Graduate Catalog. More information about our program can be found by following the link below.

Majors

- Agricultural Education and Communication (p. 18)

Faculty

Professor

- Kistler, Mark J.
- Lundy, Lisa Katherine
- Myers, Brian E.
- Roberts, Thomas G.
- Stedman, Nicole Lamee
- Telg, Ricky W.
- Warner, Laura Anne

Associate Professor

- Baker, Lauri May
- Benge, Matthew Paul
- Bunch, James Charles
- Diaz, John M.
- Galindo, Sebastian
- Loizzo, Jamie Lynn
- Monaghan, Paul F.
- Sowcik, Matthew J.

Assistant Professor

- Ahn, Jaehyun
- Beattie, Peyton Nicole
- Bush, Sarah A.
- Easterly, Ralph G.
- Greenhaw, Laura Lee
- Hundemer, Sarah E.

- Jagger, Carla
- Lamino Jarmillo, Pablo
- White, Shane

Research Associate Professor

- Stofer, Kathryn Anne

Lecturer

- Coers, Natalie
- Young, Heather L.

Affiliated Faculty

- Barry, Debra Marie-Hope
Assistant Professor

Agricultural Education and Communication

Program Information

The Master of Science program is designed to prepare graduates for domestic and international teaching, research, extension, administrative and leadership positions in both the public and private sectors. Courses are taught in an agricultural and natural resources context and are broadly applicable in educational, business, government, and agency settings. The Master of Science program is delivered on-campus and online via the AEC e-Learning Institute (eLI). The Doctor of Philosophy degree program is primarily designed to prepare graduates for academic positions in teaching, research, and extension within the realm of Agricultural Education and Communication. In addition, graduates may obtain positions in administration, human resource management, or training and development.

The **Agricultural Communication** specialization prepares students for professional communication careers in or dealing with agriculture and agribusiness. It is intended primarily for students who enter with a bachelor's degree in journalism, agricultural communication/journalism, advertising, broadcasting, public relations, or related fields. Graduates of this option are employed in:

1. communication or management positions with the numerous commodity or special-interest associations in agriculture and related fields;
2. communication support positions in agricultural extension and research information departments of land-grant universities, agencies of USDA, state Departments of Agriculture, and agricultural development projects overseas;
3. advertising and public relations positions with agribusiness firms or commodity associations; and
4. media positions involved in reporting on agriculture, agribusiness, and natural resource issues.

Students in Agricultural Communication also develop strong skills/application in media writing, production, campaign strategies and/or Web design/desktop publishing. Graduates become prepared for positions in both public and private sectors in both industry and educational settings.

The **Agricultural Education** specialization is designed to enhance the careers of those employed in the educational professions in agriculture and natural resources. Regardless if one is employed in public school

teaching, community college instruction, or training and development in agribusiness, students gain valuable knowledge and experience in designing, implementing, and evaluating educational programs. In addition, graduates of the program command added depth in the understanding of the teaching and learning process. This specialization may be designed to allow students to complete the requirements of teacher certification while completing their master's degree program. The PhD is a research-oriented degree that has a primary focus of preparing candidates to assume faculty positions in colleges or university teacher education programs. Candidates develop an individual program of study that provides a comprehensive knowledge of teaching and learning processes. The degree also seeks to extend the candidate's development by providing instruction, research opportunities, and experiences that enhance the depth and breadth of the candidate's prior learning opportunities.

The **Extension Education** specialization is designed to prepare students for careers in the Cooperative Extension service, outreach education, and/ or other international agencies. Through coursework and research, students will gain valuable knowledge and experience in designing, implementing, and evaluating educational programs. Extension graduate students choose between a domestic or international focus in regards to coursework and/or research. In addition, graduates of the program command tremendous depth of the teaching and learning process. Candidates who select the **Extension Education** specialization develop an individual program of study that focuses on such topics as program development, experiential education, the change process, educational technologies and extension, program evaluation and organizational accountability, administration and leadership, and international extension. Graduates become prepared for a variety of positions including extension specialists, county and district extension directors, outreach education coordinators for private and public agencies, 4-H Extension agents and specialists, and educator specialists with international agencies.

The **Leadership Development** specialization is designed to prepare students for educational leadership, training, and outreach positions in agricultural, extension, community and governmental agencies. Course work in the major will focus on a core of agricultural courses along with emphasis in designing educational/training programs, professional presentation enhancement, leadership development, teaching/training methods, and interpersonal communication. Candidates who select the **Leadership Development** specialization develop an individual program that focuses on leadership theory and measurement, critical and creative thinking, and leadership in cross-cultural settings. Students will encompass a strong research and theory-based program with a strong knowledge of training and development, and human resource management. Graduates become prepared for positions in both public and private sectors in both industry and educational settings.

Degrees Offered

Degrees Offered with a Major in Agricultural Education and Communication

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Agricultural Education and Communication Departmental Courses

Code	Title	Credits
AEC 5032	Agricultural and Natural Resources Media Writing	3
AEC 5034	Digital Media Production in Agriculture and Natural Resources	3
AEC 5037	Agricultural and Natural Resources Media Production	3
AEC 5060	Public Opinion and Agricultural and Natural Resource Issues	3
AEC 5074	Agriculture, Resources, People, and the Environment: A Global Perspective	3
AEC 5206	Teaching Methods in Agricultural Education	3
AEC 5227	Teaching in Agricultural Education Laboratory Facilities	3
AEC 5302	Professional Skill Development in Agriscience Education I	1-3
AEC 5324	Philosophy and Development of Agricultural Education	3
AEC 5416	Critical and Creative Thinking in Problem Solving and Decision Making	3
AEC 5440	Interpersonal Leadership in Agricultural and Life Sciences	3
AEC 5454	Leadership Development for Extension and Community Nonprofit Organizations	3
AEC 5501	Professional Skill Development in Agriscience Education II	1-3
AEC 5541	Communication and Instructional Technologies in Agricultural and Life Sciences	3
AEC 5544	Curriculum Development and Assessment Techniques in Emerging Agricultural Technologies	3
AEC 5545	Special Methods in Teaching Agriculture	3
AEC 5546	Program Planning in Agricultural Education	3
AEC 6210	Designing Educational Programs in Agricultural Settings	3
AEC 6211	Delivering Educational Programs in Agricultural Settings	3
AEC 6212	Teacher Education in Agriculture	3
AEC 6223	Participatory Arts-Based Research Methods in Agriculture and Natural Resources	3
AEC 6229	Laboratory Instruction: Theory and Practice	3
AEC 6300	Methodology of Planned Change	3
AEC 6316	From America to Zimbabwe: An Overview of International Extension Systems	3
AEC 6321	The Land Grant University and University Governance	3
AEC 6325	History and Philosophy of Agricultural Education	3
AEC 6327	Partisanship in Agriculture and Natural Resources	3
AEC 6411	Organizational Leadership in Agriculture and Life Sciences	3
AEC 6419	Communication and Competencies for Global Leadership	3
AEC 6426	Development of a Volunteer Leadership Program	3

AEC 6501	Developing and Conducting Needs Assessments in Extension Settings	3
AEC 6512	Program Development in Extension Education	3
AEC 6540	Agricultural and Natural Resources Communications Theory and Strategies	3
AEC 6543	Teaching and Learning Theory: Applications in Agricultural Education	3
AEC 6552	Evaluating Programs in Extension Education	3
AEC 6611	Agricultural and Extension Adult Education	3
AEC 6704	Extension Administration and Supervision	3
AEC 6767	Research Strategies in Agricultural Education and Communication	3
AEC 6905	Problems in Agricultural and Extension Education	1-3
AEC 6910	Supervised Research	1-5
AEC 6912	Nonthesis Research in Agricultural and Extension Education	1-3
AEC 6932	Special Topics In Agricultural Education and Communication	1-3
AEC 6933	Seminar in Agricultural Education and Communication	1-3
AEC 6940	Supervised Teaching	1-5
AEC 6945	Practicum in Agricultural Education and Communication	1-9
AEC 6947	Experiential Learning in Agricultural Education	3
AEC 6971	Research for Master's Thesis	1-15
AEC 6980	Thesis/Dissertation Proposal Development	3
AEC 7979	Advanced Research	1-12
AEC 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Agricultural Education & Communications (PHD)

SLO 1 Knowledge

Summarize contemporary and foundational theory and research in the selected specialization

SLO 2 Knowledge

Apply, analyze and synthesize content knowledge, evolving concepts and philosophies in the selected specialization to solve problems by identifying component parts, relationships and ideas.

SLO 3 Skills

Apply visual and nonvisual techniques in the use of instructional materials and methods.

SLO 4 Skills

Apply concepts and principles related to design, implementation and evaluation of formal and non-formal education and/or training and development programs.

SLO 5 Skills

Apply principles, practices and strategies for conducting behavioral research in agricultural and natural resource professions.

SLO 6 Professional Development

Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication.

Agricultural Education & Communications (MS)

SLO 1 Knowledge

Display competency in contemporary and foundational theory and research in their selected specialization.

SLO 2 Knowledge

Apply, analyze and synthesize content knowledge and evolving concepts and philosophies in the selected specialization to solve problems by identifying component parts, relationships and ideas.

SLO 3 Skills

Apply visual and nonvisual techniques in the use of instructional materials and methods.

SLO 4 Skills

Apply concepts and principles related to design, implementation and evaluation of formal and non-formal education and/or training and development programs.

SLO 5 Skills

Apply principles, practices and strategies for conducting behavioral research in agricultural and natural resource professions.

SLO 6 Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication.

Agronomy Department

Interim Department Chair: J. Ferrell

Graduate Coordinator: K. E. Kenworthy

The Agronomy Department offers the degrees of Doctor of Philosophy and Master of Science (thesis and non-thesis options) in agronomy with specializations in plant physiology, ecology, management and nutrition, weed science (terrestrial and aquatic), and plant breeding and genetics. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Graduate programs emphasize the development and subsequent application of basic principles in each specialization to the management of agricultural and natural ecosystems in Florida and throughout the world. The continuing need for increased plant production for food, fiber and energy to meet the demands of a rapidly escalating population is reflected in departmental research programs. When compatible with a student's program and permitted by prevailing circumstances, some thesis and dissertation research may be conducted wholly or in part in other countries.

Students seeking a graduate program in the Agronomy Department should hold a Bachelor of Science degree from an accredited college or university with a major in an area of plant science, or closely related discipline. A science background with basic courses in biology, botany, mathematics, chemistry, and physics is required of new graduate students.

For more information, please see <https://agronomy.ifas.ufl.edu/>.

Majors

- Agronomy (p. 21)

Faculty

Professor

- Altpeter, Fredy
- Batista Dubeux, Jose Carlos
- Burton, Michael G.
- Enloe, Stephen Frederick
- Ferrell, Jason Arden
- Flory, Stephen
- Gilbert, Robert A.
- Kakani, Vijaya Gopal
- Kenworthy, Kevin E.
- Macdonald, Gregory E.
- Odero, Dennis C.
- Sellers, Brent Alan
- Tillman, Barry
- Vansanten, Edzard
- Wang, Jianping

Associate Professor

- Babar, Md Ali
- Brym, Zachary Thomas
- Gettys, Lyn A.
- Laughinghouse, Haywood D.
- Rios, Esteban Fernando
- Sandhu, Hardev S.

Assistant Professor

- Borgato, Ednaldo A.
- Hailegnaw, Niguss Solomon
- Hammond, William
- Hernandez Jarquin, Juan Diego
- Leary, James J K
- Lopes De Souza, Cleber Henrique
- Osorio Wallau, Marcelo
- Petelewicz, Pawel
- Russell, Eli
- Singh, Hardeep
- Wilson, Chris H.
- Zhao, Chang

Other

- Bultemeier, Brett W.

Lecturer

- Estrada, James Anthony
- Koenig, Rosalie L.

Distinguished Professor

- Sollenberger, Lynn E.

Affiliated Faculty

- Sidhu, Sudeep Singh
Assistant Professor
- Warner, Laura Anne
Professor

Agronomy

Program Information

The Agronomy Department offers the degrees of Doctor of Philosophy and Master of Science (thesis and non-thesis option) in agronomy with specializations in plant physiology, ecology, management and nutrition, weed science (terrestrial and aquatic), and plant breeding and genetics.

Graduate programs emphasize the development and subsequent application of basic principles in each specialization to the management of plants in Florida and throughout the world. The continuing need for increased plant production for food, fiber and energy to meet the demands of a rapidly escalating population is reflected in departmental research programs. When compatible with a student's program and permitted by prevailing circumstances, some thesis and dissertation research may be conducted wholly or in part in other countries.

Students seeking a graduate program in the Agronomy Department should hold a Bachelor of Science degree from an accredited college or university with a major in an area of plant science, or closely related discipline. A science background with basic courses in biology, botany, mathematics, chemistry, and physics is required of new graduate students.

Degrees Offered

Degrees Offered with a Major in Agronomy

- Doctor of Philosophy
 - without a concentration
 - concentration in Global Systems Agroecology
 - concentration in Toxicology
 - concentration in Tropical Conservation and Development
- Master of Science
 - without a concentration
 - concentration in Agroecology
 - concentration in Geographic Information Systems
 - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Agronomy Departmental Courses

Code	Title	Credits
AGR 5230C	Florida Grassland Agroecosystems	4
AGR 5266C	Field Plot Techniques	3
AGR 5277C	Tropical Crop Production	3
AGR 5307	Molecular Genetics for Crop Improvement	3
AGR 5321C	Genetic Improvement of Plants	3
AGR 5444	Ecophysiology of Crop Production	3
AGR 5511	Crop Ecology	3
AGR 6233	Tropical Grassland Agroecosystems	3
AGR 6237C	Research Techniques in Forage Evaluation	3
AGR 6305	Plant Chromosomes and Genomes	3
AGR 6322	Advanced Plant Breeding	3
AGR 6325L	Plant Breeding Techniques	1
AGR 6422C	Environmental Crop Nutrition	3
AGR 6442C	Physiology of Agronomic Plants	4
AGR 6905	Agronomic Problems	1-5
AGR 6913	Supervised Extension-Agronomy	3
AGR 6932	Topics in Agronomy	1-3
AGR 6933	Graduate Agronomy Seminar	1
AGR 6940	Supervised Teaching	1-5
AGR 6971	Research for Master's Thesis	1-15
AGR 7306	Multi-Omic Integration for Applied Prediction Breeding	3
AGR 7979	Advanced Research	1-12
AGR 7980	Research for Doctoral Dissertation	1-15
ALS 5155	Global Agroecosystems	3
ALS 5932	Special Topics	1-4
ALS 6031	Project Team Research: Building Skills in Agrobiology	3
IPM 5305	Principles of Pesticides	3
PLS 5625	Upland Invasive Plant Management	3
PLS 5632C	Integrated Weed Management	3
PLS 5633	Aquatic Plant Management	3
PLS 6626	Invasive Plant Ecology	3
PLS 6655	Plant/Herbicide Interaction	3

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Agronomy (PhD)

SLO 1 Knowledge

Describe and explain theories and concepts in the basic plant sciences and in a chosen specialization (Crop Genetics and Breeding; Crop Physiology and Ecology; Crop Nutrition and Management; Weed Science).

SLO 2 Knowledge

Design and execute an innovative research plan and analyze, synthesize and interpret research results using appropriate experimental designs and statistical analyses.

SLO 3 Knowledge

Address and solve issues related to crop production and resource management in preparation for leadership roles in the discipline (in academia, government or the private sector).

SLO 4 Skills

Communicate effectively and professionally in oral and written form and in interpersonal relationships.

SLO 5 Professional Behavior

Conduct all scholarly activities, including teaching, research and outreach with collegiality, cultural sensitivity, and ethical practices.

Agronomy (MS)

SLO 1 Knowledge

Describe and explain theories and concepts in the basic plant sciences and in a chosen specialization (Crop Genetics and Breeding; Crop Physiology and Ecology; Crop Nutrition and Management; Weed Science).

SLO 2 Knowledge

Design and execute an innovative research plan and analyze, synthesize and interpret research results using appropriate experimental designs and statistical analyses.

SLO 3 Knowledge

Address and solve issues related to crop production and resource management in preparation for leadership roles in the discipline (in academia, government or the private sector).

SLO 4 Skills

Communicate effectively and professionally in oral and written form and in interpersonal relationships.

SLO 5 Professional Behavior

Conduct all scholarly activities, including teaching, research and outreach with collegiality, cultural sensitivity, and ethical practices.

Animal Sciences Department

Chair: J. Arthington

Graduate Coordinators: A. Faciola (Animal Sciences) and J. Bromfield (AMCB)

Animal Sciences is an academic department of the College of Agriculture and Life Sciences (CALS) (<https://cals.ufl.edu/>), a unit of the Institute of Food and Agricultural Sciences (IFAS) (<https://ifas.ufl.edu/>). Creating new solutions to tomorrow's problems underlies everything we do in the Animal Sciences Program. In the areas of teaching, research, and extension, our faculty integrate the most modern technologies available with personal expertise and attention to the needs of students and our industry. For more information about the Animal Sciences program, contact Antonio Faciola and for information about AMCB, reach out to John Bromfield or visit the program's website at <https://animal.ifas.ufl.edu/graduate> (<https://animal.ifas.ufl.edu/graduate/>).

Majors

- Animal Molecular and Cellular Biology (p. 23)
- Animal Sciences (p. 24)

Faculty

Professor

- Adesogan, Adegbola Tolulope
- Arthington, John David
- Capua, Ilaria
- Carr, Charles C.
- Dahl, Geoffrey E.
- De Vries, Albert
- DiLorenzo, Nicolas
- Havelaar, Arie Hendrik
- Mateescu, Raluca
- Pringle, T Dean
- Santos, Jose Eduardo

Associate Professor

- Binelli, Mario
- Brooks, Samantha Ann
- Faciola, Antonio
- Jiang, Zongliang

- Miller Cushon, Emily Kathryn
- Moriel, Philippe
- Scheffler, Jason M.
- Scheffler, Tracy Leigh
- Tenbroeck, Sandra Hodge
- Thrift, Todd A.
- Vyas, Diwakar
- Warren, Lori Kay
- Wickens, Carissa Lee

Assistant Professor

- Batistel, Fernanda
- Daigneault, Bradford William
- Gonella Diaza, Angela Maria
- Marcondes De Rezende, Fernanda
- Yu, Haipeng
- Yue, Feng

Distinguished Professor

- Hansen, Peter J.

Affiliated Faculty

- Bisinotto, Rafael Sisoneto
Associate Professor
- Bromfield, John James
Associate Professor
- Eshraghi, Aria
Assistant Professor
- Galvao, Klibs Neblan
Professor
- Jeong, Kwangcheol Casey
Professor
- Nelson, Corwin D.
Associate Professor
- Toledo, Izabella Maria Michelon
Assistant Extension Scientist
- Wohlgemuth, Stephanie
Research Assistant Professor

Animal Molecular and Cellular Biology

PROGRAM INFORMATION

The animal molecular and cell biology (AMCB) graduate program offers Master of Science and Doctor of Philosophy degrees. Faculty are drawn from these disciplines:

- Animal Sciences
- Biochemistry and Molecular Biology
- Large Animal Clinical Sciences
- Obstetrics and Gynecology
- Zoology

Early in the program, students choose a faculty supervisor who will ensure the quality of their research experience. Students may also do

optional rotations through the laboratories of one or more other faculty. The Annual Research Symposium features guest speakers and student research presentations. A weekly journal club and monthly seminars draw on the knowledge and diversity the campus offers in molecular and cell biology.

Core course requirements for the M.S. degree are BCH 5045 Graduate Survey of Biochemistry (4 cr.), registration in a 1-credit graduate seminar course and successful completion of a course on responsible and ethical conduct of research. Core course requirements for the Ph.D. include BCH 5413 Mammalian Molecular Biology and Genetics (3 cr.) and GMS 6421 Cell Biology (3-4 cr.), registration in two graduate seminar courses and successful completion of a course on responsible and ethical conduct of research.

Contact P.J. Hansen at pjhansen@ufl.edu or visit the program's website at <https://programs.ifas.ufl.edu/animal-molecular-and-cellular-biology/>

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN ANIMAL MOLECULAR AND CELLULAR BIOLOGY

- Doctor of Philosophy
 - no concentration
 - concentration in Domestic Animal Genomics
 - concentration in Reproductive Biotechnology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

ANIMAL SCIENCE DEPARTMENT COURSES

Code	Title	Credits
ANS 5446	Animal Nutrition	3
ANS 5935	Reproductive Biology Seminar and Research Studies	1
ANS 6040	Concepts in Applied Ethology	3
ANS 6255L	Dairy Farm Evaluation	2
ANS 6288	Experimental Techniques and Analytical Procedures in Meat Research	3
ANS 6312C	Applied Livestock Reproduction	3
ANS 6313	Current Concepts in Reproductive Biology	2
ANS 6379L	Techniques Genetics	2
ANS 6387	Genetic Analysis of Complex Traits in Livestock	3
ANS 6447	Ruminant Nutrition	4
ANS 6449	Vitamins	3
ANS 6452	Principles of Forage Quality Evaluation	3
ANS 6636	Meat Technology	3
ANS 6637	Quantitative Microbial Risk Assessment of Pathogens in Food Systems	3
ANS 6702	Physiology of the Mammary Gland and Lactation	2
ANS 6704	Mammalian Endocrinology	2
ANS 6711	Current Topics in Equine Nutrition and Exercise Physiology	2
ANS 6714	Current Topics in Microbial Physiology in Animals	1
ANS 6715	Gastrointestinal and Feed Microbiology	3

ANS 6716	Physiology in Farm Animals	1
ANS 6723	Mineral Nutrition and Metabolism	3
ANS 6751	Physiology of Reproduction	3
ANS 6775	Essentials of Livestock Immunology	1
ANS 6905	Problems in Animal Science	1-4
ANS 6910	Supervised Research	1-5
ANS 6932	Special Topics in Animal Science	1-3
ANS 6933	Graduate Seminar in Animal Science	1
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
ANS 6939	Animal Molecular and Cellular Biology Journal Colloquy	1
ANS 6940	Supervised Teaching	1-5
ANS 6942	Supervised Extension in the Animal Sciences	1-3
ANS 6971	Research for Master's Thesis	1-15
ANS 7979	Advanced Research	1-12
ANS 7980	Research for Doctoral Dissertation	1-15
PCB 6816	Thermal Physiology	1

Student Learning Outcomes

ANIMAL MOLECULAR & CELLULAR BIOLOGY (MS)

SLO 1 Knowledge

Identify, recall, appraise, and interpret the principles of molecular and cellular biology and their application to comparative biology

SLO 2 Skills

Design, conduct and draw sound conclusions on scientific experiments

SLO 3 Professional Behavior

Interact with peers and instructors with honesty, cultural sensitivity and effective communication

Animal Sciences

Program Information

The Department of Animal Sciences (<https://gradcatalog.ufl.edu/graduate/colleges-departments/agricultural-life-sciences/animal/>) offers the degrees of Master of Science (thesis and non-thesis) and Doctor of Philosophy in Animal Sciences with emphasis in beef or dairy cattle, swine, or equine.

Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The following informal specializations are available:

- Breeding, genetics and genomics
- Behavior
- Management
- Immunology
- Nutrition (nutritional physiology, nutrient metabolism, and feedstuff utilization)
- Physiology (environmental, lactational, muscle and reproductive)
- Molecular biology (embryology, endocrinology, and genetics)
- Meat science (meat processing, meat quality, muscle biology, and food safety)

Available formal concentration areas appearing on the transcript are listed here (<http://gradcatalog.ufl.edu/graduate/colleges-departments/agricultural-life-sciences/animal/animal/gradcatalog.ufl.edu/graduate/>)

colleges-departments/agricultural-life-sciences/animal/animal/#degreesofferedtext).

A student may work on a problem covering more than one area of study. Animal resources (beef cattle, dairy cattle, horses, swine, sheep, and laboratory animals) are available for use in various research programs. Nutrition, physiology, immunology, and meat laboratories are available for detailed chemical and carcass quality evaluations, and excellent computer facilities are available. Special arrangements may be made to conduct research at the various branch agricultural experiment stations throughout Florida.

Departmental and program prerequisites for admission to graduate study include a sound science background, with basic courses in microbiology, biology, mathematics, and chemistry. All courses in the animal sciences program area are acceptable for graduate credit as part of the candidate's major.

The Graduate School restricts graduate students from pursuing minors in academic units that contribute major credit toward their degree program. Therefore, graduate students majoring in Animal Sciences cannot pursue a minor in Food and Resource Economics, Food Science and Human Nutrition, Medicine-Biochemistry, and Veterinary Medical Sciences. In addition, undergraduate credits at the 3000–4000 level in the major of any of these listed academic units are not eligible to count toward degree requirements.

Combination Degree Program

Qualified students are encouraged to apply to the combination degree program. Acceptance into the program will allow both a bachelor's degree and a master's degree with a savings of one semester. Please contact the academic unit for more information regarding this opportunity.

Degrees Offered

Degrees Offered with a Major in Animal Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Animal Molecular and Cellular Biology
 - *optional second concentration in Domestic Animal Genomics*
 - concentration in Domestic Animal Genomics
 - concentration in Reproductive Biotechnology
- Master of Science
 - without a concentration
 - concentration in Animal Molecular and Cellular Biology
 - concentration in Domestic Animal Genomics
 - concentration in Reproductive Biotechnology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Doctoral Program Requirements

The Ph.D. program represents independent mastery of a field of knowledge and the successful pursuit of an independent research program. Requirements for the Ph.D. are more flexible and varied than those of other degrees. The general requirement is that the program be unified with clear objectives, and approved by the student's supervisory

committee. A total of 90 credits and a dissertation are required to complete this degree.

Master's Program Requirements

Requirements for the M.S. with a thesis include a research project with a minimum of 30 credit hours of which six are research credits (ANS 6971). Each student develops a degree plan that must be approved by their supervisory committee with final approval from the graduate coordinator. The M.S. non-thesis option is primarily designed for those students who are seeking opportunities in a field where research is not required for employment. A minimum of 32 credits is required to complete this degree. Each student develops a degree plan that must be approved by the student's supervisory committee with final approval from the graduate coordinator.

For more information visit <https://animal.ifas.ufl.edu/graduate/> (<https://animal.ifas.ufl.edu/graduate/>)

Animal Sciences Departmental Courses

Code	Title	Credits
ANS 5446	Animal Nutrition	3
ANS 5935	Reproductive Biology Seminar and Research Studies	1
ANS 6040	Concepts in Applied Ethology	3
ANS 6255L	Dairy Farm Evaluation	2
ANS 6288	Experimental Techniques and Analytical Procedures in Meat Research	3
ANS 6312C	Applied Livestock Reproduction	3
ANS 6313	Current Concepts in Reproductive Biology	2
ANS 6379L	Techniques Genetics	2
ANS 6387	Genetic Analysis of Complex Traits in Livestock	3
ANS 6447	Ruminant Nutrition	4
ANS 6449	Vitamins	3
ANS 6452	Principles of Forage Quality Evaluation	3
ANS 6636	Meat Technology	3
ANS 6637	Quantitative Microbial Risk Assessment of Pathogens in Food Systems	3
ANS 6702	Physiology of the Mammary Gland and Lactation	2
ANS 6704	Mammalian Endocrinology	2
ANS 6711	Current Topics in Equine Nutrition and Exercise Physiology	2
ANS 6714	Current Topics in Microbial Physiology in Animals	1
ANS 6715	Gastrointestinal and Feed Microbiology	3
ANS 6716	Physiology in Farm Animals	1
ANS 6723	Mineral Nutrition and Metabolism	3
ANS 6751	Physiology of Reproduction	3
ANS 6775	Essentials of Livestock Immunology	1
ANS 6905	Problems in Animal Science	1-4
ANS 6910	Supervised Research	1-5
ANS 6932	Special Topics in Animal Science	1-3
ANS 6933	Graduate Seminar in Animal Science	1
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
ANS 6939	Animal Molecular and Cellular Biology Journal Colloquy	1
ANS 6940	Supervised Teaching	1-5
ANS 6942	Supervised Extension in the Animal Sciences	1-3
ANS 6971	Research for Master's Thesis	1-15

ANS 7979	Advanced Research	1-12
ANS 7980	Research for Doctoral Dissertation	1-15
PCB 6816	Thermal Physiology	1

Additional Courses for Major Credit in Animal Sciences

Code	Title	Credits
AEB 5326	Agribusiness Financial Management	3
AEB 6385	Management Strategies for Agribusiness Firms	3
AEB 7182	Agricultural Risk Analysis and Decision Making	3
FOS 5205	Current Issues in Food Safety and Sanitation	3
FOS 5225C	Principles in Food Microbiology	4
FOS 5437C	Food Product Development	3
FOS 5732	Current Issues in Food Regulations	3
FOS 5126C	Psychophysical Aspects of Foods	3
FOS 6226C	Advanced Food Microbiology	4
FOS 6315C	Advanced Food Chemistry	4
FOS 6317C	Flavor Chemistry and Technology	3
FOS 6355C	Instrumental Analysis and Separations	5
FOS 6428C	Advanced Food Processing	4
FOS 6455C	Industrial Food Fermentations	3
HUN 5447	Nutrition and Immunity	3
HUN 6245	Advanced Human Nutrition	3
HUN 6301	Nutritional Aspects of Lipid Metabolism	3
HUN 6305	Nutritional Aspects of Carbohydrates	3
HUN 6321	Proteins and Amino Acids in Nutrition	3
VME 5244	Physiology: Organ Systems	4

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Animal Sciences (PHD)

SLO 1 Principles of Animal Sciences

Identify, interpret, and discuss the principles of the animal sciences with a deeper mastery of a chosen specialization.

SLO 2 Employ Scientific Methods

Employ scientific methods to critically appraise and devise solutions to problems in the animal sciences

SLO 3 Solve Problems and Generate New Information

Propose and deploy scientific methods to solve problems and generate new information.

SLO 4 Prepare Grants for Funding

Prepare grants for extramural funding during their PhD program.

SLO 5 Professional Behavior

Display ethical conduct and interact with others with honesty, cultural sensitivity, and respect.

SLO 6 Effective Communication

Communicate effectively in professional situations.

Animal sciences (MS)

SLO 1 Principles of Animal Sciences

Identify, interpret, and discuss the principles of the animal sciences with a deeper mastery of a chosen specialization.

SLO 2 Apply Scientific Methods

Apply scientific methods to problems in the animal sciences and develop new solutions to such problems.

SLO 3 Problem Solving Skills

Propose and deploy scientific methods to solve problems and generate new information.

SLO 4 Professional Behavior

Display ethical conduct and interact with others with honesty, cultural sensitivity, and respect.

SLO 5 Communicate Effectively

Communicate effectively in professional situations.

Interdisciplinary Department

- Genetics and Genomics (CALS) (p. 28)

Faculty

Professor

- Burris, Thomas P.
- Rathinasabapathi, Balasubramani

Affiliated Faculty

- Abisambra, Jose Francisco
Associate Professor
- Allen, William L.
Associate Professor
- Atkinson, Mark A.
Eminent Scholar
- Austin, James D.
Professor
- Baer, Charles
Professor

- Barbazuk, William Bradley
Professor
- Bloom, David C.
Professor
- Bloom, Linda B.
Professor
- Bonning, Bryony
Eminent Scholar
- Braun, Edward Louis
Professor
- Bungert, Jorg
Professor
- Byrne, Barry John
Professor
- Cavallari, Larisa Humma
Professor
- Chevette, Marc G.
Assistant Professor
- Choe, Keith P.
Associate Professor
- Cohn, Martin J.
Professor
- Corti, Manuela
Associate Professor
- De Crecy, Valerie Anne
Professor
- Denslow, Nancy D.
Professor
- Dinglasan, Rhoel David
Professor
- Driscoll, Daniel J.
Professor
- Duarte, Julio David
Associate Professor
- Farrer, Matthew James
Professor
- Ferl, Robert J.
Distinguished Professor
- Folta, Kevin M.
Professor
- Foster, Jamie S.
Professor
- Foster, Thomas C.
Professor
- Gulig, Paul A.
Professor
- Guralnick, Robert Penn
Curator
- Hansen, Peter J.
Distinguished Professor
- Harfe, Brian
Professor
- Hauser, Bernard A.
Associate Professor
- Hoffman, Brad E.
Associate Professor
- Kasahara, Hideko
Courtesy Associate Professor
- Kawahara, Akito
Curator
- Kaye, Frederic Joseph
Professor
- Kirst, Matias
Distinguished Professor
- Kladde, Michael P.
Professor
- Li, Yuqing
Professor
- Liao, Daiqing
Associate Professor
- Lu, Jianrong J.
Associate Professor
- Maden, Malcolm
Professor
- March, Keith L.
Professor
- Mathews, Carol Anne
Professor
- Maupin, Julie A.
Professor
- Mavian, Carla Nartuhi
Assistant Professor
- Mccarty, Donald R.
Professor
- McIntyre, Lauren M.
Professor
- Menezes, Amor
Associate Professor
- Mergia, Ayalew
Professor
- Merritt, Matthew E.
Professor
- Moroz, Leonid Leonidovich
Distinguished Professor
- Mulligan, Connie Jo
Professor
- Oppenheimer, David G.
Associate Professor
- Paul, Annalisa
Research Professor
- Peter, Gary Frank
Professor
- Ranum, Laura Page
Distinguished Professor
- Reed, David Lee
Curator
- Renne, Rolf Friedrich
Professor
- Resnick, James Lewis
Professor
- Ryan, Joseph Francis
Associate Professor
- Salemi, Marco

Professor

- Sayour, Elias
Professor
- Schatz, Desmond A.
Professor
- Scott, Edward W.
Professor
- Seaver, Elaine C.
Professor
- Soltis, Douglas Edward
Distinguished Professor
- Soltis, Pamela S.
Distinguished Professor
- Song, Sihong
Professor
- Swanson, Maurice S.
Professor
- Traktuev, Dmitry Olegovich
Research Associate Professor
- Triplett, Eric
Professor
- Vaillancourt, David E.
Professor
- Vallejos, Carlos E.
Professor
- Vermerris, Willem
Professor
- Vulpe, Christopher Dillon
Professor
- Wallace, Margaret R.
Professor
- Wang, Eric Tzy-Shi
Professor
- Wang, Jianping
Professor
- Wayne, Marta L.
Professor
- Wu, Lizi
Professor
- Xie, Mingyi
Associate Professor
- Zhou, Lei
Professor
- Zolotukhin, Serge
Professor

Genetics and Genomics (CALS)

Program Information

Program Director: T. Burris

Program Coordinator: C. Mulligan

The University of Florida Genetics Institute is a multi-college, multi-faceted research center which offers the a degree program leading to the Ph.D. in Genetics and Genomics. Minimum requirements for this degree are available in the Graduate Degrees (p. 778) section of this catalog.

What defines the Genetics & Genomics Graduate Program is the philosophy that good geneticists are integrative geneticists, who incorporate many different subfields of genetics into their work. Accordingly, faculty interests and graduate research opportunities include a wide range of areas: advances in gene therapy, understanding the maintenance of genetic variation, understanding plant immune responses, developing improved algorithms for identifying regulatory motifs in DNA sequences, and the challenges of bioethics to strategies for controlling malaria. Due to the fundamental nature of genetics in the life sciences, our training program is distributed across several colleges at UF, including but not limited to the College of Medicine (<https://graduate.education.med.ufl.edu/>), the College of Liberal Arts and Sciences (<https://clas.ufl.edu/>), the College of Agricultural and the Life Sciences (<https://cals.ufl.edu/>), and the Florida Museum of Natural History.

Graduate Program Overview

First Year:

Code	Title	Credits
ANG 7979	Advanced Research	1-12
BCH 6415	Advanced Molecular and Cell Biology	3
GMS 6221	Ethics in Genetics	1
GMS 6231	Genomics and Bioinformatics	3
GMS 6290	Genetics/Genomics Program Graduate Seminar (begins in the first semester and continues throughout students' graduate careers)	1
GMS 7877	Responsible Conduct of Biomedical Research	2
PCB 5065	Advanced Genetics	4
PHC 6052	Introduction to Biostatistical Methods	3

The first year core training is the research rotation program, in which students "rotate" through three labs in a minimum of two colleges. Rotations are critical to selecting a graduate advisor: they provide a hands-on opportunity to participate in the research being conducted in a lab, and a mutual opportunity to evaluate fit between advisor and prospective student.

Second Year:

- Individual program of courses and requirements is developed in consultation with major professor and dissertation committee

Admission Standards: Prospective students should have strong backgrounds in biology and other hard sciences. Exceptional students with other backgrounds will also be considered. The research statement required as part of the application has a particularly important part in the admissions decision. Each applicant must describe their research interests so that Graduate Faculty can evaluate knowledge of the discipline, fit to the program, and ability to articulate and motivate an interesting research problem. The required Letters of Recommendation are also extremely important in helping identify applicants with exceptional aptitude for genetics, and with research experience and promise.

Contact the Genetics and Genomics Graduate Program by email, UFGI-Info@ad.ufl.edu or by phone, 352-273-8124.

For more information, visit our website: <http://www.ufgi.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Genetics and Genomics

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Domestic Animal Genomics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Genetics and Genomics Courses

Code	Title	Credits
AGR 6322	Advanced Plant Breeding	3
ANG 6532	Molecular Genetics of Disease	3
ANG 7979	Advanced Research	1-12
ANG 7980	Research for Doctoral Dissertation	1-15
BCH 6415	Advanced Molecular and Cell Biology	3
BCH 7410	Advanced Gene Regulation	1
CAP 5510	Bioinformatics	3
CIS 6930	Special Topics in CIS	3
COT 5405	Analysis of Algorithms	3
GMS 6012	Human Genetics	1
GMS 6013	Developmental Genetics	1
GMS 6014	Applications of Bioinformatics to Genetics	1
GMS 6920	Genetics Journal Colloquy	1
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15
HOS 6201	Breeding Perennial Cultivars	3
PCB 5065	Advanced Genetics	4
PCB 5615	Molecular Evolution and Systematics	4
PCB 6528	Plant Cell and Developmental Biology	3
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15
STA 5325	Fundamentals of Probability	3
STA 5328	Fundamentals of Statistical Theory	3
STA 6166	Statistical Methods in Research I	3
STA 6167	Statistical Methods in Research II	3
STA 6208	Basic Design and Analysis of Experiments	3
STA 6329	Matrix Algebra and Statistical Computing	3
STA 6934	Special Topics in Statistics	1-4
STA 7979	Advanced Research	1-12
STA 7980	Research for Doctoral Dissertation	1-15
ZOO 6927	Special Topics in Zoology	1-4
ZOO 7979	Advanced Research	1-12
ZOO 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3

ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Faculty

Professor

- Burris, Thomas P.
- Rathinasabapathi, Balasubramani

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- Allen, William L.
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- Barbazuk, William Bradley
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- Bloom, David C.
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- Bloom, Linda B.
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- Byrne, Barry John
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- Cavallari, Larisa Humma
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- Chevrette, Marc G.
Assistant Professor
- Choe, Keith P.
Associate Professor
- Cohn, Martin J.
Professor
- Corti, Manuela
Associate Professor

- De Crecy, Valerie Anne
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- Denslow, Nancy D.
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- Dinglasan, Rhoel David
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- Driscoll, Daniel J.
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- Foster, Thomas C.
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- Gulig, Paul A.
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- Guralnick, Robert Penn
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- Hansen, Peter J.
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- Harfe, Brian
Professor
- Hauser, Bernard A.
Associate Professor
- Hoffman, Brad E.
Associate Professor
- Kasahara, Hideko
Courtesy Associate Professor
- Kawahara, Akito
Curator
- Kaye, Frederic Joseph
Professor
- Kirst, Matias
Distinguished Professor
- Kladde, Michael P.
Professor
- Li, Yuqing
Professor
- Liao, Daiqing
Associate Professor
- Lu, Jianrong J.
Associate Professor
- Maden, Malcolm
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- Maupin, Julie A.
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- Mavian, Carla Nartuhi
Assistant Professor
- Mccarty, Donald R.
Professor
- McIntyre, Lauren M.
Professor
- Menezes, Amor
Associate Professor
- Mergia, Ayalew
Professor
- Merritt, Matthew E.
Professor
- Moroz, Leonid Leonidovich
Distinguished Professor
- Mulligan, Connie Jo
Professor
- Oppenheimer, David G.
Associate Professor
- Paul, Annalisa
Research Professor
- Peter, Gary Frank
Professor
- Ranum, Laura Page
Distinguished Professor
- Reed, David Lee
Curator
- Renne, Rolf Friedrich
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- Resnick, James Lewis
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- Ryan, Joseph Francis
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- Salemi, Marco
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- Sayour, Elias
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- Schatz, Desmond A.
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- Scott, Edward W.
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- Seaver, Elaine C.
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- Soltis, Douglas Edward
Distinguished Professor
- Soltis, Pamela S.
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- Song, Sihong
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- Swanson, Maurice S.
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- Traktuev, Dmitry Olegovich
Research Associate Professor
- Triplett, Eric
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- Vaillancourt, David E.
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- Vallejos, Carlos E.

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- Vulpe, Christopher Dillon
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- Wallace, Margaret R.
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- Wang, Eric Tzy-Shi
Professor
- Wang, Jianping
Professor
- Wayne, Marta L.
Professor
- Wu, Lizi
Professor
- Xie, Mingyi
Associate Professor
- Zhou, Lei
Professor
- Zolotukhin, Serge
Professor

Entomology and Nematology Department

Chair: A. Short

Graduate Coordinator: M. Branham

The Entomology and Nematology Department offers the Master of Science (thesis and nonthesis options) and Doctor of Philosophy degrees in entomology and nematology. Minimum requirements for the M.S. and Ph.D. degrees are described in the Graduate Degrees (p. 778) section of this catalog.

The Department also offers a cooperative Doctor of Philosophy degree with Florida A&M University and distance education courses leading to the Master of Science degree with specializations in basic entomology, medical entomology, urban pest management, and landscape pest management. Members of the Graduate Faculty include the department resident faculty, faculty located on the University of Florida campuses away from Gainesville, scientists with other State of Florida agencies such as the Division of Plant Industry and Florida Department of Agriculture and Consumer Services, and scientists of the U.S. Department of Agriculture. The Graduate Faculty is qualified to direct graduate students in all specialties of entomology and nematology.

New graduate students should have backgrounds in biology, chemistry, physics, and mathematics. Minor deficiencies may be made up after entering graduate school.

The Department offers a combination bachelor's/master's degree program. Contact the graduate coordinator for information.

For more information, please see the program page below and visit our website: <https://entnemdept.ufl.edu/academic-programs/graduate-studies/>

Majors

- Entomology and Nematology (p. 32)
- Plant Medicine (p. 34)

Faculty

Professor

- Branham, Marc A.
- Crow, William T.
- Duncan, Larry Wayne
- Ellis, James
- Hahn, Daniel Allen
- Leppla, Norman C.
- Liburd, Oscar Emanuel
- McAuslane, Heather J.
- Osborne, Lance S.
- Rey, Jorge
- Rogers, Michael E.
- Scheffrahn, Rudolf H.
- Short, Andrew E.
- Stelinski, Kirsten Suzanne
- Stelinski, Lukasz Lech
- Thomas, Matthew Brian

Associate Professor

- Alto, Barry Wilmer
- Bahder, Brian W.
- Baldwin, Rebecca W.
- Beuzelin, Julien M.
- Burkett-Cadena, Nathan Daniel
- Carrillo, Daniel
- Chouvenc, Thomas
- Dale, Adam G.
- Desaegeer, Johan
- Gondhalekar, Ameya D.
- Grabau, Zane
- Kanga, Lambert H.
- Lord, Cynthia C.
- Lucky, Andrea
- Martini, Xavier Philippe
- Miller, Christine Whitney
- Minter-Killian, Carey R.
- Porazinska, Dorota Lidia
- Qureshi, Jawwad A.
- Smith, Hugh A.
- Swale, Daniel R.
- Vieira De Paula Moraes, Silvana
- Wong, Chun Nin

Assistant Professor

- Buckner, Eva Ann
- Burgess, Edwin R.

- Burini Kojin, Bianca
- Campbell, Lindsay P.
- Caragata, Eric P.
- Diepenbrock, Lauren Marie
- Esquivel, Isaac Luis
- Hahn, Philip G.
- Hajihassani, Abolfazl
- Jack, Cameron J.
- Lahiri, Sriyanka
- Lee, Yoosook
- Mallinger, Rachel
- Martin, Estelle
- Mongue, Andrew
- Mou, De-Fen
- Quinn, Nicole Frances
- Thongsripong, Panpim

Eminent Scholar

- Bonning, Bryony

Assistant Scientist

- Sourakov, Andrei

Extension Scientist

- Hodges, Amanda C.

Scientist

- Seal, Dakshina R.

Lecturer

- Kluiters, Georgette

Distinguished Professor

- Su, Nan-Yao

Courtesy Assistant Professor

- Halbert, Susan Elizabeth
- Handler, Alfred Marc
- Hix, Raymond Lee
- Hodges, Greg
- Kline, Daniel L.
- Meagher, Robert Leo
- Oi, David Hedeji
- Shirk, Paul David
- Smith, Trevor R.
- Steck, Gary John
- Vandermeer, Robert K.

Research Assistant Scientist

- Taylor, Lisa Anne

Courtesy Professor

- Alborn, Hans T.
- Brito, Janete A.
- Eger, Joseph E.
- Geden, Christopher J.
- Hogsette, Jerome A.
- Pescador, Manuel Lopez
- Skelley, Paul E.

Curator

- Daniels, Jaret C.
- Willmott, Keith Richard

Courtesy Associate Professor

- Mankin, Richard W.
- Wheeler, Gregory S.

Associate Extension Professor

- Oi, Faith M.

Affiliated Faculty

- Allan, Sandra A.
Courtesy Professor
- Elborai, Fahiem Elsayeed
Assistant Research Scientist
- Hulcr, Jiri
Professor
- Jones, Jeffrey B.
Distinguished Professor
- Kawahara, Akito
Curator
- Killiny, Nabil
Associate Professor
- Miller, Jacqueline Y.
Curator
- Reeves, Lawrence E.
Assistant Professor
- Revynthi, Alexandra
Assistant Professor
- Rohrig, Eric Andrew
Courtesy Assistant Scientist
- Shatters, Robert G.
Assistant Professor

Entomology and Nematology

Program Information

The Entomology and Nematology department offers research-based M.S. (thesis) and PhD degrees in entomology and in nematology. Our large faculty in Gainesville and at Research and Education Centers around the state allow for study in many important areas. Insect and nematode pests cause significant losses to agricultural and horticultural crops and livestock, and are important vectors of pathogens that cause diseases in plants, livestock and humans. Urban pests can affect quality of life and cause significant loss to property. However, these organisms

also provide important services through decomposition, pollination of fruits and vegetables, and as natural enemies of other pest species. Our department is uniquely positioned to address these fundamental and applied biological questions because of our strong interdisciplinary research and education programs, from molecular to whole organism and population ecology studies.

In addition to our research based degree programs, the M.S. degree can be taken in a non-thesis format, in Gainesville or entirely online, with a specialization in either entomology or pest management (with foci on pests of medical, urban or landscape importance). Online M.S. degrees are designed to accommodate place-bound students interested in biological science with emphasis on insects and other arthropods, including extension faculty and other educators; state and federal employees in agricultural, environmental and regulatory positions; consultants; pest control industry personnel; and others who want to further their education.

Certificates, comprising 15 credit hours of specific coursework, are available online or to residential students with concentrations in urban pest management, landscape pest management or medical entomology. These certificates document specialization and proficiency in sub-disciplines within entomology for enrolled graduate students and provide evidence of expertise for non-degree seeking students.

Students entering graduate programs in entomology and nematology should have a strong science background, including biology, chemistry, and algebra. Physics and statistics are recommended. Admissions criteria can be found on the Graduate School's Admission (p. 8) page.

Degrees Offered

Degrees Offered with a Major in Entomology and Nematology

- Doctor of Philosophy
 - without a concentration
 - concentration in Global Systems Agroecology
- Master of Science
 - without a concentration
 - concentration in Agroecology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Entomology and Nematology Departmental Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6502C	Linear Models in Agriculture and Natural Resources	3
ALS 6935	Topics in Biological Invasions	3
ENY 5006	Graduate Survey of Entomology	3
ENY 5006L	Graduate Survey of Entomology Laboratory	1
ENY 5160C	Survey of Science with Insects	3
ENY 5212	Insects and Wildlife	3

ENY 5223C	Biology and Identification of Urban Pests	3
ENY 5226C	Principles of Urban Pest Management	3
ENY 5241	Biological Control	4
ENY 5332	Graduate Survey of Urban Vertebrate Pest Management	2
ENY 5405	Insects as Vectors of Plant Pathogens	3
ENY 5516	Turf and Ornamental Entomology	3
ENY 5566	Tropical Entomology	3
ENY 5567	Tropical Entomology Field Laboratory	2
ENY 5611	Immature Insects	4
ENY 5820	Insect Molecular Genetics	3
ENY 6166	Insect Classification	3
ENY 6203L	Insect Ecology Laboratory	1
ENY 6203	Insect Ecology	3
ENY 6206	Ecology of Vector-Borne Disease	3
ENY 6207	Ecology and Conservation of Pollinators	3
ENY 6248	Termite Biology and Control	2
ENY 6259	Global Change and Insect Declines	2
ENY 6401L	Insect Physiology Laboratory	1
ENY 6401	Insect Physiology	3
ENY 6406	Molecular Biology of Insects and Nematodes	3
ENY 6454	Behavioral Ecology and Systematics of Insects	3
ENY 6456C	Social Insects	3
ENY 6572	Apiculture I	3
ENY 6575	Apiculture II	3
ENY 6576	Honey Bee Biology	3
ENY 6591C	Advanced Mosquito Identification	3
ENY 6593	Advanced Mosquito Biology	3
ENY 6651C	Insect Toxicology	3
ENY 6665	Advanced Medical and Veterinary Entomology I	3
ENY 6665L	Advanced Medical and Veterinary Entomology Laboratory	1
ENY 6706	Forensic Entomology	3
ENY 6821	Insect Microbiology	3
ENY 6905	Problems in Entomology	1-4
ENY 6910	Supervised Research	1-5
ENY 6920L	Invasive Ant Boot Camp	1
ENY 6931	Entomology Seminar	1
ENY 6932	Special Topics in Entomology	1-2
ENY 6934	Selected Studies in Entomology	1-4
ENY 6940	Supervised Teaching	1-5
ENY 6942	Insect Diagnostics	1-3
ENY 6943	Entomology Internship	1-3
ENY 6944	Entomology Extension Internship	1-3
ENY 6945	Practical Work Experience in Entomology and Nematology	1-3
ENY 6971	Research for Master's Thesis	1-15
ENY 7979	Advanced Research	1-12
ENY 7980	Research for Doctoral Dissertation	1-15
IPM 6021	Insect Pest and Vector Managem	3
NEM 5004C	Graduate Survey of Nematology	3
NEM 5707C	Plant Nematology	3
NEM 6101	Nematode Morphology and Anatomy	2
NEM 6101L	Nematode Morphology and Anatomy Lab	2
NEM 6102	Nematode Systematics and Molecular Phylogeny	2
NEM 6102L	Nematode Systematics and Molecular Phylogeny Laboratory	2
NEM 6103	Insect Parasitic Nematodes	2
NEM 6103L	Entomopathogenic Nematodes Laboratory	1

NEM 6201	Nematode Ecology	3
NEM 6708	Field Plant Nematology	2
NEM 6905	Problems in Nematology	1-4
NEM 6931	Nematology Seminar	1
NEM 6932	Special Topics in Nematology	1-4
NEM 6934	Selected Studies in Nematology	1-4
NEM 6940	Supervised Teaching	1-5
NEM 6942	Nematode Diagnostics	2
NEM 6943	Nematode Internship	1-3
NEM 6971	Research for Master's Thesis	1-15
NEM 7979	Advanced Research	1-12
NEM 7980	Research for Doctoral Dissertation	1-15
PMA 5205	Citrus Pest Management	3
PMA 6228	Field Techniques in Integrated Pest Management	2

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Entomology & Nematology (PHD)

SLO 1 Knowledge

Identify insects, other arthropods and/or nematodes, and describe their relationship with the environment and humans

SLO 2 Knowledge

Discuss appropriate research methodology, including aspects of statistical design and analysis, in the execution of arthropod research

SLO 3 Skills

Effectively communicate science orally and in written form to an audience of scientific peers

SLO 4 Skills

Effectively communicate science orally and in written form to a non-specialized audience through educational activities

SLO 5 Skills

Apply critical thinking and inquiry/analysis methodologies to solve problems and generate new knowledge

SLO 6 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, and teamwork.

entomology & Nematology (MS)

SLO 1 Knowledge

Identify insects, other arthropods and/or nematodes, and describe their relationship with the environment and humans

SLO 2 Knowledge

Identify insects, other arthropods and/or nematodes, and describe their relationship with the environment and humans

SLO 3 Knowledge

Discuss appropriate research methodology, including statistical aspects of experimental design and analysis, in the execution of arthropod research

SLO 4 Knowledge

Discuss appropriate research methodology, including statistical aspects of experimental design and analysis, in the execution of arthropod research

SLO 5 Skills

Effectively communicate science orally and in written form

SLO 6 Skills

Effectively communicate science orally and in written form

SLO 7 Skills

Apply critical thinking and inquiry/analysis methodologies to solve problems and generate new knowledge

SLO 8 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork and effective communication

SLO 9 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork and effective communication

Plant Medicine

Program Information

Coordinator: A.C. Hodges

Campus Program

The Doctor of Plant Medicine (DPM) program is an intensive doctorate-level graduate level training program for students interested in plant health diagnosis and management. Requirements for the degree can be found in the Graduate Degrees (p. 778) section of this catalog.

DPM students complete rigorous coursework and intensive internships. Only DPM students jointly enrolled in one of our discipline department M.S. programs complete a thesis. DPM students often participate in applied research within laboratory programs, and may participate in the publication of peer-reviewed scientific and extension papers. More information regarding the latest policies for the DPM program is available

in the DPM graduate handbook (http://dpm.ifas.ufl.edu/wp-content/uploads/2017/11/DPM_Handbook_2017.pdf).

The DPM program is a partnership among faculty mentors and teaching faculty within the following primary departments:

- Entomology and Nematology Department
- Department of Plant Pathology
- Agronomy Department
- Horticulture Sciences Department
- Environmental Horticulture Department
- Soil and Water Sciences Department
- Food Science and Human Nutrition Department

Distance Program

The College of Agricultural and Life Sciences offers a distance education program leading to the D.P.M. degree for highly qualified students. The D.P.M. degree is awarded after a 3- to 4-year program of graduate student. Foreign languages are not required. The distance education program leading to a D.P.M. degree is administered by the Entomology and Nematology Department, College of Agricultural and Life Sciences, and the Graduate School.

Admission: Students must meet the following minimum requirements:

Entrance requirements:

- A graduate degree (Master's or Doctoral) with a concentration in plant health science, plant pathology, agronomy, horticulture, environmental horticulture, forestry, entomology, nematology, soil science or a similar field.
- A passing score for the Certified Crop Advisor (CCA) exam administered by the Agronomy Society of America (ASA).
- Completion of at least two years of full-time work in a professional job associated with the Plant Doctor (DPM/H) profession. Examples of professional jobs associated with the Plant Doctor profession include: crop consultant, industry scientist, extension specialist, diagnostician, identifier, survey specialist, plant pest risk analyst, plant health technician, or instructor.
- A minimum score of a 300 on the Graduate Record Examination (GRE). Verbal and quantitative portions of the GRE should be approximately 150 each. Exceptions to the minimum may be considered by the DPM admissions committee.
- International applicants must also have a TOEFL score above 80.
- A graduate (Master's or Doctoral) grade point average of 3.0 or higher.
- A passing score (80% or higher) on the Plant Pathology Written Comprehensive Exam. The exam must be completed in Gainesville, Florida.

Course requirements: Students enter the program with a Master's or Doctoral degree and must earn 60 credits. Transfer of graduate credits from another graduate degree are not allowed for the distance education program. All D.P.M. students must complete two substantial 3-credit internships. Signed approval by a student's Committee and the D.P.M. Director is required prior to registering for substantial internship credits.

Comprehensive examination: Both written and oral comprehensive examinations are required of all D.P.M. students. The written examination has three sections:

- entomology/nematology,
- plant pathology, and
- plant/soil science.

Faculty from the appropriate disciplines are appointed by the D.P.M. Program Director and D.P.M. Competency Exam Coordinators to develop and grade the final written examination. Students enrolled in the distance education program must pass the plant pathology written competency area exam prior to admission. The two remaining sections of the written exam may be taken independently throughout the program at the discretion of the supervisory committee and the D.P.M. Director. Students are encouraged to complete the exam prior to the last full year of the D.P.M. program and their anticipated semester of graduation. Students should also complete the D.P.M. Competency Area Exams before the completion of a substantial internship. After a student passes all three sections of the final written examination (80% or higher is considered a passing grade), the supervisory committee administers an oral examination that tests the student's ability to diagnose and manage plant health problems. A student who fails to pass a comprehensive examination may retake an exam once with the recommendation of their supervisory committee.

For more information, please see the DPM website: <http://dpm.ifas.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Plant Medicine

- Doctor of Plant Medicine
 - without a concentration
 - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Agronomy Departmental Courses

Code	Title	Credits
AGR 5230C	Florida Grassland Agroecosystems	4
AGR 5266C	Field Plot Techniques	3
AGR 5277C	Tropical Crop Production	3
AGR 5307	Molecular Genetics for Crop Improvement	3
AGR 5321C	Genetic Improvement of Plants	3
AGR 5444	Ecophysiology of Crop Production	3
AGR 5511	Crop Ecology	3
AGR 6233	Tropical Grassland Agroecosystems	3
AGR 6237C	Research Techniques in Forage Evaluation	3
AGR 6305	Plant Chromosomes and Genomes	3
AGR 6322	Advanced Plant Breeding	3
AGR 6325L	Plant Breeding Techniques	1
AGR 6422C	Environmental Crop Nutrition	3
AGR 6442C	Physiology of Agronomic Plants	4
AGR 6905	Agronomic Problems	1-5
AGR 6913	Supervised Extension-Agronomy	3
AGR 6932	Topics in Agronomy	1-3
AGR 6933	Graduate Agronomy Seminar	1
AGR 6940	Supervised Teaching	1-5
AGR 6971	Research for Master's Thesis	1-15

AGR 7306	Multi-Omic Integration for Applied Prediction Breeding	3	ENY 5516	Turf and Ornamental Entomology	3
AGR 7979	Advanced Research	1-12	ENY 5566	Tropical Entomology	3
AGR 7980	Research for Doctoral Dissertation	1-15	ENY 5567	Tropical Entomology Field Laboratory	2
ALS 5155	Global Agroecosystems	3	ENY 5611	Immature Insects	4
ALS 5932	Special Topics	1-4	ENY 5820	Insect Molecular Genetics	3
ALS 6031	Project Team Research: Building Skills in Agrobiology	3	ENY 6166	Insect Classification	3
IPM 5305	Principles of Pesticides	3	ENY 6203L	Insect Ecology Laboratory	1
PLS 5625	Upland Invasive Plant Management	3	ENY 6203	Insect Ecology	3
PLS 5632C	Integrated Weed Management	3	ENY 6206	Ecology of Vector-Borne Disease	3
PLS 5633	Aquatic Plant Management	3	ENY 6207	Ecology and Conservation of Pollinators	3
PLS 6626	Invasive Plant Ecology	3	ENY 6248	Termite Biology and Control	2
PLS 6655	Plant/Herbicide Interaction	3	ENY 6259	Global Change and Insect Declines	2
			ENY 6401L	Insect Physiology Laboratory	1
			ENY 6401	Insect Physiology	3
			ENY 6406	Molecular Biology of Insects and Nematodes	3
			ENY 6454	Behavioral Ecology and Systematics of Insects	3
			ENY 6456C	Social Insects	3
			ENY 6572	Apiculture I	3
			ENY 6575	Apiculture II	3
			ENY 6576	Honey Bee Biology	3
			ENY 6591C	Advanced Mosquito Identification	3
			ENY 6593	Advanced Mosquito Biology	3
			ENY 6651C	Insect Toxicology	3
			ENY 6665	Advanced Medical and Veterinary Entomology I	3
			ENY 6665L	Advanced Medical and Veterinary Entomology Laboratory	1
			ENY 6706	Forensic Entomology	3
			ENY 6821	Insect Microbiology	3
			ENY 6905	Problems in Entomology	1-4
			ENY 6910	Supervised Research	1-5
			ENY 6920L	Invasive Ant Boot Camp	1
			ENY 6931	Entomology Seminar	1
			ENY 6932	Special Topics in Entomology	1-2
			ENY 6934	Selected Studies in Entomology	1-4
			ENY 6940	Supervised Teaching	1-5
			ENY 6942	Insect Diagnostics	1-3
			ENY 6943	Entomology Internship	1-3
			ENY 6944	Entomology Extension Internship	1-3
			ENY 6945	Practical Work Experience in Entomology and Nematology	1-3
			ENY 6971	Research for Master's Thesis	1-15
			ENY 7979	Advanced Research	1-12
			ENY 7980	Research for Doctoral Dissertation	1-15
			IPM 6021	Insect Pest and Vector Managem	3
			NEM 5004C	Graduate Survey of Nematology	3
			NEM 5707C	Plant Nematology	3
			NEM 6101	Nematode Morphology and Anatomy	2
			NEM 6101L	Nematode Morphology and Anatomy Lab	2
			NEM 6102	Nematode Systematics and Molecular Phylogeny	2
			NEM 6102L	Nematode Systematics and Molecular Phylogeny Laboratory	2
			NEM 6103	Insect Parasitic Nematodes	2
			NEM 6103L	Entomopathogenic Nematodes Laboratory	1
			NEM 6201	Nematode Ecology	3
			NEM 6708	Field Plant Nematology	2
			NEM 6905	Problems in Nematology	1-4
			NEM 6931	Nematology Seminar	1
			NEM 6932	Special Topics in Nematology	1-4
			NEM 6934	Selected Studies in Nematology	1-4

Botany Courses

Code	Title	Credits
BOT 5225C	Plant Anatomy	4
BOT 5305	Paleobotany	3
BOT 5505C	Intermediate Plant Physiology	3
BOT 5655C	Physiological Plant Ecology	3
BOT 5685C	Tropical Botany	5
BOT 5695C	Ecosystems of Florida	3
BOT 5725C	Taxonomy of Vascular Plants	4
BOT 6566	Plant Growth and Development	3
BOT 6716C	Advanced Taxonomy	2
BOT 6726C	Principles of Systematic Biology	4
BOT 6905	Individual Studies in Botany	1-3
BOT 6910	Supervised Research	1-5
BOT 6927	Advances in Botany	1-3
BOT 6935	Special Topics	1-4
BOT 6936	Graduate Student Seminar	1-2
BOT 6971	Research for Master's Thesis	1-15
BOT 7979	Advanced Research	1-12
BOT 7980	Research for Doctoral Dissertation	1-15
PCB 5046C	Advanced Ecology	3
PCB 5338	Principles of Ecosystem Ecology	3
PCB 5356	Tropical Ecology	3
PLP 6656C	Fungal Biology	4

Entomology and Nematology Departmental Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6502C	Linear Models in Agriculture and Natural Resources	3
ALS 6935	Topics in Biological Invasions	3
ENY 5006	Graduate Survey of Entomology	3
ENY 5006L	Graduate Survey of Entomology Laboratory	1
ENY 5160C	Survey of Science with Insects	3
ENY 5212	Insects and Wildlife	3
ENY 5223C	Biology and Identification of Urban Pests	3
ENY 5226C	Principles of Urban Pest Management	3
ENY 5241	Biological Control	4
ENY 5332	Graduate Survey of Urban Vertebrate Pest Management	2
ENY 5405	Insects as Vectors of Plant Pathogens	3

NEM 6940	Supervised Teaching	1-5
NEM 6942	Nematode Diagnostics	2
NEM 6943	Nematode Internship	1-3
NEM 6971	Research for Master's Thesis	1-15
NEM 7979	Advanced Research	1-12
NEM 7980	Research for Doctoral Dissertation	1-15
PMA 5205	Citrus Pest Management	3
PMA 6228	Field Techniques in Integrated Pest Management	2

School of Forest Resources and Conservation Courses

Geomatics Concentration Courses

Code	Title	Credits
GIS 6103	GIS Programming and Customization	3
GIS 6116	Geographic Information Systems Analysis	3
SUR 5365	Digital Mapping	3
SUR 5385	Remote Sensing Applications	3
SUR 5386	Image Processing for Remote Sensing	3
SUR 5525	Least Squares Adjustment Computations	3
SUR 6395	Topics in Geographic Information Systems	3
SUR 6535	GPS-INS Integration	3
SUR 6905	Special Problems in Geomatics	1-6
SUR 6934	Topics in Geomatics	1-4

Fisheries and Aquatic Sciences Program Courses

Code	Title	Credits
FAS 5015	Aquaculture I	3
FAS 5203C	Biology of Fishes	4
FAS 5255	Diseases of Warmwater Fish	3
FAS 5276C	Field Ecology of Aquatic Organisms	4
FAS 5335C	Applied Fisheries Statistics	4
FAS 5407	Biology of Fishery and Aquaculture Invertebrates	3
FAS 5901	Scientific Thinking in Ecology	2
FAS 6154	Marine Adaptations: Environmental Physiology	3
FAS 6165	Fish and Crustacean Nutrition	3
FAS 6176	Algae Biology and Ecology	3
FAS 6256	Fish and Aquatic Invertebrate Histology	3
FAS 6272	Marine Ecological Processes	3
FAS 6273	Trophic Ecology of Fishes	3
FAS 6337C	Fish Population Dynamics	4
FAS 6339C	Advanced Quantitative Fisheries Assessment	4
FAS 6355C	Fisheries Management	4
FAS 6408	Aquaculture II	3
FAS 6416	Spatial Ecology and Modeling of Fish Populations	2
FAS 6905	Individual Study	1-6
FAS 6910	Supervised Research	1-5
FAS 6932	Special Topics in Fisheries and Aquatic Sciences	1-4
FAS 6933	Graduate Symposium	1
FAS 6935	Contemporary Problems in Fisheries and Aquatic Sciences	2
FAS 6940	Supervised Teaching	1-5
FAS 6971	Research for Master's Thesis	1-15
FAS 7979	Advanced Research	1-12
FAS 7980	Research for Doctoral Dissertation	1-15

Forest Resources and Conservation Program Courses

Code	Title	Credits
FNR 5072C	Environmental Education Program Development	3
FNR 5608	Research Planning	3
FNR 6061	Conflict and Collaboration in Natural Resources	3
FNR 6560	Intro to Bayesian Statistics for Life Sciences	3
FNR 6564	Ecohydrology	3
FNR 6628	Watershed Management and Restoration	3
FNR 6669	Policy and Economics of Natural Resources	3
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6555	Introduction to Quantitative Genetics	3
SUR 6377	Geospatial Application of UASs	3
SUR 6502C	Foundations of UAS Mapping	3
SUR 6940C	Practicum in UAS Mapping	3

Horticultural Sciences Departmental Courses

Code	Title	Credits
ALS 5932	Special Topics	1-4
HOS 5085C	Principles of Postharvest Horticulture	3
HOS 5242	Genetics & Breeding of Vegetable Crops	3
HOS 5330	Postharvest Technologies for Horticultural Crops	2
HOS 5505	Getting Published Horticulture	3
HOS 5555	Tropical Fruit Production and Research in Florida	3
HOS 5711	Phytochemicals in Food & Health	3
HOS 6201	Breeding Perennial Cultivars	3
HOS 6236	Molecular Marker Assisted Plant Breeding	3
HOS 6307	Horticultural Physiology	3
HOS 6331	Postharvest Biology	3
HOS 6345	Environmental Physiology	4
HOS 6355	Root and Rhizosphere Ecology	3
HOS 6412	Nutrition of Horticultural Crops	3
HOS 6545	Advanced Citriculture I	3
HOS 6905	Problems in Horticultural Science	1-4
HOS 6910	Supervised Research	1-5
HOS 6931	Horticultural Science Seminar	1
HOS 6932	Special Topics	1-4
HOS 6934	Professional Seminar Preparation	1
HOS 6940	Supervised Teaching	1-5
HOS 6941	Practicum in Horticultural Science	2-4
HOS 6971	Research for Master's Thesis	1-15
HOS 7979	Advanced Research	1-12
HOS 7980	Research for Doctoral Dissertation	1-15
PCB 5065	Advanced Genetics	4
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6910	Supervised Research	1-5
PCB 6937	Special Topics in Plant Molecular and Cellular Biology	1-4
PCB 6971	Research for Master's Thesis	1-15
PCB 7922	Journal Colloquy in Plant Molecular and Cellular Biology	1
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15

PLS 6635	Weed Management for Organic and Sustainable Cropping Systems	3
PLS 7979	Advanced Research	1-12
PLS 7980	Research for Doctoral Dissertation	1-15

Plant Pathology Departmental Courses

Code	Title	Credits
ALS 5932	Special Topics	1-4
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
PLP 5005C	General Plant Pathology	4
PLP 5115C	Citrus Pathology	3
PLP 6105	Applied Plant Disease Management	3
PLP 6223C	Viral Pathogens of Plants	3
PLP 6235C	Applied Bioinformatics in Plant Pathology	2
PLP 6241C	Bacterial Plant Pathogens	3
PLP 6245	Fastidious Bacteria and Plant Diseases	3
PLP 6262C	Fungal Plant Pathogens	3
PLP 6291	Plant Disease Diagnosis	3
PLP 6303	Host-Parasite Interactions II	3
PLP 6404	Epidemiology of Plant Disease	4
PLP 6502	Host-Parasite Interactions I	3
PLP 6621C	Applied Population Genetics of Microbes	3
PLP 6636	Frontiers in Plant Biotechnology	3
PLP 6656C	Fungal Biology	4
PLP 6701	Impact through Networks	2
PLP 6905	Problems in Plant Pathology	1-4
PLP 6910	Supervised Research	1-5
PLP 6921	Colloquium in Principles of Plant Pathology	1
PLP 6932	Seminar in Plant Pathology	1
PLP 6940	Supervised Teaching	1-5
PLP 6942	Professional Internship in Plant Disease Clinic	3
PLP 6971	Research for Master's Thesis	1-15
PLP 7946	Plant Pathology Internship	1-10
PLP 7979	Advanced Research	1-12
PLP 7980	Research for Doctoral Dissertation	1-15

Soil and Water Sciences Departmental Courses

Code	Title	Credits
AGG 5607	Communicating in Academia	3
AGG 6503	Nanotechnology in Food, Agriculture, and Environment	3
ALS 5155	Global Agroecosystems	3
CWR 6537	Contaminant Subsurface Hydrology	3
SWS 5050L	Soils for Environmental Professionals Laboratory	1
SWS 5050	Soils for Environmental Professionals	3
SWS 5115	Environmental Nutrient Management	3
SWS 5132	Tropical Soil Management	3
SWS 5182	Earth System Analysis	3
SWS 5208	Sustainable Agricultural and Urban Land Management	3
SWS 5224	Environmental Biogeochemistry	3
SWS 5234	Environmental Soil, Water, and Land Use	3
SWS 5246	Water Resource Sustainability	3
SWS 5247	Hydric Soils	2
SWS 5248	Wetlands and Water Quality	3
SWS 5305C	Soil Microbial Ecology	3

SWS 5308	Ecology of Waterborne Pathogens	3
SWS 5406	Soil and Water Chemistry	3
SWS 5424C	Soil Chemical Analysis	3
SWS 5551	Soils, Water, and Public Health	3
SWS 5605C	Environmental Soil Physics	3
SWS 5716C	Environmental Pedology	4
SWS 5721C	GIS in Land Resource Management	3
SWS 5805	Environmental Soil and Water Monitoring Techniques	3
SWS 6117	Fertilizer Technology and Use	3
SWS 6134	Soil Quality	3
SWS 6136	Soil and Nutrient Diagnostics for Agricultural Production	3
SWS 6209	Urban Soil and Water Systems	3
SWS 6323	Advanced Microbial Ecology	3
SWS 6366	Biodegradation and Bioremediation	3
SWS 6406	Soil Health and Data	3
SWS 6448	Biogeochemistry of Wetlands and Aquatic Systems	3
SWS 6454	Advanced Soil and Water Chemistry	3
SWS 6456	Advanced Biogeochemistry	3
SWS 6722	AI Modeling in Soil and Ecosystem Sciences	3
SWS 6804	Modeling Soil, Water, and Ecosystem Processes	3
SWS 6813C	Modeling Land Biogeochemistry	3
SWS 6905	Special Problems	1-4
SWS 6910	Supervised Research	1-5
SWS 6920	Journal Colloquium in Environmental Science	1
SWS 6931	Seminar	1
SWS 6932	Topics in Soils	1-4
SWS 6940	Supervised Teaching	1-5
SWS 6950	Professional Development in Soil, Water, and Ecosystem Sciences	2
SWS 6971	Research for Master's Thesis	1-15
SWS 6992	Aquatic Toxicology: Science and Applications	3
SWS 7979	Advanced Research	1-12
SWS 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1

STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

SLO 1: Knowledge

Prevention, Diagnosis and Management of Plant Health Problems

Master the subject matter and concepts related to the prevention, diagnosis and management of plant health problems of all types

SLO 2: Skills

Solve Plant Health Problems

Integrate the subject matter and concepts learned during their program of study to solve plant health problems.

SLO 3: Professional Behavior

Exhibit professionalism in the practice of plant medicine by maintaining client confidentiality, keeping up to date on plant health management practices through continuing education and seeking the assistance of their colleagues when necessary.

Family, Youth and Community Sciences Department

Chair: L. Forthun

Graduate Coordinator: K. Fogarty

The Master of Science in FYCS can help you develop the specialized skills needed to pursue an advanced social science degree (e.g., PhD) or move into a leadership role in career areas such as human services, social welfare, family life education, nonprofit organizations, youth development, or other community-based initiatives. The curriculum examines methods to effectively create and evaluate human services programs and explores interdisciplinary research and assessment techniques you can immediately apply to your organization.

Contact the graduate coordinator for more information or visit <http://fyys.ifas.ufl.edu/>.

Majors

- Family, Youth and Community Sciences (p. 39)
- Youth Development and Family Sciences (p. 41)

Faculty

Professor

- Diem, Keith
- Forthun, Larry F.
- Irani, Tracy Anne
- Radunovich, Heidi Liss
- Shelnutt, Karla Pagan
- Simonne, Amarat
- Swisher, Marilyn E.

Associate Professor

- Cantrell, Randall Alan
- Diehl, David Christopher
- Fogarty, Kate
- Gillen, Martie
- Harris, Victor
- Kumaran, Muthusami
- Lindsey, Angela B.
- Lynne, Sarah Delphia
- O'Neal-Rodrigues, LaToya Jonnese
- Pracht, Dale
- Ruiz, Jorge

Assistant Professor

- Abraczinskas, Michelle
- Campbell, Catherine G.
- Duncan, Jenee
- Riley, Tennisha N.
- Vilaro, Melissa J.
- Wiley, Kimberly Kay
- Zhang, Xiaoya

Other

- Duffy, Nicole Owens

Lecturer

- Johnson, Emily Rose

Family, Youth, and Community Sciences

Master of Science in Family, Youth and Community Sciences

The **Master of Science** in FYCS seeks to prepare students for careers in human services, youth professions, and community development in public, private, and nonprofit organizations. There are two degree options: thesis and capstone.

- The thesis option prepares students to conduct independent research needed to develop science-based solutions to problems, issues, and policies that affect families, youth, and communities. Students develop expertise in a subject matter area directly relevant to the problem or need they want to address with the thesis research.
- The capstone option provides the student with a broad base of knowledge and skills in the discipline and culminates in a capstone project in the student's final or penultimate semester. Completion of a community-based project that addresses an identified issue within the field of Family, Youth, and Community Sciences. Projects will vary based on student interests but will comply with expected professional and ethical standards. Students will also develop a professional portfolio and deliver a professional presentation. This course meets the graduate school requirement of the final comprehensive examination for a master's degree without thesis.

Students in the Master of Science program have the option to complete one of three concentrations:

- **Concentration in Nonprofit Organizational Development.** The concentration helps students build a foundation of skills to develop and sustain an effective nonprofit organization, including coursework that examines essential topics like governance, strategic planning, fundraising, risk management, and financial planning.
- **Concentration in Family and Youth Development.** The concentration helps students build the leadership skills needed to effectively develop, implement, and evaluate services and programs affecting youth and families within their communities.
- **Concentration in Community Studies.** This concentration prepares students to serve as leaders and managers for community-based organizations and programs.

Students both inside and outside the major may complete a **Graduate Certificate in Nonprofit Leadership**. This 12-credit certificate covers the core competencies of: governance, strategic planning, fundraising, human resources management, and risk management, as well as other emerging strategies.

An online professional development program in **Personal and Family Financial Planning** is available. The program is registered with the Certified Financial Planner™ Board of Standards to offer courses that cover education requirements for sitting for the CFP examination.

The Family, Youth and Community Sciences Department offers two minors for non-majors. The **Minor in Organizational Leadership for Nonprofits** introduces students to the core management and leadership competencies necessary to work in the nonprofit sector. The **Minor in Family, Youth and Community Sciences** provides students with knowledge about the theories and body of research that explain how families, youth, and communities develop and interact.

Combination program: The Department offers a combination bachelor's/master's degree program, which allows qualified students to earn both a bachelor's degree and a master's degree with a savings of up to 12 credits.

Degrees Offered

Degrees Offered with a Major in Family, Youth, and Community Sciences

- Master of Science
 - without a concentration
 - concentration in Community Studies
 - concentration in Family and Youth Development
 - concentration in Nonprofit Organizational Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Family, Youth and Community Sciences Departmental Courses

Code	Title	Credits
FYC 5935	Personal and Family Financial Planning Capstone	3
FYC 6026	Human Resource Management for Nonprofits	3
FYC 6105	Youth and Family Relationships	3

FYC 6111	Families and Violence	3
FYC 6117	Military Families in Community Context	3
FYC 6131	Ethics for FYCS Practitioners	3
FYC 6207	Adolescent Problematic Behavior	3
FYC 6221	Grant Proposals for Community-Based Organizations	3
FYC 6222	Parenting and Child Relationships	3
FYC 6223	Promoting Positive Youth Development	3
FYC 6230	Theories of Family Development, Systems and Change	3
FYC 6234	Theoretical Approaches to Youth Development	3
FYC 6235	Prevention Science in Youth Development and Family Science	3
FYC 6302	Sustainable Community Development	3
FYC 6320	Community Development and Civic Engagement	3
FYC 6330	Theories of Community Development	3
FYC 6421	Nonprofit Organizations	3
FYC 6424	Fund Raising for Community Nonprofit Organizations	3
FYC 6425	Risk Management in Nonprofit Organizations	3
FYC 6620	Program Planning and Evaluation for Human Service Delivery	3
FYC 6662	Public Policy and Human Resource Development	3
FYC 6800	Scientific Reasoning and Research Design	3
FYC 6802	Advanced Research Methods for Family, Youth, and Community Sciences	3
FYC 6804	Applied Data Analysis in Family, Youth and Community Sciences	3
FYC 6901	Problems in Family, Youth, and Community Sciences	1-3
FYC 6912	Nonthesis Project in Family, Youth, and Community Sciences	1-3
FYC 6920	Capstone Project	3
FYC 6932	Topics in Family, Youth, and Community Sciences	1-3
FYC 6933	Seminar in Human Resource Development	1
FYC 6934	Professional Internship/Practicum in Family, Youth, and Community Sciences	1-3
FYC 6936	Professional Development Seminar in YDFS	3
FYC 6970	Thesis/Dissertation Proposal Writing in Family, Youth and Community Sciences	3
FYC 6971	Research for Master's Thesis	1-6
FYC 7979	Advanced Research	1-12
FYC 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1

ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Family, youth & community sciences (MS)

SLO 1 Analyze Problems, Issues and Needs

Use science-based research to analyze complex family, youth, or social problems, issues, and needs

SLO 2 Apply Theory and Research

Apply family, economic, or social theory and research to the analysis of policies and programs that affect families, youth, and communities

SLO 3 Analyze and Assess Needs, Issues and Problems

Analyze and assess the needs, issues and problems of families, youth, and communities

SLO 4 Impacts of Policies, Programs and Organizations

Develop, implement and analyze the impacts of policies, programs and organizations for families, youth, and communities

SLO 5 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, and teamwork

Youth Development and Family Sciences

Program Information

The Doctor of Philosophy in Youth Development and Family Sciences will prepare students to conduct high-impact research on youth, their families, and the communities in which they live. Graduates will be trained to become faculty members in academic departments such as human development and family studies, family and consumer sciences, community resource development, community psychology, and prevention science, as well as for research positions in the public and private sectors. Research in this field considers the influence of risk and protective factors, human growth and development, interpersonal and family processes and systems, and community contexts on the behavioral, psychosocial, and socio-emotional well-being of children, adolescents, and emerging adults. Students can also elect to learn how to build partnerships with local community organizations using participatory and community engaged approaches to research. Students will be able to apply this knowledge to the development and rigorous evaluation of prevention and promotion programs and activities, and contribute to systems and policy changes to benefit youth and families.

Students in the Doctor of Philosophy YDFS program have the option to complete one concentration:

Concentration in Clinical and Translational Science (CTS). This 14 credit-hour concentration was designed to provide PhD scientists in a variety of disciplines with the knowledge, skills and attitudes to support future career goals related to clinical and translational research. This concentration requires an application to UF's Clinical and Translational Science Institute outside the Family, Youth and Community Sciences department.

Degrees Offered

Degrees Offered with a Major in Youth Development and Family Science

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science (CTS)

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Youth Development and Family Science Program Courses

Code	Title	Credits
FYC 6230	Theories of Family Development, Systems and Change	3
FYC 6234	Theoretical Approaches to Youth Development	3
FYC 6330	Theories of Community Development	3
FYC 6800	Scientific Reasoning and Research Design	3
FYC 6802	Advanced Research Methods for Family, Youth, and Community Sciences	3
FYC 6932	Topics, in Family, Youth, and Community Sciences	1-3

Electives

Code	Title	Credits
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6471	Survey Design and Analysis in Educational Research	3
EDF 6475	Qualitative Foundations of Educational Research	3
EDF 7412	Structural Equation Models	3
EDF 7474	Multilevel Models	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3
EDF 7932	Multivariate Analysis in Educational Research	3
FYC 6111	Families and Violence	3
FYC 6207	Adolescent Problematic Behavior	3
FYC 6221	Grant Proposals for Community-Based Organizations	3
FYC 6222	Parenting and Child Relationships	3
FYC 6223	Promoting Positive Youth Development	3

FYC 6320	Community Development and Civic Engagement	3
FYC 6421	Nonprofit Organizations	3
FYC 6620	Program Planning and Evaluation for Human Service Delivery	3
FYC 6662	Public Policy and Human Resource Development	3
FYC 6932	Topics, in Family, Youth, and Community Sciences	1-3
MMC 6423	Content-Analysis Methods	3
MMC 6426	Qualitative Research	3
STA 6126	Statistical Methods in Social Research I	3
STA 6207	Regression Analysis	3
STA 6208	Basic Design and Analysis of Experiments	3
STA 6505	Analysis of Categorical Data	3
STA 7249	Generalized Linear Models	3
STA 7346	Statistical Inference	3
SYA 6315	Qualitative Research Methods	3

Family, Youth, and Community Sciences Departmental Courses

Code	Title	Credits
FYC 5935	Personal and Family Financial Planning Capstone	3
FYC 6026	Human Resource Management for Nonprofits	3
FYC 6105	Youth and Family Relationships	3
FYC 6111	Families and Violence	3
FYC 6117	Military Families in Community Context	3
FYC 6131	Ethics for FYCS Practitioners	3
FYC 6207	Adolescent Problematic Behavior	3
FYC 6221	Grant Proposals for Community-Based Organizations	3
FYC 6222	Parenting and Child Relationships	3
FYC 6223	Promoting Positive Youth Development	3
FYC 6230	Theories of Family Development, Systems and Change	3
FYC 6234	Theoretical Approaches to Youth Development	3
FYC 6235	Prevention Science in Youth Development and Family Science	3
FYC 6302	Sustainable Community Development	3
FYC 6320	Community Development and Civic Engagement	3
FYC 6330	Theories of Community Development	3
FYC 6421	Nonprofit Organizations	3
FYC 6424	Fund Raising for Community Nonprofit Organizations	3
FYC 6425	Risk Management in Nonprofit Organizations	3
FYC 6620	Program Planning and Evaluation for Human Service Delivery	3
FYC 6662	Public Policy and Human Resource Development	3
FYC 6800	Scientific Reasoning and Research Design	3
FYC 6802	Advanced Research Methods for Family, Youth, and Community Sciences	3
FYC 6804	Applied Data Analysis in Family, Youth and Community Sciences	3
FYC 6901	Problems in Family, Youth, and Community Sciences	1-3
FYC 6912	Nonthesis Project in Family, Youth, and Community Sciences	1-3

FYC 6920	Capstone Project	3
FYC 6932	Topics, in Family, Youth, and Community Sciences	1-3
FYC 6933	Seminar in Human Resource Development	1
FYC 6934	Professional Internship/Practicum in Family, Youth, and Community Sciences	1-3
FYC 6936	Professional Development Seminar in YDFS	3
FYC 6970	Thesis/Dissertation Proposal Writing in Family, Youth and Community Sciences	3
FYC 6971	Research for Master's Thesis	1-6
FYC 7979	Advanced Research	1-12
FYC 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

YOUTH DEVELOPMENT & FAMILY SCIENCES (PhD)

SLO 1 Knowledge

Students analyze and synthesize the existing scientific literature in all 3 priority areas: 1.) Youth Development or Family Sciences; 2. Research Methods, Statistics; 3. Area of Specialization.

SLO 2 Skills

Students analyze and synthesize theoretical and empirical research on complex problems and propose strategies for advancing their research by applying appropriate research methods, statistics, and analysis.

SLO 3 Professional Behavior

Students interact with honesty and ethical behavior, including cultural sensitivity and attention to issues of diversity in all its forms.

Food and Resource Economics Department

Chair: L. House

Graduate Coordinator: Z. Gao

The Food and Resource Economics Department offers the Master of Agribusiness (M.AB) (non-thesis), Master of Science with Concentration in Agribusiness (M.S.AB.) (non-thesis), Master of Science (thesis), and Doctor of Philosophy. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The Department participates in programs with the Center for Latin American Studies, the Center for African Studies, the Center for Tropical Agriculture, the School of Natural Resources and Environment, the College of Law, and the Florida Sea Grant College Program.

The Department programs reflects the diversity of Florida's agriculture which has more than fifty major commodities. With over thirty faculty involved in a full range of research, extension, and teaching programs in areas including Agricultural Marketing, International Trade, Policy, Production/Farm Management, International Development, Marine Economics, Natural Resource and Environmental Economics, Community/Regional Development and Labor Economics. In addition to the main campus location, the department has faculty at research centers throughout the state.

Several members of the faculty have garnered international reputations in diverse fields such as trade policy, generic advertising, citrus economics, sugar policy, business retention and expansion, leadership development, consumer attitudes towards genetically modified food, and dairy marketing.

The Department offers a combination bachelor's/master's degree program for the Master of Science and Master of Science with Concentration in Agribusiness. Contact the Graduate Program Office in 1179 McCarty Hall for information.

For more information, please see the program pages below, and see our website: <http://www.fred.ifas.ufl.edu>.

Majors

- Food and Resource Economics (p. 44)

Faculty

Professor

- Anderson, James L.
- Evans, Edward Anthony
- Gao, Zhifeng
- House, Lisa Ann
- Khachatryan, Hayk
- Kropp, Jaclyn Donna
- Larkin, Sherry L.
- Moss, Charles Britt
- Olexa, Michael T.
- Seale, James L.
- Thornsbury, Suzanne D.

- Useche, Maria Del-Pilar
- Wysocki, Allen F.

Associate Professor

- Court, Christa
- Fang, Di
- Farnsworth, Derek
- Guan, Zhengfei
- Morgan, Kimberly L.
- Mullally, Conner
- Onel, Gulcan
- Singerman, Ariel
- Ward, Patrick S.

Assistant Professor

- Anderson, Thomas Moylan
- Chen, Lijun
- Gars, Jared E.
- Hammami, AbdelMalek
- Ji, Xinde
- Kassas, Bachir
- Lai, John H.
- Palardy, Nathan Paul
- Ropicki, Andrew Justin
- Savchenko, Olesya M.
- Wade, Tara Renee
- Weng, Weizhe

Other

- Clark, Jennifer L.
- Sharp, Misti
- Stair, Caleb A.
- Zhang, Xumin

Eminent Scholar

- Schmitz, Andrew

Research Assistant Scientist

- Yoon, Sungeun

Research Assistant Professor

- Qiao, Xiaohui

Affiliated Faculty

- Adams, Damian
Professor
- Asche, Frank
Professor

Food and Resource Economics

Program Information

The Food and Resource Economics Department offers the Master of Agribusiness (M.AB.) (non-thesis), Master of Science with Concentration in Agribusiness (M.S.AB.) (non-thesis), Master of Science (thesis), and Doctor of Philosophy.

The **Ph.D. in Food and Resource Economics** is designed to provide the student with rigorous training in economics, statistics, and applied quantitative techniques. Each student is exposed to core theory and to fields of specialization with the purpose to prepare the candidate for a professional career in post-secondary education, government, non-governmental organizations, private business, and international agencies.

The **Master of Agribusiness** is designed for students with no academic background in economics. Students who come from diverse academic backgrounds including Accounting, Agricultural Education and Communication, Agricultural Operations Management, Agronomy, Animal Science, Business Administration, Finance, English, Food Science, History, Horticulture, Management, Marketing, Soil and Water Science, Turfgrass, and Wildlife Ecology and Conservation. The graduate coursework prepares students for careers in banking, investing, financial analysis, sales, management, marketing, human resources, policy, production, and entrepreneurial pursuits working in private industry, international firms, non-profit organizations and government.

The **Master of Science** in the Food and Resource Economics Department provides broad training in applied economics as it relates to food production, policy, marketing and trade, regional economics, and natural resource issues. Students are taught to use economic principles and quantitative methods to address empirical problems. The core consists of courses in microeconomics, policy, econometrics, statistics and survey research methods. Many students continue their education with a Ph.D. while others opt for employment with government agencies, nongovernmental organizations, foreign agencies, private consulting firms, or corporations.

The **Master of Science with Concentration in Agribusiness** is designed for students with an academic background in economics. The quantitative courses include microeconomics, policy, econometrics and survey research methods and provide solid economic theory and prepares students for careers in banking, investing, financial analysis, sales, management, marketing, human resources, policy, production, and entrepreneurial pursuits working in private industry, international firms, non-profit organizations and government.

For more information, please see our website: <http://www.fred.ifas.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Food and Resource Economics

- Doctor of Philosophy
 - without a concentration
 - with a concentration in Tropical Conservation and Development
- Master of Agribusiness
 - without a concentration
 - with a concentration in Tropical Conservation and Development
- Master of Science

- without a concentration
- with a concentration in Agribusiness
- with a concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Food and Resource Economics Departmental Courses

Code	Title	Credits
AEB 5188	Economics of Agribusiness Decisions	3
AEB 5326	Agribusiness Financial Management	3
AEB 5516	Quantitative Methods in Agribusiness Decisions	3
AEB 5757	Strategic Agribusiness Human Resource Management	3
AEB 6106	Microeconomic Principles and Analysis	3
AEB 6145	Agricultural Finance	3
AEB 6183	Agribusiness Risk Management	3
AEB 6225	Public Policy and the Agribusiness Firm	3
AEB 6301	Food Wholesale and Retail Marketing	3
AEB 6385	Management Strategies for Agribusiness Firms	3
AEB 6553	Elements of Econometrics	3
AEB 6675	International Agribusiness Marketing	3
AEB 6817	Survey Research Methods for Economists	3
AEB 6905	Problems in Food and Resource Economics	1-3
AEB 6921	Workshop in Food and Resource Economics I	1
AEB 6933	Special Topics	1-6
AEB 6934	Workshop in Food and Resource Economics II	1
AEB 6942	Advanced Applications in Agribusiness Experience	1-3
AEB 6971	Research for Master's Thesis	1-15
AEB 7108	Microeconomic Theory II	3
AEB 7182	Agricultural Risk Analysis and Decision Making	3
AEB 7184	Production Economics	3
AEB 7220	Agricultural Trade Policy and Welfare Economics	3
AEB 7240	Macroeconomic Theory in Open Economies II	3
AEB 7333	Applied Valuation Methods	3
AEB 7373	Consumer Demand and Applied Analysis	3
AEB 7453	Natural Resource Economics	3
AEB 7483	Seminar in Environmental Economics	3
AEB 7504	Mathematical Statistics for Applied Econometrics	3
AEB 7571	Econometric Methods I	3
AEB 7572	Econometric Methods II	3
AEB 7573	Applied Microeconometrics	3
AEB 7645	Economic Development and Agriculture	3
AEB 7979	Advanced Research	1-12
AEB 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Food and resources economics (PHD)

SLO 1 Knowledge

Explain relevant economic principles and apply economic theory to address problems relevant to agriculture and natural resources

SLO 2 Skills

Identify relevant economic problem, propose and complete an original research project, and effectively communicate results to appropriate audiences (including off campus)

SLO 3 Professional Behavior

Display honesty and integrity in research, the classroom and professional activities

Food and resources economics (MAB)

SLO 1 Principles Relating to Food and Agribusiness Firms

Explain principles of economics, management, marketing, finance, quantitative analysis and policy as they apply to food and agribusiness firms

SLO 2 Solve Management Problems

Apply, analyze and synthesize content knowledge to solve management problems faced by food and agribusiness firms

SLO 3 Display Honesty and Integrity

Display honesty and integrity in research, the classroom, and professional activities

Food and resources economics (MS)

SLO 1 Explain Relevant Economic Principles

Explain relevant economic principles and apply economic theory and tools to address problems relevant to agriculture and natural resources

SLO 2 Develop, Complete and Present Research Project

Identify relevant economic problem, complete research project, and effectively communicate results to an appropriate audience

SLO 3 Professional Behavior

Display honesty and integrity in the classroom, research and professional activities

Food Science and Human Nutrition Department

Chair: R. Goodrich-Schneider

Graduate Coordinators: C. Sims & R.E. Turner

The Food Science and Human Nutrition Department (FSHN) is one of the world's largest combined academic programs where food science, nutritional sciences, and dietetics are all studied within one department. FSHN has nearly 30 full-time faculty members, 80 graduate assistants, and close to 1,000 undergraduate students. Our programs are accredited by the Institute of Food Technologists (<http://www.ift.org/>) (IFT) and the Accreditation Counsel for Education in Nutrition and Dietetics (ACEND) (<http://www.eatrightacend.org/ACEND/>). After completing undergraduate degrees, our students typically move on to professional employment, further education or training in food or nutrition graduate programs, or on to professional school programs. We have a strong record of excellent placement of our graduate students in industry and professional organization employment positions, as faculty members at colleges and universities, or in postdoctoral training experiences.

Our faculty has trained at institutions from around the world; they have been widely successful in their teaching, research, and extension efforts. Throughout our programs in food science, nutrition, and dietetics, our faculty is recognized nationally and internationally as experts in their respective fields.

The Food Science and Human Nutrition Department offers programs leading to the degrees of Master of Science in Food Science and Human Nutrition, Doctor of Philosophy in Food Science, and Doctor of Philosophy in Nutritional Sciences (offered under the auspices of the Center for Nutritional Sciences (<http://nutritionalsciences.centers.ufl.edu/>)). Minimum requirements for these degrees are located in the Graduate Degrees section of this catalog.

For more information, please click the links to the program pages below, or see our website: <http://fshn.ifas.ufl.edu>.

Majors

- Food Science (p. 46)
- Food Science and Human Nutrition (p. 48)
- Nutritional Sciences (p. 49)

Faculty

Professor

- Borum, Peggy L.
- Collins, James Forrest
- Dahl, Wendy Joanne
- Danyluk, Michelle D.
- Gu, Liwei
- Henken, Robin J.

- Knutson, Mitchell D.
- Schneider, Renee Goodrich
- Schneider, Keith R.
- Sims, Charles A.
- Turner, Roberta Elaine

Associate Professor

- Andrade, Juan Emilio
- MacIntosh, Andrew John
- Mathews, Anne
- Wang, Yu

Assistant Professor

- Andrade, Jeanette Mary
- Best, Cora M.
- Cheng, Zhiyong
- Farzad, Razieh
- Liu, Bin
- Montazeri, Naim
- Taft, Diana H.
- Witrick, Katherine Amy Thompson
- Zhang, Boce

Eminent Scholar

- Cousins, Robert J.

Lecturer

- Ahn, Soohyoun

Affiliated Faculty

- Mathews, Clayton Elwood
Professor
- Shelnutt, Karla Pagan
Professor
- Simonne, Amarat
Professor
- Sommerfield, Linda May
Professor

Courses

Food Science and Human Nutrition Department Courses

Code	Title	Credits
DIE 6241	Advanced Medical Nutrition Therapy	4
DIE 6242	Advanced Medical Nutrition Therapy II	3
DIE 6516	Professional Development in Dietetics	2
DIE 6905	Problems in Dietetics	1-3
DIE 6938	Advanced Dietetic Seminar	1
DIE 6940	Community Nutrition Practicum	3
DIE 6942	Dietetic Internship I	9
DIE 6944	Dietetic Internship II	6
FOS 5126C	Psychophysical Aspects of Foods	3
FOS 5205	Current Issues in Food Safety and Sanitation	3
FOS 5225C	Principles in Food Microbiology	4

FOS 5437C	Food Product Development	3
FOS 5561C	Citrus Processing Technology	3
FOS 5645	Functional Foods and Nutraceuticals	3
FOS 5732	Current Issues in Food Regulations	3
FOS 6125C	Sensory Evaluation of Food	3
FOS 6215	Principles of Food Safety	3
FOS 6216	Food Safety Systems	2
FOS 6217	Food Safety, Sanitation, and Microbiology	2
FOS 6218	Food Safety Systems	2
FOS 6224	Food and Environmental Virology	2
FOS 6226C	Advanced Food Microbiology	4
FOS 6315C	Advanced Food Chemistry	4
FOS 6317C	Flavor Chemistry and Technology	3
FOS 6355C	Instrumental Analysis and Separations	5
FOS 6428C	Advanced Food Processing	4
FOS 6455C	Industrial Food Fermentations	3
FOS 6736	Food Regulations	2
FOS 6905	Problems in Food Science	1-3
FOS 6910	Supervised Research	1-5
FOS 6915	Research Planning	2
FOS 6936	Topics in Food Science	1-4
FOS 6938	Food Science Seminar	1
FOS 6940	Supervised Teaching	1-5
FOS 6971	Research for Master's Thesis	1-15
FOS 7979	Advanced Research	1-12
FOS 7980	Research for Doctoral Dissertation	1-15
HUN 5441	Metabolic Response to Enteral and Parenteral Nutrition	2
HUN 5447	Nutrition and Immunity	3
HUN 6235	Macronutrients in Human Nutrition	3
HUN 6245	Advanced Human Nutrition	3
HUN 6255	Clinical Nutrition	2-12
HUN 6301	Nutritional Aspects of Lipid Metabolism	3
HUN 6305	Nutritional Aspects of Carbohydrates	3
HUN 6321	Proteins and Amino Acids in Nutrition	3
HUN 6331	Vitamins in Human Nutrition	3
HUN 6356	Minerals in Nutrition	3
HUN 6548	Global Nutrition	3
HUN 6626	Nutrition Education	1
HUN 6804	Nutrition Research Method: Systematic Review	3
HUN 6812C	Analytical Techniques in Nutritional Biochemistry	1
HUN 6835	Research Projects in Nutrition and Dietetics – part 2	2
HUN 6905	Problems in Nutritional Sciences	1-3
HUN 6936	Topics in Nutritional Sciences	1-4
HUN 6938	Nutritional Sciences Seminar	1
HUN 6939	Advanced Clinical Nutrition	2-12
HUN 6940	Supervised Teaching	1-5
HUN 6971	Research for Master's Thesis	1-15
HUN 7979	Advanced Research	1-12
HUN 7980	Research for Doctoral Dissertation	1-15

Food Science

Program Information

The Ph.D. program in Food Science is a multidisciplinary program consisting of Food Chemistry, Food Processing and Engineering, and Food Microbiology and Safety. Students are expected to obtain a breadth

of food science knowledge by taking courses in all program areas with the majority of courses stressing one of the three areas of emphasis.

For further information, please see our website at: <http://fshn.ifas.ufl.edu>.

Degrees Offered

Degrees Offered With a Major in Food Science

- Doctor of Philosophy
 - without a concentration
 - concentration in Toxicology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Food Science and Human Nutrition Departmental Courses

Code	Title	Credits
DIE 6241	Advanced Medical Nutrition Therapy	4
DIE 6242	Advanced Medical Nutrition Therapy II	3
DIE 6516	Professional Development in Dietetics	2
DIE 6905	Problems in Dietetics	1-3
DIE 6938	Advanced Dietetic Seminar	1
DIE 6940	Community Nutrition Practicum	3
DIE 6942	Dietetic Internship I	9
DIE 6944	Dietetic Internship II	6
FOS 5126C	Psychophysical Aspects of Foods	3
FOS 5205	Current Issues in Food Safety and Sanitation	3
FOS 5225C	Principles in Food Microbiology	4
FOS 5437C	Food Product Development	3
FOS 5561C	Citrus Processing Technology	3
FOS 5645	Functional Foods and Nutraceuticals	3
FOS 5732	Current Issues in Food Regulations	3
FOS 6125C	Sensory Evaluation of Food	3
FOS 6215	Principles of Food Safety	3
FOS 6216	Food Safety Systems	2
FOS 6217	Food Safety, Sanitation, and Microbiology	2
FOS 6218	Food Safety Systems	2
FOS 6224	Food and Environmental Virology	2
FOS 6226C	Advanced Food Microbiology	4
FOS 6315C	Advanced Food Chemistry	4
FOS 6317C	Flavor Chemistry and Technology	3
FOS 6355C	Instrumental Analysis and Separations	5
FOS 6428C	Advanced Food Processing	4
FOS 6455C	Industrial Food Fermentations	3
FOS 6736	Food Regulations	2
FOS 6905	Problems in Food Science	1-3
FOS 6910	Supervised Research	1-5
FOS 6915	Research Planning	2
FOS 6936	Topics in Food Science	1-4
FOS 6938	Food Science Seminar	1
FOS 6940	Supervised Teaching	1-5
FOS 6971	Research for Master's Thesis	1-15
FOS 7979	Advanced Research	1-12
FOS 7980	Research for Doctoral Dissertation	1-15
HUN 5441	Metabolic Response to Enteral and Parenteral Nutrition	2
HUN 5447	Nutrition and Immunity	3

HUN 6235	Macronutrients in Human Nutrition	3
HUN 6245	Advanced Human Nutrition	3
HUN 6255	Clinical Nutrition	2-12
HUN 6301	Nutritional Aspects of Lipid Metabolism	3
HUN 6305	Nutritional Aspects of Carbohydrates	3
HUN 6321	Proteins and Amino Acids in Nutrition	3
HUN 6331	Vitamins in Human Nutrition	3
HUN 6356	Minerals in Nutrition	3
HUN 6548	Global Nutrition	3
HUN 6626	Nutrition Education	1
HUN 6804	Nutrition Research Method: Systematic Review	3
HUN 6812C	Analytical Techniques in Nutritional Biochemistry	1
HUN 6835	Research Projects in Nutrition and Dietetics – part 2	2
HUN 6905	Problems in Nutritional Sciences	1-3
HUN 6936	Topics in Nutritional Sciences	1-4
HUN 6938	Nutritional Sciences Seminar	1
HUN 6939	Advanced Clinical Nutrition	2-12
HUN 6940	Supervised Teaching	1-5
HUN 6971	Research for Master's Thesis	1-15
HUN 7979	Advanced Research	1-12
HUN 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Food science

SLO 1 Knowledge
Explain and apply components and interactions of food and health.

SLO 2 Skills
Use critical thinking to evaluate research design and experiments and the scientific literature.

SLO 3 Skills

Identify appropriate research methodologies, execute a research plan and interpret results for the discovery of new information.

SLO 4 Professional Behavior

Interact with professional peers, faculty, and staff with honesty, ethical behavior, respect, fellowship, and cooperation.

Food Science and Human Nutrition

Program Information

The M.S. program offers tracks in food science and in nutritional sciences. The Institute of Food Technologists and the American Society for Nutrition recognize these concentrations. The department also offers a combination Master of Science-Dietetics Internship (MS-DI) program accredited by the Accreditation for Education in Nutrition and Dietetics (ACEND) (<https://www.eatrightpro.org/acend/>). Students who complete this program are eligible to take the national registration examination to become registered dietitians. Only graduates from an ACEND accredited/approved Didactic Program in Dietetics are eligible for the MS-DI program.

Specific areas of study include nutritional biochemistry/molecular biology, nutrient function/metabolism, medical nutrition therapy/dietetics, nutritional immunology, food processing/engineering, food chemistry/biochemistry, and food safety/microbiology/quality.

Applicants must have an adequate background in physical and biological sciences and food science or nutritional sciences. Students with specific deficiencies will be required to take prerequisite courses.

For further information, please see our website at <http://fshn.ifas.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Food Science and Human Nutrition

- Master of Science
 - without a concentration
 - concentration in Nutritional Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Food Science and Human Nutrition Departmental Courses

Code	Title	Credits
DIE 6241	Advanced Medical Nutrition Therapy	4
DIE 6242	Advanced Medical Nutrition Therapy II	3
DIE 6516	Professional Development in Dietetics	2
DIE 6905	Problems in Dietetics	1-3
DIE 6938	Advanced Dietetic Seminar	1
DIE 6940	Community Nutrition Practicum	3
DIE 6942	Dietetic Internship I	9
DIE 6944	Dietetic Internship II	6
FOS 5126C	Psychophysical Aspects of Foods	3
FOS 5205	Current Issues in Food Safety and Sanitation	3
FOS 5225C	Principles in Food Microbiology	4
FOS 5437C	Food Product Development	3
FOS 5561C	Citrus Processing Technology	3

FOS 5645	Functional Foods and Nutraceuticals	3
FOS 5732	Current Issues in Food Regulations	3
FOS 6125C	Sensory Evaluation of Food	3
FOS 6215	Principles of Food Safety	3
FOS 6216	Food Safety Systems	2
FOS 6217	Food Safety, Sanitation, and Microbiology	2
FOS 6218	Food Safety Systems	2
FOS 6224	Food and Environmental Virology	2
FOS 6226C	Advanced Food Microbiology	4
FOS 6315C	Advanced Food Chemistry	4
FOS 6317C	Flavor Chemistry and Technology	3
FOS 6355C	Instrumental Analysis and Separations	5
FOS 6428C	Advanced Food Processing	4
FOS 6455C	Industrial Food Fermentations	3
FOS 6736	Food Regulations	2
FOS 6905	Problems in Food Science	1-3
FOS 6910	Supervised Research	1-5
FOS 6915	Research Planning	2
FOS 6936	Topics in Food Science	1-4
FOS 6938	Food Science Seminar	1
FOS 6940	Supervised Teaching	1-5
FOS 6971	Research for Master's Thesis	1-15
FOS 7979	Advanced Research	1-12
FOS 7980	Research for Doctoral Dissertation	1-15
HUN 5441	Metabolic Response to Enteral and Parenteral Nutrition	2
HUN 5447	Nutrition and Immunity	3
HUN 6235	Macronutrients in Human Nutrition	3
HUN 6245	Advanced Human Nutrition	3
HUN 6255	Clinical Nutrition	2-12
HUN 6301	Nutritional Aspects of Lipid Metabolism	3
HUN 6305	Nutritional Aspects of Carbohydrates	3
HUN 6321	Proteins and Amino Acids in Nutrition	3
HUN 6331	Vitamins in Human Nutrition	3
HUN 6356	Minerals in Nutrition	3
HUN 6548	Global Nutrition	3
HUN 6626	Nutrition Education	1
HUN 6804	Nutrition Research Method: Systematic Review	3
HUN 6812C	Analytical Techniques in Nutritional Biochemistry	1
HUN 6835	Research Projects in Nutrition and Dietetics – part 2	2
HUN 6905	Problems in Nutritional Sciences	1-3
HUN 6936	Topics in Nutritional Sciences	1-4
HUN 6938	Nutritional Sciences Seminar	1
HUN 6939	Advanced Clinical Nutrition	2-12
HUN 6940	Supervised Teaching	1-5
HUN 6971	Research for Master's Thesis	1-15
HUN 7979	Advanced Research	1-12
HUN 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3

ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Food Science and human nutrition (MS)

SLO 1 Knowledge

Explain and apply components and interactions of food and health.

SLO 2 Skills

Use critical thinking to evaluate research design and experiments and the scientific literature.

SLO 3 Skills

Identify appropriate research methodologies, execute a research plan and interpret results for the discovery of new information.

SLO 4 Professional Behavior

Interact with professional peers, faculty, and staff with honesty, ethical behavior, respect, fellowship, and cooperation.

Nutritional Sciences

Program Information

The field of nutritional science has unprecedented public interest. This is fostered by evolving links between diet and health, and the impact of one's individual genetic makeup on nutrient utilization. The Ph.D. degree program in Nutritional Sciences is interdisciplinary, with participating CALS, COM, CLAS, and CVM faculty directing research of doctoral students, where the full spectrum of Nutritional Sciences is available. Emphasis areas include basic nutritional sciences, biochemistry and molecular biology, genetics, immunology, physiology, clinical nutrition, microbiology, and biostatistics.

Students are admitted to the program after the bachelor's degree or a master's degree in nutritional sciences or a related field. Applicants should have a strong undergraduate background in biological sciences and chemistry. Deficiencies may be made up during the first year of graduate study.

Additional information can be found at <http://nutritionalsciences.centers.ufl.edu>.

For additional information, e-mail Dr. Wendy Dahl, Director at wdahl@ufl.edu, or Dr. Elaine Turner, Graduate Coordinator at returmer@ufl.edu.

Degrees Offered

Degrees Offered with a Major in Nutritional Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Nutritional Sciences Program Core Courses

Code	Title	Credits
BCH 6206	Advanced Metabolism	3
HUN 6938	Nutritional Sciences Seminar	1
STA 6166	Statistical Methods in Research I	3
HUN 6301	Nutritional Aspects of Lipid Metabolism	3
HUN 6305	Nutritional Aspects of Carbohydrates	3
HUN 6321	Proteins and Amino Acids in Nutrition	3
HUN 6331	Vitamins in Human Nutrition	3
HUN 6356	Minerals in Nutrition	3

Additional Course Offerings

The following courses may be taken to contribute to the overall degree award requirements.

Food Science and Human Nutrition Departmental Courses

Code	Title	Credits
DIE 6241	Advanced Medical Nutrition Therapy	4
DIE 6242	Advanced Medical Nutrition Therapy II	3
DIE 6516	Professional Development in Dietetics	2
DIE 6905	Problems in Dietetics	1-3
DIE 6938	Advanced Dietetic Seminar	1
DIE 6940	Community Nutrition Practicum	3
DIE 6942	Dietetic Internship I	9
DIE 6944	Dietetic Internship II	6
FOS 5126C	Psychophysical Aspects of Foods	3
FOS 5205	Current Issues in Food Safety and Sanitation	3
FOS 5225C	Principles in Food Microbiology	4
FOS 5437C	Food Product Development	3
FOS 5561C	Citrus Processing Technology	3
FOS 5645	Functional Foods and Nutraceuticals	3
FOS 5732	Current Issues in Food Regulations	3
FOS 6125C	Sensory Evaluation of Food	3
FOS 6215	Principles of Food Safety	3
FOS 6216	Food Safety Systems	2
FOS 6217	Food Safety, Sanitation, and Microbiology	2
FOS 6218	Food Safety Systems	2
FOS 6224	Food and Environmental Virology	2
FOS 6226C	Advanced Food Microbiology	4
FOS 6315C	Advanced Food Chemistry	4
FOS 6317C	Flavor Chemistry and Technology	3
FOS 6355C	Instrumental Analysis and Separations	5
FOS 6428C	Advanced Food Processing	4
FOS 6455C	Industrial Food Fermentations	3

FOS 6736	Food Regulations	2
FOS 6905	Problems in Food Science	1-3
FOS 6910	Supervised Research	1-5
FOS 6915	Research Planning	2
FOS 6936	Topics in Food Science	1-4
FOS 6938	Food Science Seminar	1
FOS 6940	Supervised Teaching	1-5
FOS 6971	Research for Master's Thesis	1-15
FOS 7979	Advanced Research	1-12
FOS 7980	Research for Doctoral Dissertation	1-15
HUN 5441	Metabolic Response to Enteral and Parenteral Nutrition	2
HUN 5447	Nutrition and Immunity	3
HUN 6235	Macronutrients in Human Nutrition	3
HUN 6245	Advanced Human Nutrition	3
HUN 6255	Clinical Nutrition	2-12
HUN 6301	Nutritional Aspects of Lipid Metabolism	3
HUN 6305	Nutritional Aspects of Carbohydrates	3
HUN 6321	Proteins and Amino Acids in Nutrition	3
HUN 6331	Vitamins in Human Nutrition	3
HUN 6356	Minerals in Nutrition	3
HUN 6548	Global Nutrition	3
HUN 6626	Nutrition Education	1
HUN 6804	Nutrition Research Method: Systematic Review	3
HUN 6812C	Analytical Techniques in Nutritional Biochemistry	1
HUN 6835	Research Projects in Nutrition and Dietetics – part 2	2
HUN 6905	Problems in Nutritional Sciences	1-3
HUN 6936	Topics in Nutritional Sciences	1-4
HUN 6938	Nutritional Sciences Seminar	1
HUN 6939	Advanced Clinical Nutrition	2-12
HUN 6940	Supervised Teaching	1-5
HUN 6971	Research for Master's Thesis	1-15
HUN 7979	Advanced Research	1-12
HUN 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1

STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Nutritional sciences

SLO 1 Articulate Fundamental Knowledge

Articulate (in oral and written form) fundamental knowledge in nutrition, physiology, biochemistry, molecular biology, genetics and genomics.

SLO 2 Research in Nutritional Sciences

Analyze, interpret and evaluate research in nutritional sciences.

SLO 3 Discovery of New Information

Plan, organize and conduct research for the discovery of new information.

SLO 4 Professional Behavior

Display ethical behavior in all areas of conduct; interact with peers, faculty and staff with respect, fellowship and cooperation.

Horticultural Sciences Department

Chairs: C. Gunter (Chair, Horticultural Sciences) and L. House (Interim Chair, Environmental Horticulture)

Graduate Coordinators: C. Vallejos (Horticultural Sciences) and G. Hansen (Environmental Horticulture)

The Horticultural Sciences Department Graduate Program at the University of Florida has a wide array of opportunities for graduate study.

The Horticultural Sciences (HOS) graduate program is administered jointly by the Environmental Horticulture (HSE) and Horticultural Sciences (HS) departments and offers graduate programs leading to the Master of Science (thesis or nonthesis options) and the Doctor of Philosophy degrees. Members of the program's Graduate Faculty include department resident faculty and faculty at the University of Florida Research and Education Centers located throughout Florida.

The Horticultural Sciences Department offers a combination bachelor's/master's degree program. Please contact the graduate coordinator for information.

For admission to the HOS graduate program, apply to either the HS or HSE departments, depending on your career/research interest. Details about the program and how to apply are listed on their website:

HOS <http://hos.ufl.edu>

HSE <https://hort.ifas.ufl.edu/environmental-horticulture-graduate-program/>

Majors

- Horticultural Sciences (p. 52)
- Plant Breeding (p. 55)

Faculty

Professor

- Boyd, Nathan S.
- Brecht, Jeffrey K.
- Chen, Jianjun

- Crane, Jonathan H.
- Folta, Kevin M.
- Gmitter, Frederick G.
- Grosser, Jude William
- Gunter, Christopher C.
- Koch, Karen E.
- Mccarty, Donald R.
- Messina, Carlos D.
- Moore, Kimberly
- Ritenour, Mark A.
- Sargent, Steven Alonzo
- Schaffer, Bruce A.
- Simonne, Eric H.
- Vallejos, Carlos E.
- Vendrame, Wagner Aparecido
- Whitaker, Vance M.
- Williamson, Jeffrey G.
- Zhao, Xin
- Zotarelli, Lincoln

Associate Professor

- Agehara, Shinsuke
- Albrecht, Ute
- Alferez, Fernando Miguel
- Basset, Gilles J.
- Chaparro, Jose Xavier
- Chase, Carlene Ann
- Dittmar, Peter J.
- Hutton, Samuel F.
- Kanissery, Ramdas Gopinath
- Kim, Jeongim J.
- Lee, Seonghee
- Liu, Guodong
- Meru, Geoffrey Mugambi
- Munoz Del Valle, Patricio Ricardo
- Ribeiro De Resende, Marcio Fernando
- Sandoya Miranda, German V.
- Sarkhosh, Ali
- Treadwell, Danielle D.
- Vashisth, Tripti
- Vincent, Christopher I.
- VOINICIUC, CATALIN

Assistant Professor

- Balmant, Kelly Mayrink
- Baysal, Can
- Chater, John M.
- Chitwood-Brown, Jessica L.
- Dutt, Manjul
- Leyton Naranjo, Leynar Eduardo
- Li, Xiaoying
- Liu, Tie

- Mattia, Matthew R.
- Nunez Villegas, Gerardo
- Rossi, Lorenzo
- Shahid, Muhammad A.
- Sharma, Anuj
- Singh, Jugpreet
- Tabay Zambon, Flavia
- Tsouvaltzis, Pavlos

Other

- Merchant, Amethyst G.

Eminent Scholar

- Hanson, Andrew D.

Research Associate Professor

- Suzuki, Masaharu
- Tieman, Denise M.

Distinguished Professor

- Ferl, Robert J.

Courtesy Assistant Professor

- Bai, Jinhe

Research Professor

- Paul, Annalisa

Research Assistant Scientist

- Febres, Vicente J.
- Ferrao, Luis Felipe
- Omar, Ahmad Alsayed Mohamad

Courtesy Professor

- Hunter, Charles Thomas
- Plotto, Anne
- Wheeler, Raymond M.

Courtesy Associate Professor

- Block, Anna K.

Extension Agent

- Rice, Ronald W.

Affiliated Faculty

- Altpeter, Fredy
Professor
- Babar, Md Ali
Associate Professor
- Clark, David G.
Professor
- Deng, Zhanao
Professor
- Hernandez Jarquin, Juan Diego

Assistant Professor

- Huo, Heqiang
Associate Professor
- Kenworthy, Kevin E.
Professor
- Kirst, Matias
Distinguished Professor
- Peter, Gary Frank
Professor
- Rathinasabapathi, Balasubramani
Professor
- Rios, Esteban Fernando
Associate Professor
- Sandhu, Hardev S.
Associate Professor
- Tillman, Barry
Professor
- Wang, Jianping
Professor
- Wang, Xu
Assistant Professor
- Wu, Xingbo
Assistant Professor

- Physiology and Biochemistry
- Plant Molecular Biology
- Protected Agriculture

Numerous HS and HSE faculty participate in the interdisciplinary Plant Molecular and Cellular Biology Program. Students interested in molecular biology/biotechnology may pursue molecular-oriented studies in any listed specialization. Students interested in full specialization in molecular and related disciplines should contact the Plant Molecular and Cellular Biology interdisciplinary program for specific requirements.

Specializations in the HSE department:

- Breeding and Genetics
- Restoration Ecology
- Floriculture
- Foliage Production
- Plant anatomy and development
- Plant Biotechnology
- Plant Restoration Conservation Biotechnology
- Stress Physiology
- Taxonomy
- Tissue Culture
- Turfgrass Science
- Woody Plants

Horticultural Sciences

Program Information

The Horticultural Sciences (HOS) graduate program is administered jointly by the Environmental Horticulture (HSE) and Horticultural Sciences (HS) departments and offers graduate programs leading to the Master of Science (thesis or nonthesis options) and the Doctor of Philosophy degrees. The Department offers a combination bachelor's/master's degree program. Contact the graduate coordinator for information. Members of the program's Graduate Faculty include department resident faculty and faculty at University of Florida Research and Education Centers located throughout Florida.

For admission to the HOS graduate program, apply to either the HS or HSE departments, depending on your career/research interest.

Requirements

A strong undergraduate or graduate background in horticultural, biological, agronomic, or other disciplines in the life sciences and undergraduate coursework in chemistry, physics, and mathematics. A prospective graduate student need not have majored in horticulture as an undergraduate or master's student; however, students with curriculum deficiencies are required to take prerequisite subjects during the first year of graduate study. Undergraduate courses taken to correct curriculum deficiencies do not count for graduate program credit.

Specializations in the HS department focus on vegetable and fruit crops and include

- Plant Breeding and Genetics
- Crop Production and Nutrient Management
- Postharvest Biology
- Organic Sustainable Agriculture
- Weed Science

Graduate School Degree Program Requirements Master of Science (Thesis Option)

Students must earn at least 30 credits as a graduate student at UF. No more than 9 of the 30 credits (earned with a grade of A, B+, or B) may be transferred from institutions approved for this purpose by the Dean of the Graduate School. A minimum of 12 credits is required in the Horticultural Sciences major; additionally, a maximum of 6 credits in HOS 6971 Research for Master's Thesis (1-15 cr.)- Master's Research - may be counted toward the total credits. See here for information on M.S. graduate degrees (p. 778).

A minor may be chosen in an academic unit other than the major. If a minor is chosen, at least 6 credits of course work are required in the minor field. Two 6-credit minors may be taken with the major academic unit's permission. A 3.00 (truncated) GPA is required for minor credit. In addition, a representative from the department in which the minor is being received must be on the supervisory committee.

Master of Science Non-Thesis Option

This option offers additional training beyond the bachelor's degree in a horticultural specialization. Essential elements of this program include a program of courses and a comprehensive written and/or final oral qualifying examination. There is no thesis requirement. A minimum of 30 credit hours of course work is required. Courses taken for program credit must be numbered 5000 or higher with at least 15 of these credits in the Horticultural Science major. With supervisory committee and college dean approval, 6 hours of 3000- or 4000-level undergraduate courses, taught outside the major department, may count toward the minimum requirements for the degree. Click for information on all graduate degrees (p. 778).

A minor may be chosen in an academic unit other than the major. If a minor is chosen, at least 6 credits of work are required in the minor field. Two 6-credit minors may be taken with the major academic unit's

permission. A 3.00 (truncated) GPA is required for minor credit. In addition, a representative from the department in which the minor is being received must be on the supervisory committee.

Doctor of Philosophy

The Doctor of Philosophy is a research degree and is granted on evidence of general proficiency, distinctive attainment in a special field, and ability to conduct independent investigation as demonstrated in a dissertation presenting original research with a high degree of literary skill. Consequently, doctoral programs are more flexible and varied than those leading to M.S. degree programs. The Ph.D. degree requires at least 90 credits beyond the bachelor's degree, although specific course requirements vary from field to field and from student to student. Up to 30 credits of master's degree may be transferred to a doctoral program. Any credits counted from an M.S. degree program must have been earned within the previous seven years (or by petition). The Graduate Council does not specify the courses required for the Ph.D. degree.

General requirements for the program include

- a clear objective for research
- approval of the student's entire supervisory committee
- an appropriate number of credits of doctoral research

Click for information on all graduate degrees (p. 778).

Minor

With the supervisory committee's approval, the student may choose one or more minor fields. Minor work may be completed in any academic unit outside the major, if approved for M.S. or doctoral programs listed in this catalog. The collective grade for courses included in a minor must be "B" (3.00) or higher. If one minor is chosen, the supervisory committee member representing the minor suggests 12 to 24 credits of courses numbered 5000 or higher as preparation for a qualifying examination. Part of this credit may have been earned in the M.S. degree program. If two minors are chosen, each must include at least 8 credits. Competence in the minor area is demonstrated by written examination by the minor academic unit, or by the oral qualifying examination. Minor course work at the doctoral level may include courses in more than one academic unit; if the objective of the minor is clearly stated and the combination of courses is approved by the Graduate School (this approval is not required for a minor in one academic unit). Further requirements for the Master of Science and the Doctor of Philosophy degrees are listed under those headings in the General Information section of this catalog.

Degrees Offered

Degrees Offered with a Major in Horticultural Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Environmental Horticulture
 - concentration in Horticultural Sciences
 - concentration in Toxicology
- Master of Science
 - without a concentration
 - concentration in Environmental Horticulture
 - concentration in Horticultural Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Horticultural Sciences Program Courses

Code	Title	Credits
ALS 6935	Topics in Biological Invasions	3
BCH 5045	Graduate Survey of Biochemistry	4
BOT 6935	Special Topics	1-4
HOS 6934	Professional Seminar Preparation	1
PLS 5222C	Propagation of Horticultural Crops	3
PLS 5241C	Advanced Plant Micropropagation	4

Additional Course Offerings

The following courses may be taken to contribute to the overall degree award requirements.

Botany Courses

Code	Title	Credits
BOT 5225C	Plant Anatomy	4
BOT 5305	Paleobotany	3
BOT 5505C	Intermediate Plant Physiology	3
BOT 5655C	Physiological Plant Ecology	3
BOT 5685C	Tropical Botany	5
BOT 5695C	Ecosystems of Florida	3
BOT 5725C	Taxonomy of Vascular Plants	4
BOT 6566	Plant Growth and Development	3
BOT 6716C	Advanced Taxonomy	2
BOT 6726C	Principles of Systematic Biology	4
BOT 6905	Individual Studies in Botany	1-3
BOT 6910	Supervised Research	1-5
BOT 6927	Advances in Botany	1-3
BOT 6935	Special Topics	1-4
BOT 6936	Graduate Student Seminar	1-2
BOT 6971	Research for Master's Thesis	1-15
BOT 7979	Advanced Research	1-12
BOT 7980	Research for Doctoral Dissertation	1-15
PCB 5046C	Advanced Ecology	3
PCB 5338	Principles of Ecosystem Ecology	3
PCB 5356	Tropical Ecology	3
PLP 6656C	Fungal Biology	4

Environmental Horticulture Courses

Code	Title	Credits
ALS 5934	Graduate Professional Development Seminar	2
BCH 5045	Graduate Survey of Biochemistry	4
HOS 5117C	Horticultural Plant Morphology and Identification	3
HOS 5432	Advanced Nutritional Management of Ornamental Crops	3
HOS 5515C	Greenhouse and Nursery Operations	3
HOS 5516C	Cultivation, Extraction, and Application of Medicinal Plants and Their Bioactive Compounds	3
HOS 6070	Plant Materials for Conservation and Restoration	3
HOS 6295	Methods in Plant Biotechnology	3
HOS 6523	Research and Development in Turfgrass Science	3

HOS 6905	Problems in Horticultural Science	1-4
HOS 6910	Supervised Research	1-5
HOS 6931	Horticultural Science Seminar	1
HOS 6932	Special Topics	1-4
HOS 6940	Supervised Teaching	1-5
HOS 6941	Practicum in Horticultural Science	2-4
HOS 6971	Research for Master's Thesis	1-15
HOS 6991	Fundamentals of Seed Biology	4
HOS 7979	Advanced Research	1-12
HOS 7980	Research for Doctoral Dissertation	1-15
ORH 5026C	Advanced Annual and Perennial Gardening	3
ORH 5086	Advanced Golf and Sports Turf Management	2
ORH 5282	Orchid Biology and Culture	3
ORH 5817C	Advanced Florida Native Landscaping	3
PLS 5222C	Propagation of Horticultural Crops	3
PLS 5241C	Advanced Plant Micropropagation	4

Horticultural Sciences Departmental Courses

Code	Title	Credits
ALS 5932	Special Topics	1-4
HOS 5085C	Principles of Postharvest Horticulture	3
HOS 5242	Genetics & Breeding of Vegetable Crops	3
HOS 5330	Postharvest Technologies for Horticultural Crops	2
HOS 5505	Getting Published Horticulture	3
HOS 5555	Tropical Fruit Production and Research in Florida	3
HOS 5711	Phytochemicals in Food & Health	3
HOS 6201	Breeding Perennial Cultivars	3
HOS 6236	Molecular Marker Assisted Plant Breeding	3
HOS 6307	Horticultural Physiology	3
HOS 6331	Postharvest Biology	3
HOS 6345	Environmental Physiology	4
HOS 6355	Root and Rhizosphere Ecology	3
HOS 6412	Nutrition of Horticultural Crops	3
HOS 6545	Advanced Citriculture I	3
HOS 6905	Problems in Horticultural Science	1-4
HOS 6910	Supervised Research	1-5
HOS 6931	Horticultural Science Seminar	1
HOS 6932	Special Topics	1-4
HOS 6934	Professional Seminar Preparation	1
HOS 6940	Supervised Teaching	1-5
HOS 6941	Practicum in Horticultural Science	2-4
HOS 6971	Research for Master's Thesis	1-15
HOS 7979	Advanced Research	1-12
HOS 7980	Research for Doctoral Dissertation	1-15
PCB 5065	Advanced Genetics	4
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6910	Supervised Research	1-5
PCB 6937	Special Topics in Plant Molecular and Cellular Biology	1-4
PCB 6971	Research for Master's Thesis	1-15
PCB 7922	Journal Colloquy in Plant Molecular and Cellular Biology	1
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15
PLS 6635	Weed Management for Organic and Sustainable Cropping Systems	3

PLS 7979	Advanced Research	1-12
PLS 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

horticultural sciences (PHD)

- **SLO 1 (Knowledge):** Describe and explain theories and concepts of the various disciplines of Horticultural Sciences, including plant physiology and plant genetics as related to horticultural plant growth and development, and the integration of structure and function of the whole plant
- **SLO 2 (Knowledge):** Describe new techniques and technologies from associated disciplines
- **SLO 3 (Knowledge):** Evaluate horticultural systems, components, and/or processes to meet industry and societal needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability constraints
- **SLO 4 (Skills):** Design and conduct experiments required for the successful production of fruit and vegetable crops, and analyze results
- **SLO 5 (Skills):** Communicate horticultural ideas, technical data, and design information clearly and professionally to other students, scientists, and the public
- **SLO 6 (Professional Behavior):** Display ethical behaviors, cultural sensitivity, teamwork skills, and professional conduct

Horticultural Sciences (MS)-Horticultural Sciences

- **SLO 1 (Knowledge):** Describe and explain theories and concepts of the various disciplines of Horticultural Sciences, including plant physiology and plant genetics as related to horticultural plant growth and development, and the integration of structure and function of the whole plant

- **SLO 2 (Knowledge):** Describe new techniques and technologies from associated disciplines
- **SLO 3 (Knowledge):** Evaluate horticultural systems, components, and/or processes to meet industry and societal needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability constraints
- **SLO 4 (Skills):** Design and conduct experiments required for the successful production of fruits and vegetables, and analyze results
- **SLO 5 (Skills):** Communicate horticultural ideas, technical data, and design information clearly and professionally to other students, scientists, and the public
- **SLO 6 (Professional Behavior):** Display ethical behaviors, cultural sensitivity, teamwork skills, and professional conduct

Horticultural Sciences (MS)- Environmental Horticulture

- **SLO 1 (Knowledge):** Describe and explain theories and concepts of the various disciplines of Horticultural Sciences, including plant physiology and plant genetics as related to horticultural plant growth and development, and the integration of structure and function of the whole plant.
- **SLO 2 (Knowledge):** Evaluate and advance horticultural systems, components, and/or processes to meet industry and societal needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- **SLO 3 (Knowledge):** Describe techniques and technologies from associated disciplines as applied to Environmental Horticulture
- **SLO 4 (Skills):** Design, conduct, and evaluate experiments or studies required to advance or improve the production and/or management of horticultural crops, and analyze results
- **SLO 5 (Skills):** Communicate in written and oral form horticultural ideas, technical data, and design information clearly and professionally to other students, scientists, and the public
- **SLO 6 (Professional Behavior):** Display ethical behaviors, cultural sensitivity, teamwork skills, and professional conduct

Plant Breeding PROGRAM INFORMATION

Program Director: E. Rios

Program Coordinator: E. Kampf

Plant Breeding is an interdisciplinary and interdepartmental graduate program that provides comprehensive training to prepare well-rounded and career-ready plant breeders for academic, industry, non-profit and other sectors. Our integrated curriculum equips students with traditional and contemporary breeding methodologies, including analysis of breeding trials, breeding methods and techniques, bioinformatics, gene editing, genomic prediction and quantitative genetics.

The Plant Breeding Graduate Program offers a Doctor of Philosophy degree that provides students with a strong background in experimental design and analysis during the first semester, and plant breeding theory and methods during the second semester. Our plant breeding faculty work with 50 plant species and represent diverse disciplines including: cell biology, genomics, molecular genetics, plant pathology, quantitative genetics & biometrics. For a complete faculty listing, please see the last page of this document.

To graduate in the program, students are required to have a minimum of 40 credits of coursework toward their major. Students must take all the 7 required courses listed below for a total of 20 credits of required courses and must additionally choose a minimum of 20 additional credits from the list of elective courses.

Minimum requirements for this degree are available in the Graduate Degrees (<http://gradcatalog.ufl.edu/content.php?catoid=12&navoid=2748>) section of this catalog. Successful applicants should have a B.S. or M.S. in agricultural, horticultural, forestry, biological or chemical sciences with desirable advanced undergraduate coursework in genetics, statistics, plant breeding, and biochemistry. However, outstanding students from a broad range of science and engineering disciplines will be considered.

All doctoral students must have at least one first author publication submitted to a peer-reviewed journal in their research field before graduation. Our students are strongly encouraged to publish before graduating.

Contact program director Dr. Esteban Rios at estebanrios@ufl.edu or 352-301-2244

Contact program coordinator Eliana Kampf at elianak@ufl.edu or 352-273-4760

For more information, please visit <https://programs.ifas.ufl.edu/plant-breeding/graduate-program/>

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN PLANT Breeding

- Doctor of Philosophy

Courses

PLANT Breeding COURSES

The Plant Breeding Ph.D. degree will require a minimum of 90 post-baccalaureate credit hours and will include required courses, elective courses and dissertation research. To graduate in the program, students are required to have a minimum of 40 credits of coursework toward their major. All students are required to take 20 credits of required courses and must additionally choose a minimum of 20 additional credits from the list of elective courses.

Students must take the following 20 credits of required courses toward the Plant Breeding major:

REQUIRED COURSES

Code	Title	Credits
AGR 5266C	Field Plot Techniques	3
AGR 5321C	Genetic Improvement of Plants	3
AGR 6325L	Plant Breeding Techniques	1
Students can take AGR 6325L any spring semester of odd years in coordination with their supervisory committee.		
HOS 6932	Special Topics	1-4
Students need to take a total of 7 credits of HOS 6932 Special Topics: HOS 6932 Survey of Breeding Tools and Methods (3 credits) and a minimum of 4 credits of HOS 6932 Journal Colloquium (1 credit) toward the major. HOS 6932 can be taken any fall and spring semester.		
PCB 6555	Introduction to Quantitative Genetics	3
Students can take PCB 6555 any fall semester of even years in coordination with their supervisory committee.		

STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3

Students must choose a minimum of 20 credits from the list of electives below:

ELECTIVE COURSES

Code	Title	Credits
AGR 5307	Molecular Genetics for Crop Improvement	3
AGR 6305	Plant Chromosomes and Genomes	3
AGR 6322	Advanced Plant Breeding	3
AGR 5444	Ecophysiology of Crop Production	3
BCH 5045	Graduate Survey of Biochemistry	4
ENY 5006	Graduate Survey of Entomology	3
ENY 5006L	Graduate Survey of Entomology Laboratory	1
HOS 5242	Genetics & Breeding of Vegetable Crops	3
HOS 6201	Breeding Perennial Cultivars	3
HOS 6236	Molecular Marker Assisted Plant Breeding	3
HOS 6295	Methods in Plant Biotechnology	3
HOS 6932	Special Topics	1-4
HOS 6991	Fundamentals of Seed Biology	4
NEM 5004C	Graduate Survey of Nematology	3
PCB 5065	Advanced Genetics	4
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6685	Population Genetics	4
PLP 5005C	General Plant Pathology	4
PLP 6291	Plant Disease Diagnosis	3

Students admitted with an M.S. degree may be able to transfer up to 30 credits toward their elective courses requirement from a regionally accredited institution or international equivalent, subject to existing UF Graduate School policies.

The number of dissertation research credits will vary according to the student's field of study and progression toward research and degree.

Agronomy Departmental Courses

Code	Title	Credits
AGR 5230C	Florida Grassland Agroecosystems	4
AGR 5266C	Field Plot Techniques	3
AGR 5277C	Tropical Crop Production	3
AGR 5307	Molecular Genetics for Crop Improvement	3
AGR 5321C	Genetic Improvement of Plants	3
AGR 5444	Ecophysiology of Crop Production	3
AGR 5511	Crop Ecology	3
AGR 6233	Tropical Grassland Agroecosystems	3
AGR 6237C	Research Techniques in Forage Evaluation	3
AGR 6305	Plant Chromosomes and Genomes	3
AGR 6322	Advanced Plant Breeding	3
AGR 6325L	Plant Breeding Techniques	1
AGR 6422C	Environmental Crop Nutrition	3
AGR 6442C	Physiology of Agronomic Plants	4
AGR 6905	Agronomic Problems	1-5
AGR 6913	Supervised Extension-Agronomy	3
AGR 6932	Topics in Agronomy	1-3
AGR 6933	Graduate Agronomy Seminar	1
AGR 6940	Supervised Teaching	1-5
AGR 6971	Research for Master's Thesis	1-15
AGR 7306	Multi-Omic Integration for Applied Prediction Breeding	3
AGR 7979	Advanced Research	1-12
AGR 7980	Research for Doctoral Dissertation	1-15
ALS 5155	Global Agroecosystems	3

ALS 5932	Special Topics	1-4
ALS 6031	Project Team Research: Building Skills in Agrobiology	3
IPM 5305	Principles of Pesticides	3
PLS 5625	Upland Invasive Plant Management	3
PLS 5632C	Integrated Weed Management	3
PLS 5633	Aquatic Plant Management	3
PLS 6626	Invasive Plant Ecology	3
PLS 6655	Plant/Herbicide Interaction	3

Environmental Horticulture Departmental Courses

Code	Title	Credits
ALS 5934	Graduate Professional Development Seminar	2
BCH 5045	Graduate Survey of Biochemistry	4
HOS 5117C	Horticultural Plant Morphology and Identification	3
HOS 5432	Advanced Nutritional Management of Ornamental Crops	3
HOS 5515C	Greenhouse and Nursery Operations	3
HOS 5516C	Cultivation, Extraction, and Application of Medicinal Plants and Their Bioactive Compounds	3
HOS 6070	Plant Materials for Conservation and Restoration	3
HOS 6295	Methods in Plant Biotechnology	3
HOS 6523	Research and Development in Turfgrass Science	3
HOS 6905	Problems in Horticultural Science	1-4
HOS 6910	Supervised Research	1-5
HOS 6931	Horticultural Science Seminar	1
HOS 6932	Special Topics	1-4
HOS 6940	Supervised Teaching	1-5
HOS 6941	Practicum in Horticultural Science	2-4
HOS 6971	Research for Master's Thesis	1-15
HOS 6991	Fundamentals of Seed Biology	4
HOS 7979	Advanced Research	1-12
HOS 7980	Research for Doctoral Dissertation	1-15
ORH 5026C	Advanced Annual and Perennial Gardening	3
ORH 5086	Advanced Golf and Sports Turf Management	2
ORH 5282	Orchid Biology and Culture	3
ORH 5817C	Advanced Florida Native Landscaping	3
PLS 5222C	Propagation of Horticultural Crops	3
PLS 5241C	Advanced Plant Micropropagation	4

Horticultural Sciences Departmental Courses

Code	Title	Credits
ALS 5932	Special Topics	1-4
HOS 5085C	Principles of Postharvest Horticulture	3
HOS 5242	Genetics & Breeding of Vegetable Crops	3
HOS 5330	Postharvest Technologies for Horticultural Crops	2
HOS 5505	Getting Published Horticulture	3
HOS 5555	Tropical Fruit Production and Research in Florida	3
HOS 5711	Phytochemicals in Food & Health	3
HOS 6201	Breeding Perennial Cultivars	3
HOS 6236	Molecular Marker Assisted Plant Breeding	3
HOS 6307	Horticultural Physiology	3
HOS 6331	Postharvest Biology	3
HOS 6345	Environmental Physiology	4
HOS 6355	Root and Rhizosphere Ecology	3
HOS 6412	Nutrition of Horticultural Crops	3

HOS 6545	Advanced Citriculture I	3	FAS 6426	Applied Aquaculture Genetics	3
HOS 6905	Problems in Horticultural Science	1-4	FAS 6705	Fisheries and aquaculture: An economics perspective	3
HOS 6910	Supervised Research	1-5	FAS 6905	Individual Study	1-6
HOS 6931	Horticultural Science Seminar	1	FAS 6910	Supervised Research	1-5
HOS 6932	Special Topics	1-4	FAS 6932	Special Topics in Fisheries and Aquatic Sciences	1-4
HOS 6934	Professional Seminar Preparation	1	FAS 6933	Graduate Symposium	1
HOS 6940	Supervised Teaching	1-5	FAS 6935	Contemporary Problems in Fisheries and Aquatic Sciences	2
HOS 6941	Practicum in Horticultural Science	2-4	FAS 6940	Supervised Teaching	1-5
HOS 6971	Research for Master's Thesis	1-15	FAS 6971	Research for Master's Thesis	1-15
HOS 7979	Advanced Research	1-12	FAS 7979	Advanced Research	1-12
HOS 7980	Research for Doctoral Dissertation	1-15	FAS 7980	Research for Doctoral Dissertation	1-15
PCB 5065	Advanced Genetics	4	FNR 5015	Ecosystem Restoration Principles and Practice	3
PCB 5530	Plant Molecular Biology and Genomics	3	FNR 5016	Ecology and Restoration of Longleaf Pine Ecosystems	3
PCB 6528	Plant Cell and Developmental Biology	3	FNR 5072C	Environmental Education Program Development	3
PCB 6910	Supervised Research	1-5	FNR 5405	Forest Information Systems	3
PCB 6937	Special Topics in Plant Molecular and Cellular Biology	1-4	FNR 5608	Research Planning	3
PCB 6971	Research for Master's Thesis	1-15	FNR 5625	Managing Public Lands and Waters	3
PCB 7922	Journal Colloquy in Plant Molecular and Cellular Biology	1	FNR 5626	Forest Resource Manag	3
PCB 7979	Advanced Research	1-12	FNR 6006	Silviculture: Concepts and Application	3
PCB 7980	Research for Doctoral Dissertation	1-15	FNR 6046C	Lidar Remote Sensing for Forestry Applications	3
PLS 6635	Weed Management for Organic and Sustainable Cropping Systems	3	FNR 6061	Conflict and Collaboration in Natural Resources	3
PLS 7979	Advanced Research	1-12	FNR 6075	Science Communication & Public Education	3
PLS 7980	Research for Doctoral Dissertation	1-15	FNR 6085	Landscape Planning for Ecotourism	3

School of Forest, Fisheries, and Geomatics Sciences Departmental Courses

Code	Title	Credits			
FAS 5015	Aquaculture I	3	FNR 6075	Science Communication & Public Education	3
FAS 5203	Biology of Fishes	3	FNR 6085	Landscape Planning for Ecotourism	3
FAS 5203C	Biology of Fishes	4	FNR 6134	Physiology of Forest Trees	3
FAS 5255	Diseases of Warmwater Fish	3	FNR 6308	Urban Forestry	3
FAS 5276C	Field Ecology of Aquatic Organisms	4	FNR 6314	Issues in Southeastern Forest Health	3
FAS 5335C	Applied Fisheries Statistics	4	FNR 6315	Tropical Forestry	3
FAS 5407	Biology of Fishery and Aquaculture Invertebrates	3	FNR 6406C	Lidar Remote Sensing for Forestry Applications	3
FAS 5901	Scientific Thinking in Ecology	2	FNR 6462	Foundations of Geospatial AI for Natural Resource Management	3
FAS 6154	Marine Adaptations: Environmental Physiology	3	FNR 6504	Analysis of Forest Ecosystems	3
FAS 6165	Fish and Crustacean Nutrition	3	FNR 6505	Forest Ecosystem Health	3
FAS 6176	Algae Biology and Ecology	3	FNR 6506	Forest Ecosystem Resilience	3
FAS 6238	Environmental Physiology of Fishes	3	FNR 6516	Management and Restoration of Invaded Ecosystems	3
FAS 6256	Fish and Aquatic Invertebrate Histology	3	FNR 6560	Intro to Bayesian Statistics for Life Sciences	3
FAS 6272	Marine Ecological Processes	3	FNR 6564	Ecohydrology	3
FAS 6273	Trophic Ecology of Fishes	3	FNR 6565	Simulation Analysis of Forest Ecosystems	3
FAS 6275	Freshwater Ecology	3	FNR 6607	Conservation Behavior	3
FAS 6306C	Spatial Sciences for Marine Environmental Characterization	4	FNR 6615C	Visualization of Ecological Data	3
FAS 6310C	Fish & Limnology	3	FNR 6620	Community Forest Management	3
FAS 6337C	Fish Population Dynamics	4	FNR 6626	Fire Paradigms	3
FAS 6339C	Advanced Quantitative Fisheries Assessment	4	FNR 6628	Watershed Management and Restoration	3
FAS 6355C	Fisheries Management	4	FNR 6665	Natural Resource Economics and Valuation	3
FAS 6356	Fisheries Enhancement	2	FNR 6668	Natural Resources in a Changing Climate	3
FAS 6356	Fisheries Enhancement	2	FNR 6669	Policy and Economics of Natural Resources	3
FAS 6357	Marine Protected Areas	3	FNR 6905	Research Problems in Forest Resources and Conservation	1-6
FAS 6360	Invasion Ecology of Aquatic Animals	3	FNR 6910	Supervised Research	1-5
FAS 6408	Aquaculture II	3	FNR 6933	Seminar	1
FAS 6416	Spatial Ecology and Modeling of Fish Populations	2	FNR 6934	Topics in Forest Resources and Conservation	1-4
			FNR 6940	Supervised Teaching	1-5
			FNR 6971	Research for Master's Thesis	1-15

FNR 7979	Advanced Research	1-12
FNR 7980	Research for Doctoral Dissertation	1-15
GIS 6103	GIS Programming and Customization	3
GIS 6116	Geographic Information Systems Analysis	3
GIS 6116	Geographic Information Systems Analysis	3
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6555	Introduction to Quantitative Genetics	3
SUR 5365	Digital Mapping	3
SUR 5385	Remote Sensing Applications	3
SUR 5386	Image Processing for Remote Sensing	3
SUR 5525	Least Squares Adjustment Computations	3
SUR 6346	Marine Geomatics	3
SUR 6355	Analytical Photogrammetry	3
SUR 6377	Geospatial Application of UASs	3
SUR 6395	Topics in Geographic Information Systems	3
SUR 6502C	Foundations of UAS Mapping	3
SUR 6535	GPS-INS Integration	3
SUR 6536	Geodesy and Geodetic Positioning	3
SUR 6905	Special Problems in Geomatics	1-6
SUR 6934	Topics in Geomatics	1-4
SUR 6940C	Practicum in UAS Mapping	3

Research Credits

Code	Title	Credits
PLS 7979	Advanced Research	1-12
PLS 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Plant Breeding (PHD)

- **SLO 1 (Knowledge):** Students explain and apply fundamental theory and principles of plant breeding, such as genetics and genomics, plant biochemistry, plant transformation technologies, and computational genetics.
- **SLO 2 (Knowledge):** Students apply genetic inheritance theory to crops of interest and develop a research proposal and a dissertation for a targeted crop/trait/method based on the biology of the crop and the technology available.
- **SLO 3 (Skills):** Students use critical thinking to revise scientific literature and to evaluate, plan, analyze, and design experiments related to plant breeding and cultivar development.
- **SLO 4 (Skills):** Students prepare and complete plant breeding research of sufficient quality to be published in peer-reviewed journals.
- **SLO 5 (Skills):** Students communicate plant breeding knowledge effectively and clearly in oral form to peers, scientists, industry, producers, and the general public.
- **SLO 6 (Professional Behavior):** Students interact with peers, faculty, and staff with honesty, respect, ethical behavior, cultural sensitivity, fellowship, and cooperation.

Microbiology and Cell Science Department

Chair: E. Triplett

Graduate Coordinator: J. Maupin

Graduate study is offered leading to the Master of Science and Doctor of Philosophy degrees in microbiology and cell science, with emphasis

in one or more of the disciplines of biochemistry, cell biology, and microbiology.

Requirements for these degrees are provided in the Graduate Degrees (p. 778) section of this catalog and also on the Department webpage: <http://microcell.ufl.edu/>. (<http://microcell.ufl.edu/>)

Instruction and guidance are collaborative among faculty in the Colleges of Agricultural and Life Sciences, Liberal Arts and Sciences, and Medicine.

Research spans broad areas in the cellular and molecular aspects of bacterial, plant, and animal life functions. Areas of research include microbial biochemistry, biotechnology, biomass conversion, genetic and metabolic regulation, environmental microbiology, cell biology, molecular biology, molecular genetics, genomics and bioinformatics, immunology, virology, parasitology, host-pathogen interactions, cellular ultrastructure.

Prerequisites for admission to graduate study, in addition to those of the Graduate School, are a broad educational background including mathematics, physics, and chemistry through organic, analytical, and physical chemistry; basic courses in biology, botany, and/or zoology; and at least one course in microbiology and biochemistry. An undergraduate major in biochemistry, physical or chemical science, engineering, or general biology may be an acceptable alternative to a degree in microbiology or cell science. Receipt of an advanced degree requires detailed knowledge of microbiology, biochemistry, and chemistry; undergraduate deficiencies may necessitate additional coursework prior to entry into the graduate program.

Majors

- Microbiology and Cell Science (p. 59)

Faculty

Professor

- Christner, Brent Craig
- De Crecy, Valerie Anne
- Foster, Jamie S.
- Gonzalez, Claudio F.
- Lorca, Graciela L.
- Maupin, Julie A.
- Mou, Zhonglin
- Triplett, Eric
- Vermerris, Willem

Associate Professor

- Ferraro, Mariola Jadwiga
- Kima, Peter Epeh
- Larkin, Joseph
- Rice, Kelly C.
- Wang, Xin
- Wurdig Roesch, Luiz Fernando

Assistant Professor

- Aversch, Nils Jonathan Helmuth
- Chevrette, Marc G.
- Czyz, Daniel M.

- De Anda Torres, Valerie Yselle
- Dias, Raquel
- Doore, Sarah M.
- Fernandez Garcia, Jessie
- Jones, Melissa Kolsch
- Martens-Habbena, Willm Abben
- Moreira Passalacqua, Luiz Fernando
- Rolando Betancou, Jose L.
- Square, Tyler A.
- Zhao, Meixia

Eminent Scholar

- Wang, Nian

Courtesy Professor

- Conesa Cegarra, Ana

Senior Lecturer

- Drew, Jennifer C.

Affiliated Faculty

- Burne, Robert Arthur
Distinguished Professor
- Mai, Volker
Associate Professor
- Morris, John Glenn
Professor
- Pullammanappallil, P C.
Associate Professor
- Strauss, Sarah L.
Associate Professor
- Yamamoto, Janet K.
Professor

Microbiology and Cell Science

Program Information

The Department of Microbiology and Cell Science offers a top-10 education for students who wish to earn their M.S. or Ph.D. in Microbiology and Cell Science. Graduates are well prepared to pursue careers in government, industry, research and teaching in microbiology, cell biology, cellular biochemistry, and molecular genetics. For more information on how to apply for these programs, please visit our Microbiology and Cell Science Graduate Program Website – <http://microcell.ufl.edu/graduate-program/#> (<http://microcell.ufl.edu/graduate-program/>).

Currently there are 25 tenure eligible faculty positions staffed, 2 emeritus faculty, 5 non-tenure eligible faculty, 16 post-doctoral fellows, over 56 graduate students, and 2 full time academic advisors. Most faculty are involved in both teaching and research programs that complement one another. The faculty's research programs span areas of broad interest in the cellular and molecular aspects bacterial, plant and animal life functions. Areas of research include:

- Microbial Biochemistry, Physiology, Metabolism and Regulation
- Molecular Biology

- Molecular Genetics
- Immunology
- Virology
- Host-pathogen Interactions
- Environmental Microbiology
- Bioinformatics
- Functional and Comparative Genomics
- Astrobiology
- Human Parasitology
- Cellular Ultrastructure and Function
- Microbial Communities
- Microbial Processing of Plant Biomass

For more information, please see our website: <http://microcell.ufl.edu>.
For Microbiology and Cell Science Academic Advising, contact Jacqueline Lee at 352-846-1330 or jlee9@ufl.edu.

Degrees Offered

Degrees Offered with a Major in Microbiology and Cell Science

- Doctor of Philosophy
 - without a concentration
 - concentration in Microbial and Cellular Data Science
 - concentration in Toxicology
- Master of Science
 - without a concentration
 - concentration in Medical Microbiology and Biochemistry
 - concentration in Microbiome in Health & Disease

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Microbiology and Cell Science Courses

Code	Title	Credits
BSC 6438	R for Functional Genomics	3
BSC 6459	Fundamentals of Bioinformatics	3
MCB 5205	Microbiology of Human Pathogens	3
MCB 5252	Microbiology, Immunology, and Immunotherapeutics	4
MCB 5305L	Microbial Genetics and Biotechnology Laboratory	2
MCB 5505	General Virology	3
MCB 6151	Prokaryotic Diversity	3
MCB 6317	Molecular Biology of Gene Expression	1
MCB 6318	Comparative Microbial Genomics	2
MCB 6355	Microbial/Host Defense	1
MCB 6407	Prokaryotic Cell Structure and Function	3
MCB 6417	Microbial Metabolism and Energetics	1
MCB 6457	Metabolic Regulation	1
MCB 6465	Microbial Metabolic Engineering	1
MCB 6485	Advanced Techniques in Microbiology and Cell Science	2-4
MCB 6670C	The Microbiome	3
MCB 6772	Advanced Topics in Cell Biology	1
MCB 6781	Extremophiles	3
MCB 6905	Experimental Microbiology	1-8

MCB 6930	Seminar	1
MCB 6937	Special Topics in Microbiology	1-4
MCB 6940	Supervised Teaching	1-5
MCB 6971	Research for Master's Thesis	1-15
MCB 7922	Journal Colloquy	1
MCB 7979	Advanced Research	1-12
MCB 7980	Research for Doctoral Dissertation	1-15
PCB 5136L	Techniques in Microbial and Cell Biology	3
PCB 5235	Immunology	3

Microbiology and Cell Science Departmental Courses

Code	Title	Credits
BSC 6438	R for Functional Genomics	3
BSC 6459	Fundamentals of Bioinformatics	3
BSC 6895C	AI in Agricultural and Life Sciences	3
MCB 5205	Microbiology of Human Pathogens	3
MCB 5215	Clinical Immunology	1
MCB 5252	Microbiology, Immunology, and Immunotherapeutics	4
MCB 5255	Clinical Bacteriology	3
MCB 5256	Clinical Mycology, Virology and Parasitology	3
MCB 5270	Antimicrobial Resistance (AMR)	3
MCB 5305L	Microbial Genetics and Biotechnology Laboratory	2
MCB 5505	General Virology	3
MCB 5655	Clinical Laboratory Ethics, Management, Safety, and Professional Issues	2
MCB 5666	Clinical Research, Assessment, Education, and Quantitative Methods	1
MCB 5705	Astrobiology	3
MCB 5942L	Clinical Microbiology Lab	2
MCB 5945L	Clinical Experience in Microbiology	2
MCB 6095	Careers for Impact in Microbiology and Cell Science	1
MCB 6096	Innovation Project Management for Life Sciences	1
MCB 6151	Prokaryotic Diversity	3
MCB 6317	Molecular Biology of Gene Expression	1
MCB 6318	Comparative Microbial Genomics	2
MCB 6326	Computational Genomics and Epigenomics	3
MCB 6355	Microbial/Host Defense	1
MCB 6407	Prokaryotic Cell Structure and Function	3
MCB 6417	Microbial Metabolism and Energetics	1
MCB 6424	Probiotics	3
MCB 6457	Metabolic Regulation	1
MCB 6458	Post Translational Modifications of Proteins in Microbiology	2
MCB 6465	Microbial Metabolic Engineering	1
MCB 6485	Advanced Techniques in Microbiology and Cell Science	2-4
MCB 6656	Environmental Microbiology	3
MCB 6670C	The Microbiome	3
MCB 6772	Advanced Topics in Cell Biology	1
MCB 6781	Extremophiles	3
MCB 6796	Analysis, Interpretation, and Visualization of Microbiological Data	3
MCB 6900	Final Assessment - Literature Review	1
MCB 6905	Experimental Microbiology	1-8
MCB 6930	Seminar	1
MCB 6937	Special Topics in Microbiology	1-4

MCB 6940	Supervised Teaching	1-5
MCB 6971	Research for Master's Thesis	1-15
MCB 7922	Journal Colloquy	1
MCB 7979	Advanced Research	1-12
MCB 7980	Research for Doctoral Dissertation	1-15
PCB 5136L	Techniques in Microbial and Cell Biology	3
PCB 5235	Immunology	3
PCB 6667	Human Genomics	3

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Microbiology & Cell science (PHD)

SLO 1 Knowledge

Describe orally and in writing, the molecular genetic, biochemical and cellular basis of life

SLO 2 Skills

Discuss orally and in writing, research methodologies for applying the scientific method to the generation of new knowledge

SLO 3 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication.

Microbiology & Cell science (MS)

SLO 1 Knowledge

Describe in writing and orally, the molecular genetic, biochemical and cellular basis of life

SLO 2 Skills

Discuss orally and in writing, research methodologies for applying the scientific method to the generation of new knowledge.

SLO 3 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication.

Plant Molecular and Cellular Biology Department

Plant Molecular and Cellular Biology (PMB) currently has 45 faculty members in the program. They are based in the departments of Agronomy (<http://agronomy.ifas.ufl.edu/>), Biology (<http://web.botany.ufl.edu/>), Environmental Horticulture (<https://hort.ifas.ufl.edu/>), Forest Resources and Conservation (<http://sfrc.ufl.edu/>), Horticultural Sciences (<https://hos.ifas.ufl.edu/>), Microbiology and Cell Science (<http://microcell.ufl.edu/>), Molecular Genetics and Microbiology (<http://mgm.ufl.edu/>), and Plant Pathology (<https://plantpath.ifas.ufl.edu/>) within the colleges of Agriculture and Life Sciences (<https://cals.ufl.edu/>), Medicine (<https://med.ufl.edu/>), and Liberal Arts and Sciences (<https://clas.ufl.edu/>).

Majors

- Plant Molecular and Cellular Biology (CALS) (p. 61)

Faculty

Affiliated Faculty

- Altpeter, Fredy
Professor
- Barbazuk, William Bradley
Professor
- Basset, Gilles J.
Associate Professor
- Ferl, Robert J.
Distinguished Professor
- Fernandez Garcia, Jessie
Assistant Professor
- Folimonova, Svetlana Yuryevna
Professor
- Folta, Kevin M.
Professor
- Gabriel, Dean W.
Professor
- Hanson, Andrew D.
Eminent Scholar
- Jones, Jeffrey B.
Distinguished Professor
- Kim, Jeongim J.
Associate Professor
- Kirst, Matias
Distinguished Professor
- Koch, Karen E.
Professor
- Levy, Amit
Associate Professor
- Liu, Tie
Assistant Professor
- Martins, Samuel J.
Assistant Professor
- Mccarty, Donald R.

Professor

- McIntyre, Lauren M.
Professor
- Mou, Zhonglin
Professor
- Munoz Del Valle, Patricio Ricardo
Associate Professor
- Nadakuduti, Satya Swathi
Assistant Professor
- Padilla, Kevin Begcy
Assistant Professor
- Paul, Annalisa
Research Professor
- Peter, Gary Frank
Professor
- Rathinasabapathi, Balasubramani
Professor
- Ribeiro De Resende, Marcio Fernando
Associate Professor
- Rollins, Jeffrey A.
Professor
- Soltis, Douglas Edward
Distinguished Professor
- Soltis, Pamela S.
Distinguished Professor
- Song, Wen-Yuan
Associate Professor
- Suzuki, Masaharu
Research Associate Professor
- Tieman, Denise M.
Research Associate Professor
- Vallejos, Carlos E.
Professor
- Vermerris, Willem
Professor
- VOINICIUC, CATALIN
Associate Professor
- Wang, Jianping
Professor
- Wang, Nian
Eminent Scholar
- Wang, Ying
Associate Professor
- Zhao, Meixia
Assistant Professor

Plant Molecular and Cellular Biology (CALS)

Program Information

Director: Dr. Svetlana Folimonova

Graduate Coordinator: Dr. Gilles Basset

Program Coordinator: Eliana Kampf

Plant Molecular and Cellular Biology (PCMB) is an interdisciplinary and interdepartmental graduate degree program that emphasizes

understanding the molecular and cellular mechanisms that mediate plant development, adaptation, and evolution. Students can pursue an M.S. or a Ph.D. degree through the PMCB program. All students complete core courses in Advanced Genetics, Plant Molecular Biology and Genomics, Plant Cellular and Developmental Biology, and Plant Biochemistry. In addition to the core classes, students can select from a variety of courses in biochemistry, molecular biology, physiology, breeding, genetics, evolution, microbiology, and plant pathology.

New students are exposed to a variety of faculty and experimental systems while they rotate through several laboratories during their first two semesters before selecting an adviser and dissertation research area. Both M.S. and Ph.D. students take four required courses:

PCB 5065 Advanced Genetics (4 cr.), PCB 5530 Plant Molecular Biology and Genomics (3 cr.), PCB 6528 Plant Cell and Developmental Biology (3 cr.) and BOT 6935 Special Topics (1-4 cr.), as well as journal colloquium classes (PCB 7922 Journal Colloquy in Plant Molecular and Cellular Biology (1 cr.)). Additional elective courses are taken after approval by the student's supervisory committee. For additional information see <http://pmcb.ifas.ufl.edu>.

Successful candidates should have a strong interest in plant molecular and cellular mechanisms controlling development, metabolism, adaptation, and evolution. Applicants typically have a B.S. or M.S. in the agricultural, forestry, biological or chemical sciences.

Degrees Offered

Degrees Offered with a Major in Plant Molecular and Cellular Biology

- Doctor of Philosophy
 - without a concentration
 - concentration in Toxicology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Plant Molecular and Cellular Biology Courses

Code	Title	Credits
BOT 6935	Special Topics	1-4
PCB 5065	Advanced Genetics	4
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6910	Supervised Research	1-5
PCB 6937	Special Topics in Plant Molecular and Cellular Biology	1-4
PCB 6971	Research for Master's Thesis	1-15
PCB 7922	Journal Colloquy in Plant Molecular and Cellular Biology	1
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Plant molecular & Cellular biology (MS)

SLO 1 Knowledge

Describe and explain fundamental theories and concepts in plant biochemistry, cell and developmental biology, genetics and genomics, molecular biology and general plant biology

SLO 2 Knowledge

Use critical thinking to evaluate research design and experiments

SLO 3 Skills

Critically evaluate the primary scientific literature

SLO 4 Skills

Develop practical experimental research skills

SLO 5 Skills

Communicate effectively using scientific writing and oral presentation skills

SLO 6 Professional Behavior

Effectively work in teams with peers interacting honestly, ethically and with cultural sensitivity

Plant Pathology Department

Chair: M. Paret

Graduate Coordinators: J. Jones

The Department of Plant Pathology offers graduate studies leading to the Master of Science (thesis and nonthesis option) and Doctor of Philosophy degrees. The Department also participates in the Doctor of Plant Medicine interdisciplinary professional degree.

The Department offers a combination bachelor's/master's degree program. Contact the graduate coordinator for information.

For more information, please visit <http://plantpath.ifas.ufl.edu/>.

Majors

- Plant Pathology (p. 63)

Faculty

Professor

- Folimonova, Svetlana Yuryevna
- Gabriel, Dean W.
- Garrett, Karen A.
- Goss, Erica M.
- Harmon, Philip Frederick
- Loria, Rosemary
- Paret, Mathews
- Peres Lauretti, Natalia A.
- Roberts, Pamela D.
- Rollins, Jeffrey A.
- Smith, Matthew E.
- Vallad, Gary Edward
- White, Frank F.
- Zhang, Shouan

Associate Professor

- Batuman, Ozgur
- Dewdney, Megan M.
- Dufault, Nicholas S.
- Gazis-Seregina, Romina
- Killiny, Nabil
- Levy, Amit
- Norman, David J.
- Richter, Brantlee Spakes
- Small, Ian Malcolm
- Song, Wen-Yuan
- Wang, Ying

Assistant Professor

- Brawner, Jeremy T.
- Cano Mogrovejo, Liliana Maria
- Dhillon, Braham
- Martins, Samuel J.
- Navia Urrutia, Monica
- Viana Xavier, Katia

Distinguished Professor

- Jones, Jeffrey B.

Research Assistant Scientist

- Huguet Tapia, Jose
- Marin, Marcus Vinicius

Research Assistant Professor

- Schuerger, Andrew C.

Associate In

- Harmon, Carrie Lapaire

Affiliated Faculty

- Mou, Zhonglin
Professor
- Wang, Nian
Eminent Scholar

Plant Pathology

Program Information

A student may pursue studies in one of several basic areas of plant pathology. These areas include fungal plant pathology, plant bacteriology, plant virology, diagnostics, control, and also molecular and biochemical aspects of host-pathogen systems, biological control of pathogens and weeds, epidemiology, etiology, genetics of host-pathogen systems, soil microbiology, and pathogen taxonomy. In Florida, the variety of cultivated plants, coupled with an environment ideal for plant disease development, offers the student opportunities to study diseases of many crops as they develop. First-hand knowledge can be gained of diseases of field, fruit, ornamental, pasture, range, turf, and vegetable crops in temperate, subtropical, and tropical environments. Students who anticipate study in plant pathology at the University of Florida should include in their undergraduate programs training in botany, chemistry (through biochemistry), genetics, and microbiology.

Courses in nematology are offered by the Department of Entomology and Nematology.

Degrees Offered

Degrees Offered with a Major in Plant Pathology

- Doctor of Philosophy
 - without a concentration
 - concentration in Toxicology
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Plant Pathology Departmental Courses

Code	Title	Credits
ALS 5932	Special Topics	1-4
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
PLP 5005C	General Plant Pathology	4
PLP 5115C	Citrus Pathology	3
PLP 6105	Applied Plant Disease Management	3
PLP 6223C	Viral Pathogens of Plants	3
PLP 6235C	Applied Bioinformatics in Plant Pathology	2
PLP 6241C	Bacterial Plant Pathogens	3
PLP 6245	Fastidious Bacteria and Plant Diseases	3

PLP 6262C	Fungal Plant Pathogens	3
PLP 6291	Plant Disease Diagnosis	3
PLP 6303	Host-Parasite Interactions II	3
PLP 6404	Epidemiology of Plant Disease	4
PLP 6502	Host-Parasite Interactions I	3
PLP 6621C	Applied Population Genetics of Microbes	3
PLP 6636	Frontiers in Plant Biotechnology	3
PLP 6656C	Fungal Biology	4
PLP 6701	Impact through Networks	2
PLP 6905	Problems in Plant Pathology	1-4
PLP 6910	Supervised Research	1-5
PLP 6921	Colloquium in Principles of Plant Pathology	1
PLP 6932	Seminar in Plant Pathology	1
PLP 6940	Supervised Teaching	1-5
PLP 6942	Professional Internship in Plant Disease Clinic	3
PLP 6971	Research for Master's Thesis	1-15
PLP 7946	Plant Pathology Internship	1-10
PLP 7979	Advanced Research	1-12
PLP 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Plant pathology (PHD)

SLO 1 Knowledge

Describe and explain the literature, theories and ideas of plant pathology

SLO 2 Skills

Utilize the scientific method to conduct experimental research

SLO 3 Skills

Communicate effectively skills in oral and written form

SLO 4 Skills

Develop, organization and deliver instruction

SLO 5 Professional Behavior

Exhibit professional behavior and ethical practices in the conduct of research and scholarship

PLant pathology (MS)

SLO 1 Knowledge

Describe and explain the literature, theories and ideas of plant pathology

SLO 2 Skills

Utilize the scientific method to conduct experimental research

SLO 3 Skills

Communicate effectively in oral and written form

SLO 4 Skills

Develop, organize and deliver instruction

SLO 5 Professional Behavior

Exhibit professional behavior and ethical practices in the conduct of research and scholarship

School of Forest, Fisheries, and Geomatics Sciences

Director: T. "Red" Baker III

Graduate Coordinator: S. Bohlman (Forest Resources and Conservation) and D. Behringer (Fisheries and Aquatic Sciences)

Since 1937 the Change to School of Forest, Fisheries and Geomatics Sciences has prepared students for professional careers caring for natural resources. We emphasis the role of people in managing both terrestrial and aquatic systems, to produce the myriad of benefits and services they provide. Our faculty have a broad range of interests, including ecology, economics/policy, and recreation/education, and are united by an interest in environmental resources, rather than by traditional academic discipline. The School is composed of three programmatic areas: Fisheries and Aquatic Sciences, Forest Resources and Conservation and Geomatics which is a concentration within the Forest Resources and Conservation major. These programs offer seven different degree options (including two professional masters degrees), as well as concentrations and certificates in a diversity of specific areas. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Joint program: Students may simultaneously earn a juris doctorate from the College of Law and a graduate degree (M.F.R.C., M.S., or Ph.D.) in Forest Resources and Conservation.

Combination programs: The School offers a combination bachelor's/master's degree program, which allows qualified students to earn both a bachelor's degree and a master's degree with a savings of 1 semester. Ph.D. students may pursue a co-major with the Department of Statistics (see below).

Concentrations: SFFGS graduate students completing 15 or more credit hours in designated courses may earn a concentration in the following areas: Ecological Restoration, Geomatics or Natural Resource Policy and Administration. For additional information please go to the SFFGS website (<https://ffgs.ifas.ufl.edu/>).

Statistics co-major: Ph.D. students with the School may elect the co-major offered jointly with the Department of Statistics. Students focusing on forest genetics, tree improvement, and other statistics-intensive

aspects of natural resource management are potential candidates for this option.

Certificates: SFFGS offers a variety of undergraduate and graduate certificate programs. For more information. Please go here (<https://ffgs.ifas.ufl.edu/academics/certificates/>).

For additional information, please visit the School's web page at <https://ffgs.ifas.ufl.edu>. (<https://ffgs.ifas.ufl.edu>)

Majors

- Fisheries and Aquatic Sciences (p. 66)
- Forest Resources and Conservation (p. 68)

Faculty

Affiliated Faculty

- Abd-Elrahman, Amr H.
Professor
- Adams, Alison Eve
Associate Professor
- Adams, Damian
Professor
- Allen, Micheal S.
Professor
- Andreu, Michael G.
Associate Professor
- Asche, Frank
Professor
- Austin, James D.
Professor
- Baker, Terrell T.
Professor
- Baker, Shirley M.
Professor
- Barry, Savanna C.
Other
- Bartels, Wendy Lin
Research Assistant Scientist
- Behringer, Donald Charles
Professor
- Bohlman, Stephanie Ann
Professor
- Bojko, Jamie
Associate Professor
- Bracho-Garrillo, Rosvel
Research Associate Scientist
- Braswell, Anna E.
Assistant Professor
- Broadbent, Eben North
Associate Professor
- Camp, Edward Vincent
Associate Professor
- Carlson, Andrew Kenneth
Courtesy Assistant Professor
- Carney, Tyler Jonathan
Other
- Chagaris, David D.
Research Assistant Professor
- Cichra, Charles
Professor
- Clarke, Mysha
Assistant Professor
- Cohen, Matthew J.
Professor
- Collins, Angela S.
Assistant Extension Scientist
- Crandall, Raelene M.
Associate Professor
- Cropper, Wendell P.
Professor
- Cushing, Tamara Lee
Assistant Professor
- Dai, Chunli
Assistant Professor
- DiMaggio, Matthew A.
Associate Professor
- Donovan, Victoria M.
Assistant Professor
- Ennes, Megan E.
Assistant Curator
- Francis-Floyd, Ruth
Professor
- Frazer, Tom K.
Courtesy Professor
- Hedman, Craig Wallace
Courtesy Assistant Professor
- Hill, Jeffrey Eugene
Professor
- Hochmair, Hartwig H.
Professor
- Hulcr, Jiri
Professor
- Iannone, Basil V.
Associate Professor
- Ibarra Castro, Leonardo
Assistant Professor
- Johnson, Andra Darrel
Professor
- Johnson, Daniel Jacob
Associate Professor
- Kainer, Karen A.
Professor
- Kirst, Matias
Distinguished Professor
- Klarenberg, Geraldine
Lecturer
- Klauberg Silva, Carine
Research Assistant Scientist
- Klizentyte, Kotryna
Assistant Professor
- Lamb, Robert Wellington
Research Assistant Professor
- Lassiter, Howard A.

- Assistant Professor
- Lescord, Gretchen
Assistant Professor
- Li, Yue
Assistant Professor
- Lorenzen, Kai
Professor
- Lowerre-Barbieri, Susan K.
Research Professor
- Martin, Timothy A.
Professor
- Mcguire, Maia Patterson
Extension Agent
- Minogue, Patrick J.
Associate Professor
- Murie, Debra Jean
Professor
- Ohs, Courtney L.
Associate Professor
- Patterson, William Frank
Professor
- Patterson, Joshua T.
Associate Professor
- Paudyal, Ramesh
Courtesy Assistant Professor
- Peter, Gary Frank
Professor
- Philips, Edward J.
Professor
- Putz, Francis E.
Distinguished Professor
- Qiu, Jiangxiao
Associate Professor
- Reisinger, Lindsey Sargent
Assistant Professor
- Ribeiro Do Valle, Denis
Associate Professor
- Siders, Zachary
Assistant Professor
- Silva, Carlos Alberto
Assistant Professor
- Stein, Taylor Verne
Professor
- Subramaniam, Kuttichantran
Research Associate Professor
- Tuckett, Quenton
Assistant Professor
- Vogel, Jason
Associate Professor
- Wilkinson, Benjamin E.
Associate Professor
- Wonkka, Carissa L.
Assistant Professor
- Yang, Huiping
Associate Professor

- Yanong, Roy P.
Professor

Fisheries and Aquatic Sciences

Program Information

Director: T. "Red" Baker III

Graduate Coordinator: D. Behringer

Since 1937 the Change to School of Forest, Fisheries and Geomatics Sciences has prepared students for professional careers caring for natural resources. We emphasize the role of people in managing both terrestrial and aquatic systems, to produce the myriad of benefits and services they provide. Our faculty have a broad range of interests, including ecology, economics/policy, and recreation/education, and are united by an interest in environmental resources, rather than by traditional academic discipline. The School is composed of three programmatic areas: Fisheries and Aquatic Sciences, Forest Resources and Conservation, and Geomatics. Combined, these programs offer seven different degree options (including two professional masters degrees), as well as concentrations and certificates in a diversity of specific areas.

The School's program in Fisheries and Aquatic Sciences leads to the Master of Science, Master of Fisheries and Aquatic Sciences (nonthesis), and Doctor of Philosophy degrees with a program in Fisheries and Aquatic Sciences. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The Fisheries and Aquatic Sciences program also offers a combination bachelor's/master's degree program. Contact the academic coordinator for information.

The School of Forest, Fisheries and Geomatics Sciences program in Fisheries and Aquatic Sciences conducts research, teaching, and extension programs in four broad areas:

- Sustainable fisheries
- Aquaculture
- Aquatic animal health
- Conservation and management of aquatic environments

Faculty encompass both freshwater and marine environments, as well as managed aquaculture systems. Collaborators include the UF College of Veterinary Medicine, National Biological Survey, National Marine Fisheries Service, Harbor Branch Oceanographic Institute, Mote Marine Laboratory, the US Geologic Survey, the Florida Fish and Wildlife Conservation Commission, and others. Academic programs are structured to emphasize direct engagement of students with faculty. Further information, including specific degree options, faculty biographies, and information on the admissions process, is available at <https://ffgs.ifas.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Fisheries and Aquatic Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Ecological Restoration
 - concentration in Geographic Information Systems

- concentration in Natural Resource Policy and Administration
- concentration in Wetland Sciences
- Master of Fisheries and Aquatic Sciences
 - without a concentration
 - concentration in Ecological Restoration
 - concentration in Geographic Information Systems
 - concentration in Natural Resource Policy and Administration
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Ecological Restoration
 - concentration in Geographic Information Systems
 - concentration in Natural Resource Policy and Administration
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Forest, Fisheries, and Geomatic Sciences Courses

Geomatics Departmental Courses

Code	Title	Credits
GIS 6103	GIS Programming and Customization	3
GIS 6116	Geographic Information Systems Analysis	3
SUR 5365	Digital Mapping	3
SUR 5385	Remote Sensing Applications	3
SUR 5386	Image Processing for Remote Sensing	3
SUR 5525	Least Squares Adjustment Computations	3
SUR 6346	Marine Geomatics	3
SUR 6355	Analytical Photogrammetry	3
SUR 6377	Geospatial Application of UASs	3
SUR 6395	Topics in Geographic Information Systems	3
SUR 6502C	Foundations of UAS Mapping	3
SUR 6535	GPS-INS Integration	3
SUR 6536	Geodesy and Geodetic Positioning	3
SUR 6905	Special Problems in Geomatics	1-6
SUR 6934	Topics in Geomatics	1-4
SUR 6940C	Practicum in UAS Mapping	3

Fisheries and Aquatic Sciences Program Courses

Code	Title	Credits
FAS 5015	Aquaculture I	3
FAS 5203	Biology of Fishes	3
FAS 5203C	Biology of Fishes	4
FAS 5255	Diseases of Warmwater Fish	3
FAS 5276C	Field Ecology of Aquatic Organisms	4
FAS 5335C	Applied Fisheries Statistics	4
FAS 5407	Biology of Fishery and Aquaculture Invertebrates	3
FAS 5901	Scientific Thinking in Ecology	2
FAS 6154	Marine Adaptations: Environmental Physiology	3
FAS 6165	Fish and Crustacean Nutrition	3
FAS 6176	Algae Biology and Ecology	3
FAS 6238	Environmental Physiology of Fishes	3
FAS 6256	Fish and Aquatic Invertebrate Histology	3
FAS 6272	Marine Ecological Processes	3

FAS 6273	Trophic Ecology of Fishes	3
FAS 6275	Freshwater Ecology	3
FAS 6310C	Fish & Limnology	3
FAS 6337C	Fish Population Dynamics	4
FAS 6339C	Advanced Quantitative Fisheries Assessment	4
FAS 6355C	Fisheries Management	4
FAS 6356	Fisheries Enhancement	2
FAS 6357	Marine Protected Areas	3
FAS 6360	Invasion Ecology of Aquatic Animals	3
FAS 6408	Aquaculture II	3
FAS 6416	Spatial Ecology and Modeling of Fish Populations	2
FAS 6426	Applied Aquaculture Genetics	3
FAS 6705	Fisheries and aquaculture: An economics perspective	3
FAS 6905	Individual Study	1-6
FAS 6910	Supervised Research	1-5
FAS 6932	Special Topics in Fisheries and Aquatic Sciences	1-4
FAS 6933	Graduate Symposium	1
FAS 6935	Contemporary Problems in Fisheries and Aquatic Sciences	2
FAS 6940	Supervised Teaching	1-5
FAS 6971	Research for Master's Thesis	1-15
FAS 7979	Advanced Research	1-12
FAS 7980	Research for Doctoral Dissertation	1-15

Forest Resources and Conservation Program Courses

Code	Title	Credits
FNR 5072C	Environmental Education Program Development	3
FNR 5608	Research Planning	3
FNR 6061	Conflict and Collaboration in Natural Resources	3
FNR 6560	Intro to Bayesian Statistics for Life Sciences	3
FNR 6564	Ecology	3
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6555	Introduction to Quantitative Genetics	3
SUR 6377	Geospatial Application of UASs	3
SUR 6502C	Foundations of UAS Mapping	3
SUR 6940C	Practicum in UAS Mapping	3

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10

ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Fisheries & Aquatic sciences (PHD)

SLO 1 Knowledge

Describe and explain key concepts, theories and information in their discipline.

SLO 2 Knowledge

Apply the scientific method and the appropriate methodologies to the generation of new knowledge.

SLO 3 Skills

Communicate effectively in both written and oral form.

SLO 4 Skills

Develop and execute proper experimental or sampling designs.

SLO 5 Skills

Utilize critical thinking to evaluate spoken and written communications.

SLO 6 Professional Behavior

Work in teams with peers; interact honestly, ethically and with cultural sensitivity; translate skills, knowledge and motivation into observable behaviors related to success in specific situations.

Fisheries & Aquatic sciences (MFAS)

SLO 1 Knowledge

Describe and explain key concepts, theories and information in their discipline.

SLO 2 Knowledge

Apply the appropriate methodologies to the synthesis of existing knowledge.

SLO 3 Skills

Communicate effectively in both written and oral form.

SLO 4 Skills

Develop and execute proper project design.

SLO 5 Skills

Utilize critical thinking to evaluate spoken and written communications.

SLO 6 Professional Behavior

Work in teams with peers; interact honestly, ethically and with cultural sensitivity; translate skills, knowledge and motivation into observable behaviors related to success in specific situations.

fisheries & Aquatic Sciences (MS)

SLO 1 Knowledge

Describe and explain key concepts, theories and information into their discipline.

SLO 2 Knowledge

Apply the scientific method and the appropriate methodologies to the generation of new knowledge.

SLO 3 Skills

Communicate effectively in both written and oral form.

SLO 4 Skills

Develop and execute proper experimental or sampling designs.

SLO 5 Skills

Utilize critical thinking to evaluate spoken and written communications.

SLO 6 Professional Behavior

Work in teams with peers; interact honestly, ethically and with cultural sensitivity; translate skills, knowledge and motivation into observable behaviors related to success in specific situations.

Forest Resources and Conservation Program Information

Director: T. "Red" Baker III

Graduate Coordinator: S. Bohlman

Since 1937 the Change to School of Forest, Fisheries and Geomatics Sciences has prepared students for professional careers caring for natural resources. We emphasize the role of people in managing both terrestrial and aquatic systems, to produce the myriad of benefits and services they provide. Our faculty have a broad range of interests, including ecology, economics/policy, and recreation/education, and are united by an interest in environmental resources, rather than by traditional academic discipline. The School is composed of three programmatic areas: Fisheries and Aquatic Sciences, Forest Resources and Conservation and Geomatics which is a concentration within the Forest Resources and Conservation major. These programs offer seven different degree options (including two professional masters degrees), as well as concentrations and certificates in a diversity of specific areas. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The SFFGS offers graduate programs leading to the Master of Forest Resources and Conservation (professional, non-thesis), Master of Science (thesis and non-thesis), and Doctor of Philosophy degrees in Forest Resources and Conservation. The Master of Science non-thesis degree may be taken entirely online. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The Forest Resources and Conservation program prepares students to work with the ecological, economic, and social aspects of natural resources, including the management of spatial information gathered through traditional surveying as well as remote sensing. Faculty have a wide variety of specializations, including fire ecology, land tenure, tree genetics, recreation management, environmental education, geographic information systems, silviculture, forest economics, and environmental policy. Further information, including specific degree options, faculty biographies, and information on the admissions process, is available at: <https://ffgs.ifas.ufl.edu/>

Degrees Offered

Degrees Offered with a Major in Forest Resources and Conservation

- Doctor of Philosophy
 - without a concentration
 - concentration in Agroforestry
 - concentration in Ecological Restoration
 - concentration in Geographic Information Systems
 - concentration in Geomatics
 - concentration in Hydrologic Sciences
 - concentration in Natural Resource Policy and Administration
 - concentration in Toxicology
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences
- Master of Forest Resources and Conservation
 - without a concentration
 - concentration in Agroforestry
 - concentration in Geographic Information Systems
 - concentration in Geomatics
 - concentration in Natural Resource Policy and Administration
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Agroforestry
 - concentration in Ecological Restoration
 - *optional second concentration in Hydrologic Sciences*
 - concentration in Geographic Information Systems
 - concentration in Geomatics
 - concentration in Hydrologic Sciences
 - concentration in Natural Resource Policy and Administration
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Forest Resources and Conservation Courses

Geomatics Concentration Courses

Code	Title	Credits
GIS 6103	GIS Programming and Customization	3
GIS 6116	Geographic Information Systems Analysis	3
SUR 5365	Digital Mapping	3
SUR 5385	Remote Sensing Applications	3
SUR 5386	Image Processing for Remote Sensing	3
SUR 5525	Least Squares Adjustment Computations	3
SUR 6346	Marine Geomatics	3
SUR 6355	Analytical Photogrammetry	3
SUR 6377	Geospatial Application of UASs	3
SUR 6395	Topics in Geographic Information Systems	3
SUR 6502C	Foundations of UAS Mapping	3
SUR 6535	GPS-INS Integration	3

SUR 6536	Geodesy and Geodetic Positioning	3
SUR 6905	Special Problems in Geomatics	1-6
SUR 6934	Topics in Geomatics	1-4
SUR 6940C	Practicum in UAS Mapping	3

Fisheries and Aquatic Sciences Program Courses

Code	Title	Credits
FAS 5015	Aquaculture I	3
FAS 5203	Biology of Fishes	3
FAS 5203C	Biology of Fishes	4
FAS 5255	Diseases of Warmwater Fish	3
FAS 5276C	Field Ecology of Aquatic Organisms	4
FAS 5335C	Applied Fisheries Statistics	4
FAS 5407	Biology of Fishery and Aquaculture Invertebrates	3
FAS 5901	Scientific Thinking in Ecology	2
FAS 6154	Marine Adaptations: Environmental Physiology	3
FAS 6165	Fish and Crustacean Nutrition	3
FAS 6176	Algae Biology and Ecology	3
FAS 6238	Environmental Physiology of Fishes	3
FAS 6256	Fish and Aquatic Invertebrate Histology	3
FAS 6272	Marine Ecological Processes	3
FAS 6273	Trophic Ecology of Fishes	3
FAS 6275	Freshwater Ecology	3
FAS 6310C	Fish & Limnology	3
FAS 6337C	Fish Population Dynamics	4
FAS 6339C	Advanced Quantitative Fisheries Assessment	4
FAS 6355C	Fisheries Management	4
FAS 6356	Fisheries Enhancement	2
FAS 6357	Marine Protected Areas	3
FAS 6360	Invasion Ecology of Aquatic Animals	3
FAS 6408	Aquaculture II	3
FAS 6416	Spatial Ecology and Modeling of Fish Populations	2
FAS 6426	Applied Aquaculture Genetics	3
FAS 6705	Fisheries and aquaculture: An economics perspective	3
FAS 6905	Individual Study	1-6
FAS 6910	Supervised Research	1-5
FAS 6932	Special Topics in Fisheries and Aquatic Sciences	1-4
FAS 6933	Graduate Symposium	1
FAS 6935	Contemporary Problems in Fisheries and Aquatic Sciences	2
FAS 6940	Supervised Teaching	1-5
FAS 6971	Research for Master's Thesis	1-15
FAS 7979	Advanced Research	1-12
FAS 7980	Research for Doctoral Dissertation	1-15

Forest Resources and Conservation Program Courses

Code	Title	Credits
FAS 6306C	Spatial Sciences for Marine Environmental Characterization	4
FAS 6356	Fisheries Enhancement	2
FNR 5015	Ecosystem Restoration Principles and Practice	3
FNR 5016	Ecology and Restoration of Longleaf Pine Ecosystems	3
FNR 5072C	Environmental Education Program Development	3
FNR 5405	Forest Information Systems	3

FNR 5608	Research Planning	3
FNR 5625	Managing Public Lands and Waters	3
FNR 5626	Forest Resource Manag	3
FNR 6006	Silviculture: Concepts and Application	3
FNR 6046C	Lidar Remote Sensing for Forestry Applications	3
FNR 6061	Conflict and Collaboration in Natural Resources	3
FNR 6075	Science Communication & Public Education	3
FNR 6085	Landscape Planning for Ecotourism	3
FNR 6134	Physiology of Forest Trees	3
FNR 6308	Urban Forestry	3
FNR 6314	Issues in Southeastern Forest Health	3
FNR 6315	Tropical Forestry	3
FNR 6406C	Lidar Remote Sensing for Forestry Applications	3
FNR 6462	Foundations of Geospatial AI for Natural Resource Management	3
FNR 6504	Analysis of Forest Ecosystems	3
FNR 6505	Forest Ecosystem Health	3
FNR 6506	Forest Ecosystem Resilience	3
FNR 6516	Management and Restoration of Invaded Ecosystems	3
FNR 6560	Intro to Bayesian Statistics for Life Sciences	3
FNR 6564	Ecohydrology	3
FNR 6565	Simulation Analysis of Forest Ecosystems	3
FNR 6607	Conservation Behavior	3
FNR 6615C	Visualization of Ecological Data	3
FNR 6620	Community Forest Management	3
FNR 6626	Fire Paradigms	3
FNR 6628	Watershed Management and Restoration	3
FNR 6665	Natural Resource Economics and Valuation	3
FNR 6668	Natural Resources in a Changing Climate	3
FNR 6669	Policy and Economics of Natural Resources	3
FNR 6905	Research Problems in Forest Resources and Conservation	1-6
FNR 6910	Supervised Research	1-5
FNR 6933	Seminar	1
FNR 6934	Topics in Forest Resources and Conservation	1-4
FNR 6940	Supervised Teaching	1-5
FNR 6971	Research for Master's Thesis	1-15
FNR 7979	Advanced Research	1-12
FNR 7980	Research for Doctoral Dissertation	1-15
GIS 6116	Geographic Information Systems Analysis	3
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6555	Introduction to Quantitative Genetics	3

Code	Title	Credits
SUR 6377	Geospatial Application of UASs	3
SUR 6502C	Foundations of UAS Mapping	3
SUR 6940C	Practicum in UAS Mapping	3

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2

ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Forest resources & Conservation (PHD)

SLO 1 Knowledge

Describes and explains theories and concepts in major-specific and related subject matter areas relevant to the individualized focus of the degree program

SLO 2 Skills

Critically evaluates literature, analyzes and synthesizes information, applies experimental and/or descriptive research methodologies, creates new knowledge through discovery, and effectively communicates information

SLO 3 Professional Behavior

Displays honest, ethical, and culturally sensitive behavior and practices in all scholarly activities including teaching, research, and outreach

Forest resources & Conservation (MFRC)

SLO 1 Knowledge

Describes and explains theories and concepts in major-specific and related subject matter areas relevant to the individualized focus of the degree program

SLO 2 Skills

Critically evaluates literature, analyzes and synthesizes information, applies experimental and/or descriptive research methodologies, creates new knowledge through discovery, and effectively communicates information

SLO 3 Professional Behavior

Displays honest, ethical, and culturally sensitive behavior and practices in all scholarly activities including teaching, research, and outreach

Forest Resources & Conservation (MS)

SLO 1 Knowledge

Describes and explains theories and concepts in major-specific and related subject matter areas relevant to the individualized focus of the degree program

SLO 2 Skills

Critically evaluates literature, analyzes and synthesizes information, applies experimental and/or descriptive research methodologies, creates

new knowledge through discovery, and effectively communicates information

SLO 3 Professional Behavior

Displays honest, ethical, and culturally sensitive behavior and practices in all scholarly activities including teaching, research, and outreach

School of Natural Resources and Environment

Director and Graduate Coordinator: K. R. Reddy

The University of Florida School of Natural Resources and Environment offers interdisciplinary coursework in the basic and applied science of ecology, the related social sciences, and sustainability, leading to M.S. and Ph.D. degrees. Choose from about 450 courses, 280 faculty advisors, and 44 participating departments. Research areas of ecology graduate students range across natural resource ecology, environmental policy and management, and sustainable development.

Environmental problems are fundamentally human problems and should be understood in terms of human motivations and actions in a biophysical context. Their solution requires holistic thinking about dynamic ecological systems and the social, economic, and political forces driving human action. To this end, the goal of the Interdisciplinary Ecology graduate program is to provide advanced training in ecosystems thinking and the main theories and methodologies of the biophysical and social sciences to foster integrative approaches to complex real-world problems. Interdisciplinary Ecology students are intensely interested in the sustainability problem, and they welcome the challenge of addressing it through more than one traditional discipline.

Combination programs: The School offers a combination bachelor's/master's degree program, which allows qualified students to earn both a bachelor's degree and a master's degree with a savings of 1 semester.

Majors

- Interdisciplinary Ecology (p. 77)

Faculty

Affiliated Faculty

- Abil, Zhanar
Assistant Professor
- Acevedo Torres, Miguel A.
Assistant Professor
- Adams, Alison Eve
Associate Professor
- Adams, Carrie R.
Associate Professor
- Adams, Damian
Professor
- Adams, Peter N.
Professor
- Allen, Micheal S.
Professor
- Altieri, Andrew H.
Assistant Professor
- Andreu, Michael G.
Associate Professor
- Annable, Michael D.
Professor
- Asche, Frank
Professor
- Ash, Kevin D.
Assistant Professor
- Austin, James D.
Professor
- Bacon, Allan
Assistant Professor
- Baiser, Benjamin H.
Associate Professor
- Baker, Shirley M.
Professor
- Balaguera-Reina, Sergio
Research Assistant Scientist
- Barry, Savanna C.
Other
- Bartels, Wendy Lin
Research Assistant Scientist
- Baruzzi, Carolina
Assistant Professor
- Batista Dubeux, Jose Carlos
Professor
- Baweja, Vandana
Associate Professor
- Bayabil, Haimanote Kebede
Associate Professor
- Bean, Eban Zachary
Associate Professor
- Behringer, Donald Charles
Professor
- Bhadha, Jehangir
Assistant Professor
- Blackburn, David C.
Curator
- Blackburn, Jason K.
Professor
- Blake, John G.
Professor
- Bliznyuk, Nikolay A.
Associate Professor
- Bohlman, Stephanie Ann
Professor
- Bonzongo, Jean-Claude J.
Professor
- Branch, Lyn Clarke
Professor
- Braswell, Anna E.
Assistant Professor
- Brenner, Mark
Professor
- Broadbent, Eben North
Associate Professor
- Bruck, Julie Lehman
Professor
- Bruna, Emilio M.

Professor

- Brym, Zachary Thomas
Associate Professor
- Byrd, Jason H.
Clinical Professor
- Callaghan, Corey T.
Assistant Professor
- Camp, Edward Vincent
Associate Professor
- Campbell, Lindsay P.
Assistant Professor
- Campos Krauer, Juan Manuel
Clinical Assistant Professor
- Carlson, Andrew Kenneth
Courtesy Assistant Professor
- Carney, Jeffrey Andrew
Associate Professor
- Carthy, Raymond R.
Courtesy Professor
- Cellinese, Nicoletta
Curator
- Chagaris, David D.
Research Assistant Professor
- Chalfin, Brenda Helene
Professor
- Chapman, Frank A.
Associate Professor
- Chase, Carlene Ann
Associate Professor
- Child, Brian Anthony
Associate Professor
- Cichra, Charles
Professor
- Clark, Mark W.
Associate Professor
- Clarke, Mysha
Assistant Professor
- Coenen, Danny
Other
- Coers, Natalie
Lecturer
- Cohen, Matthew J.
Professor
- Cohn, Martin J.
Professor
- Contreras, Daniel A.
Associate Professor
- Court, Christa
Associate Professor
- Crandall, Raelene M.
Associate Professor
- Cropper, Wendell P.
Professor
- Dale, Adam G.
Associate Professor
- Daniels, Jaret C.

Curator

- Daroub, Samira H.
Professor
- Davis, Jack Emerson
Distinguished Professor
- Defrance, Susan D.
Professor
- Denslow, Nancy D.
Professor
- Díaz, John M.
Associate Professor
- Diehl, David Christopher
Associate Professor
- DiMaggio, Matthew A.
Associate Professor
- Dukes, Michael D.
Professor
- Dumitru, Oana-Alexandra
Associate Professor
- Durham, Bryndan P.
Assistant Professor
- Dutton, Christopher Lee
Assistant Professor
- Ellington, Edward Hanson
Assistant Professor
- Emery, Katherine Freances
Curator
- Enloe, Stephen Frederick
Professor
- Ennes, Megan E.
Assistant Curator
- Ernest, Sarah Kelson Morgan
Professor
- Ferl, Robert J.
Distinguished Professor
- Fletcher, Robert Jeffrey
Professor
- Flory, Stephen
Professor
- Francis-Floyd, Ruth
Professor
- Frank, Kathryn I.
Associate Professor
- Fu, Rachel Juichi
Professor
- Gao, Zhifeng
Professor
- Gauthier, Nicolas Edouard
Assistant Curator
- Gerber, Stefan
Associate Professor
- Gettys, Lyn A.
Associate Professor
- Gilbert, Robert A.
Professor
- Gillooly, James F.

Associate Professor

- Glenn, Alina Zare
Professor
- Gold, Martin Arnold
Associate Professor
- Golmohammadi, Golmar
Assistant Professor
- Good, Ryan Z.
Lecturer
- Gordon, Doria R.
Courtesy Associate Professor
- Goss, Erica M.
Professor
- Graham, Wendy Dimbero
Professor
- Grunwald, Sabine
Professor
- Guralnick, Robert Penn
Curator
- Guzman Gutierrez, Sandra Milena
Assistant Professor
- Hahn, Daniel Allen
Professor
- Hahn, Philip G.
Assistant Professor
- Hammond, William
Assistant Professor
- Hanson, Rebecca Annice
Assistant Professor
- Hatfield, Kirk
Professor
- He, Zhenli
Professor
- Heckenberger, Michael Joseph
Professor
- Hellgren, Eric C.
Professor
- Hensel, Marc J.
Research Assistant Professor
- Her, Young Gu
Associate Professor
- Hill, Jeffrey Eugene
Professor
- Hochmair, Hartwig H.
Professor
- Hocter, Thomas Scott
Research Associate Professor
- Holt, Robert D.
Eminent Scholar
- Hoogenboom, Gerrit
Professor
- Hostetler, Mark E.
Professor
- Hull, Vanessa K.
Associate Professor
- Hundemer, Sarah E.

Assistant Professor

- Iannone, Basil V.
Associate Professor
- Inglett, Patrick W.
Professor
- Irani, Tracy Anne
Professor
- Jaeger, John M.
Professor
- Jawitz, James W.
Professor
- Ji, Xinde
Assistant Professor
- Johnson, Daniel Jacob
Associate Professor
- Johnson, Steven Albert
Professor
- Jones, Douglas S.
Professor
- Judge, Jasmeet
Professor
- Kadyampakeni, Davie Mayeso
Assistant Professor
- Kahler, Jessica Siders
Assistant Professor
- Kainer, Karen A.
Professor
- Kane, Andrew S.
Associate Professor
- Kaplan, David A.
Professor
- Kawahara, Akito
Curator
- Keellings, David James
Assistant Professor
- Keiser, Carl N.
Assistant Professor
- Kiker, Gregory A.
Professor
- Kimball, Rebecca T.
Professor
- Klein, Ryan William
Assistant Professor
- Klizentyte, Kotryna
Assistant Professor
- Knowles, Harold S.
Lecturer
- Koeser, Andrew K.
Associate Professor
- Koppel, Anita Anantharam
Associate Professor
- Kowalewski, Michal
Curator
- Krigbaum, John
Professor
- Lamb, Robert Wellington

Research Assistant Professor

- Lamino Jarmillo, Pablo
Assistant Professor
- Larkin, Iskande V.
Senior Lecturer
- Larkin, Sherry L.
Professor
- Lashley, Marcus Alan
Associate Professor
- Laughinghouse, Haywood D.
Associate Professor
- Leary, James J K
Assistant Professor
- Leibold, Mathew
Professor
- Lescord, Gretchen
Assistant Professor
- Li, Jiayang
Assistant Professor
- Li, Yuncong
Professor
- Liao, Hui-Ling
Associate Professor
- Liburd, Oscar Emanuel
Professor
- Lichstein, Jeremy W.
Professor
- Lin, Yang
Assistant Professor
- Lindner, Angela S.
Professor
- Loiselle, Bette Ann
Professor
- Loizzo, Jamie Lynn
Associate Professor
- Longo Berrios, Ana Veronica
Associate Professor
- Lord, Cynthia C.
Associate Professor
- Lorenzen, Kai
Professor
- Lowerre-Barbieri, Susan K.
Research Professor
- Lucky, Andrea
Associate Professor
- Luo, Yi
Assistant Professor
- Lusk, Mary G.
Assistant Professor
- Macdonald, Gregory E.
Professor
- Mackowiak, Cheryl
Associate Professor
- Main, Martin B.
Professor
- Majure, Lucas C.

Associate Curator

- Mallinger, Rachel
Assistant Professor
- Maltais Landry, Gabriel
Assistant Professor
- Martin, Ellen Eckels
Professor
- Martin, Jonathan Bowman
Professor
- Martin, Julien
Associate Professor
- Martin, Timothy A.
Professor
- Matyas, Corene J.
Professor
- Mazzotti, Frank J.
Professor
- McAuslane, Heather J.
Professor
- McCarty, Christopher
Professor
- McCleery, Robert Alan
Professor
- McGowan, Conor Patrick
Courtesy Associate Professor
- McKune, Sarah Lindley
Research Associate Professor
- Meyer, Julie
Assistant Professor
- Migliaccio, Kati White
Professor
- Miller, Christine Whitney
Associate Professor
- Miller, David
Professor
- Miller, Deborah Louise
Professor
- Minogue, Patrick J.
Associate Professor
- Monaghan, Paul F.
Associate Professor
- Morales, Nia Aisha Haynes
Assistant Professor
- Morrison, Elise S.
Assistant Professor
- Mossa, Joann
Professor
- Moulton, Michael P.
Associate Professor
- Mullally, Conner
Associate Professor
- Mullens, Esther D.
Assistant Professor
- Munoz-Carpena, Rafael
Distinguished Professor
- Murie, Debra Jean

Professor

- Myers, Brian E.
Professor
- Mylavarapu, Rao S.
Professor
- Nair, Vimala D.
Research Professor
- Nichols, James D.
Courtesy Professor
- Ogram, Andrew V.
Professor
- Olexa, Michael T.
Professor
- Oli, Madan Kumar
Professor
- Osborne, Todd Z.
Associate Professor
- Ossiboff, Robert J.
Clinical Associate Professor
- Overdevest, Christine A.
Associate Professor
- Oyuela-Caycedo, Augusto
Associate Professor
- Page, Larry M.
Curator
- Palmer, Todd
Professor
- Patterson, William Frank
Professor
- Patterson, Joshua T.
Associate Professor
- Paulay, Gustav
Curator
- Paulson, Susan
Professor
- Perez, Hector E.
Professor
- Perz, Stephen George
Professor
- Peterson, Anna
Professor
- Philips, Edward J.
Professor
- Pilyugin, Sergei S.
Professor
- Ponciano Castellanos, Jose Miguel
Professor
- Porazinska, Dorota Lidia
Associate Professor
- Powell, Abby Neva
Courtesy Professor
- Putz, Francis E.
Distinguished Professor
- Qiao, Xiaohui
Research Assistant Professor
- Qiu, Jiangxiao

Associate Professor

- Radunovich, Heidi Liss
Professor
- Rechcigl, John Edward
Professor
- Reddy, Rameshwer Konda
Graduate Research Professor
- Reed, David Lee
Curator
- Reisinger, Alexander J.
Assistant Professor
- Reisinger, Lindsey Sargent
Assistant Professor
- Reynolds, Laura
Assistant Professor
- Ribeiro Do Valle, Denis
Associate Professor
- Ries, Robert
Professor
- Rios, Esteban Fernando
Associate Professor
- Roberts, Thomas G.
Professor
- Robinson, Scott K.
Eminent Scholar
- Romagosa, Christina M.
Associate Professor
- Romero, Claudia
Courtesy Assistant Professor
- Rossi, Lorenzo
Assistant Professor
- Ryan, Sadie Jane
Professor
- Salemi, Marco
Professor
- Sandoval Gutierrez, Hector Hugo
Research Assistant Professor
- Sansalone, John Joseph
Professor
- Sassaman, Kenneth Edward
Professor
- Schaffer, Bruce A.
Professor
- Scheffers, Brett Ryan
Associate Professor
- Serra, Renata
Master Lecturer
- Sharma, Lakesh Kumar
Assistant Professor
- Sharma, Vivek
Assistant Professor
- Shirey, Vaughn Michael
Assistant Curator
- Short, Andrew E.
Professor
- Sieving, Kathryn E.

Professor

- Silveira, Maria Lucia
Professor
- Simmons, Cynthia S.
Professor
- Smith, Benjamin B.
Professor
- Smith, Hugh A.
Associate Professor
- Smith, Matthew E.
Professor
- Smyth, Ashley R.
Assistant Professor
- Sollenberger, Lynn E.
Distinguished Professor
- Soltis, Pamela S.
Distinguished Professor
- Souunny-Slitine, Moulay M.
Other
- Southworth, Jane
Professor
- Stein, Taylor Verne
Professor
- Steiner, Ruth Lorraine
Professor
- Stepp, John Richard
Professor
- Stofer, Kathryn Anne
Research Associate Professor
- Strauss, Sarah L.
Associate Professor
- Subalusky, Amanda L.
Assistant Professor
- Sutton, Lerah K.
Other
- Swisher, Marilyn E.
Professor
- Taylor, Bron R.
Professor
- Telg, Ricky W.
Professor
- Thetford, Mack
Associate Professor
- Thiele, Leslie Paul
Distinguished Professor
- Thomas, Matthew Brian
Professor
- Thompson, Kevin R.
Associate Professor
- Townsend, Timothy G.
Professor
- Treadwell, Danielle D.
Associate Professor
- Tucker, Catherine May
Professor
- Tziolas, Nikolaos

Assistant Professor

- Useche, Maria Del-Pilar
Professor
- Valenta, Kim L.
Assistant Professor
- Vander Zanden, Hannah B.
Assistant Professor
- Vieira De Paula Moraes, Silvana
Associate Professor
- Vincent, Christopher I.
Associate Professor
- Vogel, Jason
Associate Professor
- Walker, Robert T.
Professor
- Walsh-Childers, Kimberly B.
Professor
- Warner, Laura Anne
Professor
- Wells, Randall Stewart
Professor
- Weng, Weizhe
Assistant Professor
- Whiles, Matthew R.
Professor
- White, Ethan P.
Professor
- Wilkie, Ann Christina
Research Professor
- Wilkinson, Benjamin E.
Associate Professor
- Willmott, Keith Richard
Curator
- Wilson, Chris H.
Assistant Professor
- Wilson, Patrick Christopher
Professor
- Wilson, Sandra Barbour
Professor
- Wisely, Samantha M.
Professor
- Wonkka, Carissa L.
Assistant Professor
- Wright, Alan Lee
Professor
- Wurdig Roesch, Luiz Fernando
Associate Professor
- Yang, Huiping
Associate Professor
- Yoon, Seonkyoo
Assistant Professor
- Young, Alyson Gail
Associate University Librarian
- Zhao, Chang
Assistant Professor
- Zhao, Xin

Professor

- Zimmerman, Andrew R.
Professor

Interdisciplinary Ecology

Program Information

Director of Academic Programs and Graduate Coordinator: K. R. Reddy

Graduate students are advised by one of the 340 members of the School's affiliate faculty and have a supervisory committee with interdisciplinary composition. For the list of Graduate Faculty, see <https://snre.ifas.ufl.edu/people/affiliate-faculty/>. Graduate students are hosted in one of 50 participating academic units.

The School offers a program of study leading to the Master of Science (thesis and non-thesis options), and Doctor of Philosophy degrees in interdisciplinary ecology. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog. The course work requirements and curriculum are described in more detail at <http://snre.ifas.ufl.edu/academics/graduate/courses-syllabi-and-curriculum/>. Choices among 450 courses are custom-fitted by the student and the supervisory committee to meet the student's specific needs and interests.

The Interdisciplinary Ecology program views the social-ecological system as the proper framework for addressing the full scope of complex, adaptive systems comprising humans in the natural world. The degree program challenges students to understand both natural and human dynamics to obtain a holistic view and to foster integration of human activities with natural resources and the environment. The learning outcomes of the program are to develop a thorough understanding of the components, processes, and interactions of the social-ecological system, competence in scientific research methodologies, and experience in professional interaction with peers.

The degree programs combine

1. course work in the science of ecology and additional natural and social sciences; and
2. competence in a recognized discipline in one of these fields of study.

The former is achieved with a core-course and distribution requirement and the latter by extra course work for the master's and a concentration for the doctoral degree. A thesis or dissertation provides first-hand experience creating scientific knowledge. The non-thesis master's option provides rapid, advanced preparation for the job market in 3 to 4 semesters, without research experience. Course requirements are 30 semester hours for the thesis option, 30 hours for the non-thesis option, and 60 hours beyond the master's degree for the doctoral degree.

Combination programs: The School offers a combination bachelor's/master's degree program, which allows qualified students to earn both a bachelor's degree and a master's degree with a savings of 1 semester.

Degrees Offered

Degrees Offered with a Major in Interdisciplinary Ecology

- Doctor of Philosophy
 - without a concentration
 - concentration in Agricultural and Biological Engineering
 - concentration in Agricultural Education and Communication
 - concentration in Agronomy
 - concentration in Anthropology
 - concentration in Architecture
 - concentration in Biochemistry and Molecular Biology
 - concentration in Botany
 - concentration in Business Administration
 - concentration in Chemistry
 - concentration in Civil Engineering
 - concentration in Climate Science
 - concentration in Coastal and Oceanographic Engineering
 - concentration in Economics
 - concentration in English
 - concentration in Entomology and Nematology
 - concentration in Environmental Engineering Sciences
 - concentration in Family, Youth and Community Sciences
 - concentration in Farming Systems
 - concentration in Fisheries and Aquatic Sciences
 - concentration in Food and Resource Economics
 - concentration in Food Science
 - concentration in Forest Resources and Conservation
 - concentration in Foundations of Education
 - concentration in Geographic Information Systems
 - concentration in Geography
 - concentration in Geology
 - concentration in Global Systems Agroecology
 - concentration in Health and Human Performance
 - concentration in Horticultural Sciences
 - concentration in Hydrologic Sciences
 - concentration in Landscape Architecture
 - concentration in Mathematics
 - concentration in Microbiology and Cell Science
 - concentration in Nuclear and Radiological Engineering
 - concentration in Philosophy
 - concentration in Political Science
 - concentration in Religion
 - concentration in Sociology
 - concentration in Soil and Water Science
 - concentration in Statistics
 - concentration in Tropical Conservation and Development
 - concentration in Urban and Regional Planning
 - concentration in Veterinary Medical Sciences
 - concentration in Wetland Sciences
 - concentration in Wildlife Ecology And Conservation

- concentration in Women's/Gender Studies
- concentration in Zoology
- Master of Science
 - without a concentration
 - concentration in Agricultural and Biological Engineering
 - concentration in Agricultural Education and Communication
 - concentration in Agronomy
 - concentration in Anthropology
 - concentration in Architecture
 - concentration in Biochemistry and Molecular Biology
 - concentration in Botany
 - concentration in Business Administration
 - concentration in Chemistry
 - concentration in Civil Engineering
 - concentration in Climate Science
 - concentration in Coastal and Oceanographic Engineering
 - concentration in Economics
 - concentration in English
 - concentration in Entomology and Nematology
 - concentration in Environmental Engineering Sciences
 - concentration in Family, Youth and Community Sciences
 - concentration in Farming Systems
 - concentration in Fisheries and Aquatic Sciences
 - concentration in Food and Resource Economics
 - concentration in Food Science
 - concentration in Forest Resources and Conservation
 - concentration in Foundations of Education
 - concentration in Geographic Information Systems
 - concentration in Geography
 - concentration in Geology
 - concentration in Health and Human Performance
 - concentration in Horticultural Sciences
 - concentration in Hydrologic Sciences
 - concentration in Landscape Architecture
 - concentration in Mathematics
 - concentration in Microbiology and Cell Science
 - concentration in Nuclear and Radiological Engineering
 - concentration in Philosophy
 - concentration in Political Science
 - concentration in Religion
 - concentration in Sociology
 - concentration in Soil and Water Science
 - concentration in Statistics
 - concentration in Tropical Conservation and Development
 - concentration in Urban and Regional Planning
 - concentration in Veterinary Medical Sciences
 - concentration in Wetland Sciences
 - concentration in Wildlife Ecology And Conservation
 - concentration in Women's/Gender Studies
 - concentration in Zoology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Interdisciplinary Ecology Core Course Options

<https://snre.ifas.ufl.edu/academics/graduate/graduate-student-curriculum/>

INTERDISCIPLINARY ECOLOGY Program COURSES (available through SNRE)

Code	Title	Credits
EVR 5705	Natural Resources and Innovation Systems	3
EVR 6933	Seminar	1
PCB 6971	Research for Master's Thesis	1-15
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

INTERDISCIPLINARY ECOLOGY (PH.D.)

SLO 1 Knowledge

Describe and explain the components, processes, and interactions of the social-ecological system

SLO 2 Skills

Apply the scientific method to generate new knowledge

SLO 3 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

Interdisciplinary ecology (M.S.)

SLO 1 Knowledge

Describe and explain the components, processes, and interactions of the social-ecological system

SLO 2 Skills

Apply the scientific method to generate new knowledge

SLO 3 Professional Behavior

Interact with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

Soil, Water, and Ecosystem Sciences Department

Chair and Graduate Coordinator: P. C. Wilson

Soil and water are vital resources in urban, agricultural, and natural ecosystems. The Department of Soil, Water, and Ecosystem Sciences provides highly visible leadership in teaching, research, and extension/outreach programs related to improving the productivity of agriculture with environmentally sound management practices, improving water quality, and protecting and conserving natural resources. Our department is one of the few in the nation that offers comprehensive research and educational programs (molecular to landscape level) involving terrestrial, wetland, and aquatic ecosystems. In addition to traditional on-campus educational programs, we use innovative e-technologies to offer educational programs to place-bound students throughout the world.

Our graduates and postdoctoral fellows are well-prepared for future careers in universities, state and federal agencies, and private industry. The Department of Soil, Water, and Ecosystem Sciences offers Master of Science and Doctor of Philosophy degrees in the *Soil and Water Sciences*. Broadly defined emphasis areas for degree programs include:

- biogeochemistry (coastal, landscape, soil, trace metals, and wetlands)
- bioenergy and sustainable technology
- carbon dynamics and ecosystem services
- environmental toxicology
- landscape analysis and modeling
- landscape and soil hydrology
- microbial ecology, molecular biology, bioinformatics
- pedological sciences
- soil quality (natural, agricultural, and urban systems)
- soil physics
- soil, water, and aquifer remediation
- soil, water, and environmental chemistry
- soil, water, and nutrient management
- water quality (natural, agricultural, and urban systems)
- watershed sciences and management
- wetland, aquatic systems, and coastal ecology

Students can work with departmental faculty on the main campus and at Research and Education Centers located throughout the state to custom-design their graduate program.

The department also offers a completely online Master of Science degree (thesis or professional non-thesis option) via distance education for place-bound students interested in environmental sciences or an agroecology concentration (<http://soils.ifas.ufl.edu/sws-online> (<http://soils.ifas.ufl.edu/sws-online/>)).

<http://soils.ifas.ufl.edu/sws-online/>)). Requirements for the M.S. and Ph.D. degrees are given in the Graduate Degrees (<http://gradcatalog.ufl.edu/content.php?catoid=12&navoid=2748>) section of this catalog. An additional option offered by the Department is a combination bachelor's/master's degree program that allows students to earn a B.S. in Soil and Water Sciences or Interdisciplinary Studies – Environmental Management in Agriculture and Natural Resources and an M.S. Degree within five years. In addition to the MS and PhD degrees, the Department also offers graduate-level certificates in Biodegradation and Remediation, Global Agroecology, Soil Ecosystem Services, Sustainable Agroecosystems, Sustainable Land Resource and Nutrient Management, and Wetland and Water Resource Management for on-campus and off-campus students via the distance education delivery system (<http://soils.ifas.ufl.edu/academics/degree-certificates.shtml> (<http://soils.ifas.ufl.edu/academics/degree-certificates.shtml/>)). Contact the graduate coordinator for more information.

For more information, please see our program's page in this catalog (p. 80) and our website: <http://soils.ifas.ufl.edu>.

Majors

- Soil, Water, and Ecosystem Sciences (p. 80)

Faculty

Professor

- Angle, Jay Scott
- Daroub, Samira H.
- Grunwald, Sabine
- He, Zhenli
- Inglett, Patrick W.
- Jawitz, James W.
- Li, Yuncong
- Mylavarapu, Rao S.
- Ogram, Andrew V.
- Rechcigl, John Edward
- Schumann, Arnold Walter
- Silveira, Maria Lucia
- Whiles, Matthew R.
- Wilson, Patrick Christopher
- Wood, Charles Wesley
- Wright, Alan Lee

Associate Professor

- Clark, Mark W.
- Gerber, Stefan
- Gu, Binhe
- Liao, Hui-Ling
- Mackowiak, Cheryl
- Osborne, Todd Z.
- Strauss, Sarah L.

Assistant Professor

- Babaeian, Ebrahim
- Bacon, Allan
- Bhadha, Jehangir

- Golmohammadi, Golmar
- Judy, Jonathan
- Kadyampakeni, Davie Mayeso
- Lin, Yang
- Lusk, Mary G.
- Maltais Landry, Gabriel
- Meyer, Julie
- Nunes, Marcio Renato
- Reisinger, Alexander J.
- Reynolds, Laura
- Sharma, Lakesh Kumar
- Smyth, Ashley R.
- Tziolas, Nikolaos

Other

- Ellis, Larry R.

Assistant Scientist

- Tootoonchi, Mohsen

Lecturer

- Enloe, Heather Allen

Research Professor

- Nair, Vimala D.
- Wilkie, Ann Christina

Research Assistant Professor

- Fujimoto, Masanori
- Hensel, Marc J.

Senior Lecturer

- Bonczek, James Lee

Graduate Research Professor

- Reddy, Rameshwer Konda

Affiliated Faculty

- Cohen, Matthew J.
Professor
- Moore, Kimberly
Professor

Soil, Water, and Ecosystem Sciences Program Information

The Soil, Water, and Ecosystem Sciences Department offers Master of Science (thesis or professional non-thesis option) and Doctor of Philosophy degrees in soil, water, and ecosystem sciences with the following specializations: ecology, environmental science, hydrologic science, and soil science. The department also offers Master of Science (thesis or professional option) track in environmental science via distance education for place bound students (<http://soils.ifas.ufl.edu/academics/degree-environscience.shtml> ([http://soils.ifas.ufl.edu/](http://soils.ifas.ufl.edu/academics/degree-environscience.shtml)

<http://soils.ifas.ufl.edu/academics/degree-environscience.shtml>)). Requirements for the M.S. and Ph.D. degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Students can also develop specializations in several interdisciplinary areas including biogeochemistry, ecology, geographic information systems, hydrologic science, tropical agriculture, turfgrass management, and wetland science. The Department emphasizes (but is not limited to) the following research areas:

- Nutrient, Pesticide, and Waste Management
- Soil, Water, and Aquifer Remediation
- Carbon Dynamics and Ecosystem Services
- Landscape Analysis and Modeling
- Wetlands and Aquatic Ecosystems

Interests of the student and faculty, the facilities, and funding available will determine the student's research area. A specific program of study is prepared by an appointed supervisory committee for each student. Students will present a thesis or dissertation in their major field (M.S. thesis option and Ph.D.). In addition, Ph.D. candidates must pass a qualifying examination covering several areas of soil and water science and related fields.

Prerequisites: Students who expect to do graduate work in the Soil, Water, and Ecosystem Sciences Department should hold a bachelor's degree from an accredited college or university with a major in soil, water, and ecosystem sciences or the equivalent background in another field of science. Graduate students should have backgrounds in biology, chemistry, physics, and mathematics and knowledge of basic soil and water science.

For more information, please see our website: <http://soils.ifas.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Soil, Water, and Ecosystem Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Climate Science
 - concentration in Geographic Information Systems
 - concentration in Global Systems Agroecology
 - concentration in Hydrologic Sciences
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Agroecology
 - concentration in Climate Science
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Research Methods
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Soil, Water, and Ecosystem Sciences Departmental Courses

Code	Title	Credits
AGG 5607	Communicating in Academia	3
AGG 6503	Nanotechnology in Food, Agriculture, and Environment	3
ALS 5155	Global Agroecosystems	3
CWR 6537	Contaminant Subsurface Hydrology	3
SWS 5050L	Soils for Environmental Professionals Laboratory	1
SWS 5050	Soils for Environmental Professionals	3
SWS 5115	Environmental Nutrient Management	3
SWS 5132	Tropical Soil Management	3
SWS 5182	Earth System Analysis	3
SWS 5208	Sustainable Agricultural and Urban Land Management	3
SWS 5224	Environmental Biogeochemistry	3
SWS 5234	Environmental Soil, Water, and Land Use	3
SWS 5246	Water Resource Sustainability	3
SWS 5247	Hydric Soils	2
SWS 5248	Wetlands and Water Quality	3
SWS 5305C	Soil Microbial Ecology	3
SWS 5308	Ecology of Waterborne Pathogens	3
SWS 5406	Soil and Water Chemistry	3
SWS 5424C	Soil Chemical Analysis	3
SWS 5551	Soils, Water, and Public Health	3
SWS 5605C	Environmental Soil Physics	3
SWS 5716C	Environmental Pedology	4
SWS 5721C	GIS in Land Resource Management	3
SWS 5805	Environmental Soil and Water Monitoring Techniques	3
SWS 6117	Fertilizer Technology and Use	3
SWS 6134	Soil Quality	3
SWS 6136	Soil and Nutrient Diagnostics for Agricultural Production	3
SWS 6209	Urban Soil and Water Systems	3
SWS 6323	Advanced Microbial Ecology	3
SWS 6366	Biodegradation and Bioremediation	3
SWS 6406	Soil Health and Data	3
SWS 6448	Biogeochemistry of Wetlands and Aquatic Systems	3
SWS 6454	Advanced Soil and Water Chemistry	3
SWS 6456	Advanced Biogeochemistry	3
SWS 6722	AI Modeling in Soil and Ecosystem Sciences	3
SWS 6804	Modeling Soil, Water, and Ecosystem Processes	3
SWS 6813C	Modeling Land Biogeochemistry	3
SWS 6905	Special Problems	1-4
SWS 6910	Supervised Research	1-5
SWS 6920	Journal Colloquium in Environmental Science	1
SWS 6931	Seminar	1
SWS 6932	Topics in Soils	1-4
SWS 6940	Supervised Teaching	1-5
SWS 6950	Professional Development in Soil, Water, and Ecosystem Sciences	2
SWS 6971	Research for Master's Thesis	1-15
SWS 6992	Aquatic Toxicology: Science and Applications	3

SWS 7979	Advanced Research	1-12
SWS 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3
ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

soil and water science (PHD)

SLO 1 Theories and Concepts
Describe and explain theories and concepts in soil and water sciences

SLO 2 Skills
Apply, analyze, and synthesize content knowledge by identifying component parts, relationships and ideas

SLO 3 Professional Behavior
Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication

Soil and water science (MS)

SLO 1 Theories and Concepts in Soil and Water Sciences
Describe and explain theories and concepts in soil and water sciences

SLO 2 Skills
Apply, analyze, and synthesize content knowledge by identifying component parts, relationships and ideas

SLO 3 Professional Behavior
Display ethical behaviors, cultural sensitivity, professional conduct and effective communication

Wildlife Ecology and Conservation Department

Chair: E. C. Hellgren
Graduate Coordinator: J. Austin

The Department of Wildlife Ecology and Conservation offers Master of Science (thesis and nonthesis option) and Doctor of Philosophy degrees in wildlife ecology and conservation. Requirements for these degrees are described in the Graduate Degrees (p. 778) section of this catalog.

Program emphases include wildlife biology, ecology, and management; landscape ecology and restoration; human dimensions; tropical and international conservation; and conservation education. Graduate students should have appropriate undergraduate training in the biological, social, and physical sciences including physics, chemistry, and mathematics. Students with inadequate backgrounds may be required to take (without credit at the graduate level) remedial undergraduate courses pertinent to their fields of interest.

For more information, please see our website: <http://www.wec.ufl.edu>.

Majors

- Wildlife Ecology and Conservation (p. 83)

Faculty

Professor

- Branch, Lyn Clarke
- Ernest, Sarah Kelson Morgan
- Fletcher, Robert Jeffrey
- Hellgren, Eric C.
- Hostetler, Mark E.
- Johnson, Steven Albert
- Loiselle, Bette Ann
- Main, Martin B.
- Mazzotti, Frank J.
- McCleery, Robert Alan
- Miller, Deborah Louise
- Noss, Reed F.
- Oli, Madan Kumar
- Sieving, Kathryn E.
- Wells, Randall Stewart
- White, Ethan P.
- Wisely, Samantha M.

Associate Professor

- Baiser, Benjamin H.
- Hull, Vanessa K.
- Lashley, Marcus Alan
- Martin, Julien
- Moulton, Michael P.
- Romagosa, Christina M.
- Scheffers, Brett Ryan

Assistant Professor

- Acevedo Torres, Miguel A.
- Baruzzi, Carolina
- Callaghan, Corey T.
- Ellington, Edward Hanson
- Hart, Kristen M.

- Lowe, Benjamin S.
- Morales, Nia Aisha Haynes

Courtesy Assistant Professor

- Carlson, Andrew Kenneth
- Kluever, Bryan
- Rivas Torres, Gonzalo Francisco

Research Assistant Scientist

- Balaguera-Reina, Sergio
- Miller, Melissa A.

Research Assistant Professor

- Baker, Bridget Brewer
- Hallett, Matthew T.
- Thomas, Travis Michael

Courtesy Professor

- Carthy, Raymond R.
- Conner, Larry Michael
- Nichols, James D.
- Powell, Abby Neva

Curator

- Blackburn, David C.

Courtesy Associate Professor

- McGowan, Conor Patrick
- Miller, Karl Erich
- Onorato, David P.
- Robertson, Kevin M.

Extension Agent

- Johnson, Shelly A.

Assistant Research Scientist

- Chaudhary, Vratika

Affiliated Faculty

- Austin, James D.
Professor
- Bruna, Emilio M.
Professor
- Campos Krauer, Juan Manuel
Clinical Assistant Professor
- Miro Herrans, Aida T.
Associate University Librarian
- Nations, Jonathan Allen
Assistant Curator

Wildlife Ecology and Conservation

Program Information

The Department of Wildlife Ecology and Conservation offers a breadth of graduate programs that are designed to prepare students for professional employment in conservation of natural resources in a changing world.

WEC faculty teach, conduct research, and provide service and extension in the following areas: avian ecology, behavioral ecology, community ecology, conservation biology, conservation education, conservation genetics, ecosystem management, environmental interpretation, habitat restoration, global change ecology, herpetofaunal ecology, human dimensions of wildlife management, international conservation, introduced species, landscape ecology, macroecology, mammalian behavior, marine mammal ecology, plant ecology, population biology, range ecology, systems ecology, tropical conservation, urban wildlife relations, wetlands ecology, wildlife diseases, and wildlife management.

The **Doctor of Philosophy (PhD) program** in Wildlife Ecology and Conservation serves graduate students conducting advanced, original studies of fundamental ecological and social sciences (e.g., ecosystem, community, landscape ecology, human dimensions), usually with applications to further society's understanding of wildlife ecology and to improve conservation of wildlife resources.

The **Master of Science (MS) thesis program** in Wildlife Ecology and Conservation:

1. prepares graduate students for entry-level professional positions in areas of wildlife biology and ecology, natural resource management, conservation, and
2. provides a solid scientific foundation for further graduate work leading to the PhD degree.

The **Master of Science, non-thesis (MS) program** in Wildlife Ecology and Conservation provides advanced training for students in technical and professional aspects of wildlife management, conservation, and public education, emphasizing written and oral communication of scientific information.

- Master of Science in Wildlife Ecology and Conservation with a concentration in Wildlife Forensics Science and Conservation - offered by WEC in conjunction with UF's Maples Center for Forensic Science as a non-thesis, online option. Students are prepared for real-world situations in wildlife forensics such as poaching and illegal trade and courses are taught by faculty members who have years of experience in the field working with law enforcement and wildlife organizations. See <https://masters.wildlife.forensics.med.ufl.edu/programs/masters-degree/> for a full program description and application instructions.

For more information, please see our website: <http://www.wec.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Wildlife Ecology and Conservation

- Doctor of Philosophy
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences

- Master of Science
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences
 - concentration in Wildlife Forensic Sciences and Conservation

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Wildlife Ecology and Conservation Courses

Code	Title	Credits
ALS 6500	Multivariate Statistics for Agricultural and Life Sciences	3
ALS 6501	Data Carpentry for Biologists	3
WIS 5496	Research Design in Wildlife Ecology	3
WIS 5555C	Conservation Biology	3
WIS 5562	Conservation Medicine	3
WIS 6050	Pro Communication in Wildlife Forensic Sciences	3
WIS 6051	Wildlife Tracks and Sign	3
WIS 6052	Bird Language	3
WIS 6306	Applied Wildlife Forensic Genetics	3
WIS 6307	Integrated Wildlife Forensic Genetics	3
WIS 6405	Biodiversity	3
WIS 6421	Wildlife Toxicology: The Ecohealth Perspective	3
WIS 6425	Carrion Ecology and Evolution	3
WIS 6444C	Wetland Management	3
WIS 6455	Wildlife Population Ecology	3
WIS 6466	Wildlife Population Modeling	3
WIS 6468C	Pattern and Process in Landscape Ecology	3
WIS 6505C	Quantitative Analysis of Animal Populations	3
WIS 6522	Coupled Human and Wildlife Systems	3
WIS 6526	Stakeholder Engagement in Natural Resources	3
WIS 6544	Administration in Natural Resources	3
WIS 6557	International Wildlife Conservation Law, Policy and Ethics	3
WIS 6558	Introduction to U.S. Wildlife Law, Policy & Ethics	3
WIS 6559	Forensic Science for Conservation Biology	3
WIS 6561	Wildlife Crime Scene Processing	3
WIS 6563	Wildlife Forensic Pathology	3
WIS 6565	Negative and Suboptimal Research Findings in Wildlife Forensics	3
WIS 6576	Human and Wildlife Conflict	3
WIS 6905	Research Problems in Wildlife and Range Sciences	1-6
WIS 6910	Supervised Research	1-5
WIS 6933	Seminar	1
WIS 6934	Topics in Wildlife Ecology and Conservation	1-4
WIS 6940	Supervised Teaching	1-5
WIS 6946	Wildlife Forensics Internship	1-6
WIS 6971	Research for Master's Thesis	1-15
WIS 7979	Advanced Research	1-12
WIS 7980	Research for Doctoral Dissertation	1-15

Wildlife Ecology and Conservation Departmental Courses

Code	Title	Credits
ALS 6500	Multivariate Statistics for Agricultural and Life Sciences	3
ALS 6501	Data Carpentry for Biologists	3
WIS 5496	Research Design in Wildlife Ecology	3
WIS 5555C	Conservation Biology	3
WIS 5562	Conservation Medicine	3
WIS 6050	Pro Communication in Wildlife Forensic Sciences	3
WIS 6051	Wildlife Tracks and Sign	3
WIS 6052	Bird Language	3
WIS 6306	Applied Wildlife Forensic Genetics	3
WIS 6307	Integrated Wildlife Forensic Genetics	3
WIS 6405	Biodiversity	3
WIS 6421	Wildlife Toxicology: The Ecohealth Perspective	3
WIS 6425	Carrion Ecology and Evolution	3
WIS 6444C	Wetland Management	3
WIS 6455	Wildlife Population Ecology	3
WIS 6466	Wildlife Population Modeling	3
WIS 6468C	Pattern and Process in Landscape Ecology	3
WIS 6505C	Quantitative Analysis of Animal Populations	3
WIS 6522	Coupled Human and Wildlife Systems	3
WIS 6526	Stakeholder Engagement in Natural Resources	3
WIS 6544	Administration in Natural Resources	3
WIS 6557	International Wildlife Conservation Law, Policy and Ethics	3
WIS 6558	Introduction to U.S. Wildlife Law, Policy & Ethics	3
WIS 6559	Forensic Science for Conservation Biology	3
WIS 6561	Wildlife Crime Scene Processing	3
WIS 6563	Wildlife Forensic Pathology	3
WIS 6565	Negative and Suboptimal Research Findings in Wildlife Forensics	3
WIS 6576	Human and Wildlife Conflict	3
WIS 6905	Research Problems in Wildlife and Range Sciences	1-6
WIS 6910	Supervised Research	1-5
WIS 6933	Seminar	1
WIS 6934	Topics in Wildlife Ecology and Conservation	1-4
WIS 6940	Supervised Teaching	1-5
WIS 6946	Wildlife Forensics Internship	1-6
WIS 6971	Research for Master's Thesis	1-15
WIS 7979	Advanced Research	1-12
WIS 7980	Research for Doctoral Dissertation	1-15

College of Agricultural and Life Sciences Courses

Code	Title	Credits
ALS 5156	Agricultural Ecology Principles and Applications	3
ALS 5905	Individual Study	1-4
ALS 5932	Special Topics	1-4
ALS 6046	Grant Writing	2
ALS 6166	Exotic Species and Biosecurity Issues	3

ALS 6921	Colloquium on Plant Pests of Regulatory Significance	1
ALS 6925	Integrated Plant Medicine	4
ALS 6931	Plant Medicine Program Seminar	1
ALS 6935	Topics in Biological Invasions	3
ALS 6942	Principles of Plant Pest Risk Assessment and Management	3
ALS 6943	Internship in Plant Pest Risk Assessment and Management	1-10
ANS 6936	Graduate Seminar in Animal Molecular and Cell Biology	1-2
BCH 5045	Graduate Survey of Biochemistry	4
FNR 6933	Seminar	1
STA 6093	Introduction to Applied Statistics for Agricultural and Life Sciences	3
STA 6329	Matrix Algebra and Statistical Computing	3

Student Learning Outcomes

Wildlife ecology & conservation (PHD)

SLO 1 Concepts and Theories of Wildlife Ecology and Conservation
Describe and explain concepts and theories of wildlife ecology and conservation science, and the appropriate methods and techniques in a specialization.

SLO 2 Independent/Original Research
Plan, conduct and analyze independent/original research.

SLO 3 Apply Research to Address Problems
Apply quantitative, spatial or qualitative research approaches to address wildlife ecology and conservation problems.

SLO 4 Effective Communication
Communicate proficiently and productively in oral and written form.

SLO 5 Professional Behavior
Display ethical behaviors and professional conduct to contribute as responsible professionals in the field of wildlife ecology and conservation

wildlife ecology & Conservation (MS)

SLO 1 Concepts and Theories of Wildlife Ecology and Conservation Science
Describe and explain concepts and theories of wildlife ecology and conservation science, and the appropriate methods and techniques in a specialization.

SLO 2 Independent/Original Research
Plan, conduct and analyze independent/original research.

SLO 3 Apply Research to Address Problems
Apply quantitative, spatial or qualitative research approaches to address wildlife ecology and conservation problems.

SLO 4 Effective Communication
Communicate proficiently and productively in oral and written form.

SLO 5 Professional Behavior
Display ethical behaviors and professional conduct to contribute as responsible professionals in the field of wildlife ecology and conservation.

College of Dentistry

Dean: I. Garcia

Associate Dean & Director: R. Pileggi

Advanced education has progressed over the years to be an integral component of the College of Dentistry, growing from six certificate residency programs, with an enrollment of only 36 students in 1979, to fourteen certificate programs and various fellowship programs. Enrollment is now over 145. In 1993, the college started master degree programs in endodontics, orthodontics, periodontics and prosthodontics, and continues today to grow.

Follow this link for more information about UF's College of Dentistry graduate programs: <http://admissions.dental.ufl.edu/advanced-graduate-programs> (<http://dental.ufl.edu/admissions/>)

Departments

- Dental Sciences (p. 86)
 - Dental Sciences (p. 87)

Faculty

Professor

- Bhattacharyya, Indraneel
- Catalanotto, Frank Alfred
- Caudle, Robert M.
- Cha, Seunghee
- Dolce, Calogero
- Esquivel-Upshaw, Josephine F.
- Guelmann, Marcio
- Katz, Joseph
- Riley, Joseph Leo
- Roulet, Jean-Francois

Associate Professor

- Cruz-Almeida, Yenisel
- Toth, Zsolt

Assistant Professor

- Bartley, Emily Jo
- Papp, Bernadett

Distinguished Professor

- Fillingim, Roger Benton
- Gordan, Valeria Veiga

Clinical Associate Professor

- Duncan, William Dupree

Affiliated Faculty

- Abdulhameed, Nader Farhan
Clinical Associate Professor
- Abranches, Jacqueline
Associate Professor
- Abu Arqub, Sarah H.

Clinical Assistant Professor

- Aguilar, Maria L.
Clinical Professor
- Ahn, Sang-Joon
Research Associate Scientist
- Brady, Linda J.
Professor
- Burne, Robert Arthur
Distinguished Professor
- Chang, Jia
Assistant Professor
- Davey, Mary Ellen
Courtesy Associate Professor
- Delgado, Alejandro
Clinical Associate Professor
- Dias Ribeiro, Ana Paula
Associate Professor
- Figueiredo Reis, Andre
Clinical Professor
- Frias-Lopez, Jorge
Associate Professor
- Gibson, Frank
Professor
- Gohel, Anita
Clinical Professor
- Gonzaga, Luiz H.
Clinical Associate Professor
- Holliday, Lexie Shannon
Associate Professor
- Hosney, Sherif
Clinical Assistant Professor
- Karanth Huttinagadde, Divakar S.
Clinical Associate Professor
- Khan, Nadeem
Associate Professor
- Lakshmyya, Kesavalu Naidu
Professor
- Lemos, Jose A.
Professor
- Martin, William Christopher
Clinical Professor
- Martinez Torres, Luis R.
Associate Professor
- McNeil, Daniel W.
Professor
- Mendes Duarte Reis, Poliana
Clinical Associate Professor
- Murphy, Niall
Associate Research Professor
- Nascimento, Marcelle Matos
Professor
- Nobrega Rodrigues Pereira, Patricia
Clinical Professor
- Oliveira, Dayane Carvalho
Clinical Associate Professor
- Pileggi, Roberta

Professor

- Progulske, Ann
Distinguished Professor
- Ribeiro Dasilva, Margarete
Clinical Professor
- Rocha, Mateus Garcia
Clinical Associate Professor
- Rodrigues Duarte, Wagner
Associate Professor
- Sibille, Kimberly T.
Associate Professor
- Singhal, Astha
Associate Professor
- Wallet, Shannon Margaret
Professor
- Widmer, Charles G.
Clinical Associate Professor
- Zeng, Lin
Associate Professor
- Zoidis, Panagiotis
Clinical Professor

Dental Sciences Department

Endodontics Chair and Graduate Coordinator: R. Pileggi
Orthodontics Chair: C. Dolce; *Graduate Coordinator:* D. Karanth
Periodontology Chair: I. Aukhil; *Graduate Coordinator:* W. Duarte
Restorative Dental Sciences Chair: D. Dilbone; *Graduate Coordinator:* E. O'Neill

The College of Dentistry offers the Master of Science degree in dental sciences with concentrations in endodontics, orthodontics, periodontics, and prosthodontics. These concentrations include a minimum of 38 hours of appropriate course work and research in topics relevant to each specialization. Requirements for the master's degree include a minimum of 38 hours of appropriate course work and research in topics relevant to each specialization. Requirements for the master's degree include

- Satisfactory completion of all course work
- Meeting the requirements for clinical certification in the respective dental specialty
- Thesis or project based on research.

Prerequisites for admission, in addition to those of the Graduate School, include

- D.D.S. or D.M.D. degree
- Completion of Parts I and II of the American Dental Association's National Board of Dental Examinations.

The application deadline for Endodontics is July 1

The application deadline for Periodontics is August 1

The application deadline of Orthodontics and Prosthodontics is September 2

Application details for these programs can be found on the webpage <http://admissions.dental.ufl.edu/advanced-graduate-programs/> (<http://admissions.dental.ufl.edu/advanced-graduate-programs/programs-application-process/>)

Requirements for the M.S. degree are provided in the Graduate Degrees (p. 778) section of this catalog.

Majors

- Dental Sciences (p. 87)

Faculty

Professor

- Bhattacharyya, Indraneel
- Catalanotto, Frank Alfred
- Caudle, Robert M.
- Cha, Seunghee
- Dolce, Calogero
- Esquivel-Upshaw, Josephine F.
- Guelmann, Marcio
- Katz, Joseph
- Riley, Joseph Leo
- Roulet, Jean-Francois

Associate Professor

- Cruz-Almeida, Yenisel
- Toth, Zsolt

Assistant Professor

- Bartley, Emily Jo
- Papp, Bernadett

Distinguished Professor

- Fillingim, Roger Benton
- Gordan, Valeria Veiga

Clinical Associate Professor

- Duncan, William Dupree

Affiliated Faculty

- Abdulhameed, Nader Farhan
Clinical Associate Professor
- Abranches, Jacqueline
Associate Professor
- Abu Arqub, Sarah H.
Clinical Assistant Professor
- Aguilar, Maria L.
Clinical Professor
- Ahn, Sang-Joon
Research Associate Scientist
- Brady, Linda J.
Professor
- Burne, Robert Arthur
Distinguished Professor
- Chang, Jia
Assistant Professor
- Davey, Mary Ellen
Courtesy Associate Professor
- Delgado, Alejandro

- Clinical Associate Professor
- Dias Ribeiro, Ana Paula
Associate Professor
- Figueiredo Reis, Andre
Clinical Professor
- Frias-Lopez, Jorge
Associate Professor
- Gibson, Frank
Professor
- Gohel, Anita
Clinical Professor
- Gonzaga, Luiz H.
Clinical Associate Professor
- Holliday, Lexie Shannon
Associate Professor
- Hosney, Sherif
Clinical Assistant Professor
- Karanth Huttinagadde, Divakar S.
Clinical Associate Professor
- Khan, Nadeem
Associate Professor
- Lakshmyya, Kesavalu Naidu
Professor
- Lemos, Jose A.
Professor
- Martin, William Christopher
Clinical Professor
- Martinez Torres, Luis R.
Associate Professor
- McNeil, Daniel W.
Professor
- Mendes Duarte Reis, Poliana
Clinical Associate Professor
- Murphy, Niall
Associate Research Professor
- Nascimento, Marcelle Matos
Professor
- Nobrega Rodrigues Pereira, Patricia
Clinical Professor
- Oliveira, Dayane Carvalho
Clinical Associate Professor
- Pileggi, Roberta
Professor
- Progulske, Ann
Distinguished Professor
- Ribeiro Dasilva, Margaret
Clinical Professor
- Rocha, Mateus Garcia
Clinical Associate Professor
- Rodrigues Duarte, Wagner
Associate Professor
- Sibille, Kimberly T.
Associate Professor
- Singhal, Astha
Associate Professor
- Wallet, Shannon Margaret

- Professor
- Widmer, Charles G.
Clinical Associate Professor
- Zeng, Lin
Associate Professor
- Zoidis, Panagiotis
Clinical Professor

Dental Sciences

Program Information

The College of Dentistry offers the Master of Science degree in dental sciences with concentrations in endodontics, orthodontics, periodontics, and prosthodontics. These concentrations include a minimum of 38 hours of appropriate course work and research in topics relevant to each specialization. Requirements for the master's degree include

- Satisfactory completion of all course work
- Meeting the requirements for clinical certification in the respective dental specialty
- Thesis or project based on research.

Prerequisites for admission, in addition to those of the Graduate School, include

- D.D.S. or D.M.D. degree
- Completion of Parts I and II of the American Dental Association's National Board of Dental Examinations according to individual program requirements.

Application deadlines for these programs can be found on the webpage <http://admissions.dental.ufl.edu/advanced-graduate-programs> (<http://dental.ufl.edu/admissions/>)

Those not in Dentistry are given in-department graduate credit. Registration in the courses listed below is restricted to students currently admitted to a program in the College of Dentistry.

Degrees Offered

Degrees Offered with a Major in Dental Sciences

- Master of Science
 - without a concentration
 - concentration in Endodontics
 - concentration in Operative and Esthetic Dentistry
 - concentration in Orthodontics
 - concentration in Periodontics
 - concentration in Prosthodontics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Dental Sciences General Courses

Code	Title	Credits
DEN 6674	Advanced Oral Pathology	1
DEN 6675	Craniofacial Pain	1

DEN 6678	Advanced Oral Medicine and Drug Interactions in Dentistry	1
DEN 6679	Advanced Radiology and Interpretation	1
DEN 6905	Individual Study	1-6
DEN 6910	Supervised Research	1-5
DEN 6934	Special Topics in Dentistry	1-3
DEN 6935	Special Topics in Dentistry	1-6
DEN 6936	Practice Management	1
DEN 6940	Supervised Teaching	1-5
DEN 6941	Clinical Teaching in Dentistry	1
DEN 6942	Grand Rounds	1-3
DEN 6971	Research for Master's Thesis	1-6
DEN 6973	Project in Lieu of Thesis	1-9

Endodontics Courses

Code	Title	Credits
DEN 6642	Introduction to Advanced Endodontics	1
DEN 6644	Nonsurgical Endodontic Care I	1
DEN 6645	Nonsurgical Endodontic Care II	1

Orthodontics Courses

Code	Title	Credits
DEN 6602	Orthodontic Treatment—Appliance Management and Effect of Treatment Part 1: Class I Treatment	1
DEN 6603	Orthodontic Treatment—Appliance Management and Effect of Treatment Part 2: Class II Treatment	1
DEN 6604	Appliance Mgmt and Effect of Orthodontic Treatment Part 3: Class II and Overbite Treatments	1
DEN 6605	Appliance Mgmt and Effect of Orthodontic Treatment Part 4: Class II and Overbite Treatments	1
DEN 6606	Appl Mgmt and Effect of Ortho Treatment Part 5: Class III and Crossbite Tmts, Soft Tissue	1
DEN 6607	Appl Mgmt and Effect of Ortho Treatment Part 6: Impactions, Transplantations, and Stability	1
DEN 6610	Biology of Tooth Movement: Part I	1
DEN 6612	Orthodontic Biomechanics: Part I	1
DEN 6613	Orthodontic Biomechanics: Part II	1
DEN 6615	Ortho-Perio Relationships: Part II	1
DEN 6616	Orthognathic Surgery: Part I	1
DEN 6617	Orthognathic Surgery: Part II	1
DEN 6618	Postnatal Growth and Development	1
DEN 6672	Materials in Orthodontics	0-1

Periodontics Courses

Code	Title	Credits
DEN 6652	Review of Periodontics Literature I	1
DEN 6654	Review of Periodontics Literature III	1
DEN 6655	Review of Periodontics Literature IV	1
DEN 6656	Introduction to Advanced Periodontology	1
DEN 6657	Periodontal Histology and Histopathology	1
DEN 6658	Treatment Planning in Periodontal Therapy	1

Prosthodontics Courses

Code	Title	Credits
DEN 6622	Principles of Occlusion	2
DEN 6623	Maxillofacial Prosthetics	1
DEN 6624	Dental Implant Restoration	1
DEN 6625	Fixed Prosthodontic Ceramics	1
DEN 6626	Advanced Removable Partial Dentures	1
DEN 6627	Treatment Planning Seminar	1

College of Dentistry Courses

Code	Title	Credits
DEN 6905	Individual Study	1-6
DEN 6910	Supervised Research	1-5
DEN 6934	Special Topics in Dentistry	1-3
DEN 6935	Special Topics in Dentistry	1-6
DEN 6936	Practice Management	1
DEN 6940	Supervised Teaching	1-5
DEN 6941	Clinical Teaching in Dentistry	1
DEN 6942	Grand Rounds	1-3
DEN 6971	Research for Master's Thesis	1-6
DEN 6973	Project in Lieu of Thesis	1-9

Student Learning Outcomes

Dental Sciences (MS)

SLO 1 Knowledge
Describe and show didactic and scientific proficiency in their specialty as required by each specific Advanced Graduate Education standards

SLO 2 Skills
Develop and apply clinical skills based on evidence based practice and scientific literature

SLO 3 Professional Behavior
Connect and align standards for professional behavior

College of Design, Construction and Planning

Dean: C. Anumba

DCP is home to five independent professional disciplines: architecture, construction management, interior design, landscape architecture and urban and regional planning. The college is also home to an interdisciplinary program in historic preservation, which allows graduate students to gain expertise in research and application of historic preservation in the United States and abroad.

Accreditation and Degrees

The academic programs in the college have an accreditation process from the professional organizations of each discipline.

- Architecture – National Architectural Accrediting Board
- Construction Management – American Council for Construction Education
- Interior Design – Foundation for Interior Design Education Research
- Landscape Architecture – American Society of Landscape Architects
- Urban and Regional Planning – Planning Accreditation Board

DCP offers both undergraduate and graduate degrees and programs. Through its academic units, the college offers doctoral, master's, and bachelor's degrees, as well as distance education programs, combination degrees, joint degrees, certificate programs, and academic minors.

College Institutes, Centers and Programs

Research and service projects conducted through the research centers and institutes often entail multidisciplinary, cross-campus student input and effort. Each division of the college is involved in on-going projects that advance both scholarly study and professional practice. The college contributes to community, state, regional and national efforts to conserve and improve the quality of the natural and built environments through its research centers. The college's teaching and research programs have national and international prominence.

For more information, please see our website: <http://www.dcp.ufl.edu>. (<http://www.dcp.ufl.edu>)

Departments

- DCP Interdisciplinary Programs (p. 89)
 - Design, Construction and Planning (Ph.D.) (p. 89)
 - Historic Preservation (p. 93)
 - Integrated Sustainable Development (p. 96)
- Interior Design (p. 98)
 - Interior Design (p. 99)
- Landscape Architecture (p. 100)
 - Landscape Architecture (p. 102)
- M.E. Rinker, Sr. School of Construction Management (p. 103)
 - Construction Management (p. 104)
 - Fire and Emergency Sciences (p. 106)
 - Sustainable Construction (p. 108)
- School of Architecture (p. 110)
 - Architecture (p. 111)
- Urban and Regional Planning (p. 114)
 - Urban Analytics (p. 115)
 - Urban and Regional Planning (p. 116)

Faculty

Interdisciplinary Departments

- Design, Construction and Planning (Ph.D.) (p. 89)
- Historic Preservation (p. 93)
- Integrated Sustainable Development (p. 96)

Faculty

Design, Construction, and Planning (Ph.D.)

Program Information

The Department of Design, Construction and Planning offers a Doctor of Philosophy degree. The department also offers Doctor of Philosophy degrees with the following specializations: historic preservation, urban and regional planning, landscape architecture, construction management, interior design, and geographic information systems.

Degrees Offered

Degrees Offered with a Major in Design, Construction, and Planning

- Doctor of Philosophy
 - without a concentration
 - concentration in Architecture
 - concentration in Construction Management
 - *optional second concentration in Geographic Information Systems*
 - *optional second concentration in Hydrologic Sciences*
 - concentration in Geographic Information Systems
 - concentration in Historic Preservation
 - *optional second concentration in Geographic Information Systems*
 - concentration in Interior Design
 - *optional second concentration in Geographic Information Systems*
 - concentration in Landscape Architecture
 - *optional second concentration in Geographic Information Systems*
 - concentration in Urban and Regional Planning
 - *optional second concentration in Geographic Information Systems*

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Architecture Departmental Courses

Code	Title	Credits
ARC 5040	Introduction to Themed Environments	3
ARC 5041	Design and Documentation of Themed Environments	3
ARC 5042	Fabrication and Execution for Themed Environments	3
ARC 5043	Integration Practices for Built Environments	3
ARC 5921	Fundamentals of Coding and Computation - Introduction to Computer Programming for Architects	3
ARC 6044	Development and Operations for Themed Environments	3
ARC 6045C	Project Development Studio for Themed Environments	6
ARC 6116	Drawing toward Architecture	1-2
ARC 6212	Topics in Phenomena and Architecture	3
ARC 6228	Film and Architecture	3
ARC 6241	Advanced Studio I	1-9
ARC 6242	Research Methods	3
ARC 6281	Professional Practice	3
ARC 6306C	Public Interest Design: Contemporary Issues and Practice	3
ARC 6311C	Building Information Modeling	3
ARC 6355	Advanced Studio II	6
ARC 6356	Advanced Studio III	6
ARC 6357	Advanced Topics in Architectural Design	3
ARC 6386	Introduction to Healthcare Design	3
ARC 6399	Advanced Topics in Urban Design	3

ARC 6505	Architectural Structural Systems: Wood, Steel, and Concrete	4	BCN 6586	Construction Ecology and Metabolism	3
ARC 6512	Structural Modeling	3	BCN 6641	Construction Value Engineering	3
ARC 6611	Advanced Topics in Architectural Technology	3	BCN 6748	Construction Law	3
ARC 6621	Graduate Environmental Technology 2	3	BCN 6785	Construction Information Systems	3
ARC 6642	Architectural Acoustic Design Laboratory	3	BCN 6905	Directed Independent Study in Construction	1-3
ARC 6643	Architectural Acoustics	3	BCN 6933	Advanced Construction Management	1-5
ARC 6670	Lighting Design Seminar	3	BCN 6940	Supervised Teaching	1-3
ARC 6680	Architecture Energy and Ecology	3	BCN 6971	Research for Master's Thesis	1-15
ARC 6685	Life Safety, Sanitation, and Plumbing Systems	3	FES 6705	Communications in Emergency Management	3
ARC 6686	LEED for Sustainable Design and Construction	3	FES 6724	Fire and Emergency Services Response Planning	3
ARC 6705	Graduate Architectural History 3	3	FES 6726	Hazard Mitigation and Preparedness	3
ARC 6773	Strains of Modernism	3	FES 6735	International Emergency/Disaster Management	3
ARC 6793	Advanced Topics in Regional Architecture	3	FES 6736	Homeland Security and Emergency Management	3
ARC 6821	Preservation Problems and Processes	3	FES 6786	Research Methods in FES	3
ARC 6883	Vernacular Architecture & Sustainability	3	FES 6806	Disaster Response and Recovery	3
ARC 6911	Architectural Research	1-6	FES 6826	Emergency Services - Disaster Planning	3
ARC 6912	Architectural Research II	1-6	FES 6827	Business Continuity and Disaster Planning	3
ARC 6913	Architectural Research III	1-6	FES 6836	Impacts of Natural and Man-made Disasters on Buildings	3
ARC 6922	Machine Learning for Architects	3	FES 6916	Research for Master's Report	3
ARC 6923	AI & Ethics in Architecture	3	FES 6940	Practicum in FES	1-3
ARC 6933	Sustainable Site Design	3	FES 6971	Research for Master's Thesis	1-6
ARC 6934	European Approach to Sustainable Design	3	ICM 5905	Special Studies	1-3
ARC 6940	Supervised Teaching	1-5	ICM 6420	Commercial Management and Cost Control	3
ARC 6971	Research for Master's Thesis	1-15	ICM 6440	Construction Value Management	3
ARC 6979	Master's Research Project	1-10	ICM 6680	Principles of International Sustainable Construction	3

Construction Management Departmental Courses

Code	Title	Credits
BCN 5470	Construction Methods Improvements	3
BCN 5618C	Comprehensive Estimating	3
BCN 5625	Construction Cost Analysis	3
BCN 5705C	Project Management for Construction	3
BCN 5722	Advanced Construction Planning and Control	3
BCN 5729	Design-Build Delivery Methods	3
BCN 5737	Advanced Issues in Construction Safety and Health	3
BCN 5776	International Construction Business Management	3
BCN 5778	Facilities Operation and Maintenance	3
BCN 5789C	Construction Project Delivery	3
BCN 5874	Equipment and Methods for Heavy Construction	3
BCN 5885	Methods and Management for Heavy Construction	3
BCN 5905	Special Studies in Construction	1-5
BCN 5949	Graduate Construction Management Internship	1-3
BCN 5957	Advanced International Studies in Construction	1-4
BCN 6036	Research Methods in Construction	3
BCN 6558C	Building Integrated Renewable Energy Systems	3
BCN 6580	High-Performance Green Building Delivery Systems	3
BCN 6583	Sustainable Housing	3
BCN 6584C	Building Energy Modeling	3
BCN 6585	Sustainable Construction	3

BCN 6586	Construction Ecology and Metabolism	3
BCN 6641	Construction Value Engineering	3
BCN 6748	Construction Law	3
BCN 6785	Construction Information Systems	3
BCN 6905	Directed Independent Study in Construction	1-3
BCN 6933	Advanced Construction Management	1-5
BCN 6940	Supervised Teaching	1-3
BCN 6971	Research for Master's Thesis	1-15
FES 6705	Communications in Emergency Management	3
FES 6724	Fire and Emergency Services Response Planning	3
FES 6726	Hazard Mitigation and Preparedness	3
FES 6735	International Emergency/Disaster Management	3
FES 6736	Homeland Security and Emergency Management	3
FES 6786	Research Methods in FES	3
FES 6806	Disaster Response and Recovery	3
FES 6826	Emergency Services - Disaster Planning	3
FES 6827	Business Continuity and Disaster Planning	3
FES 6836	Impacts of Natural and Man-made Disasters on Buildings	3
FES 6916	Research for Master's Report	3
FES 6940	Practicum in FES	1-3
FES 6971	Research for Master's Thesis	1-6
ICM 5905	Special Studies	1-3
ICM 6420	Commercial Management and Cost Control	3
ICM 6440	Construction Value Management	3
ICM 6680	Principles of International Sustainable Construction	3
ICM 6682	Construction Ecology and Metabolism	3
ICM 6684	High-Performance Green Building Delivery Systems	3
ICM 6710	Construction Human Resource Management	3
ICM 6716	Construction Productivity and Methods Improvement	3
ICM 6750	Managing Construction Information Technology	3
ICM 6761	Advanced Planning, Scheduling, and Logistics	3
ICM 6762	Construction Risk Management	3
ICM 6770	Advanced Project Safety Management	3
ICM 6775	Manufactured Construction Processes	3
ICM 6905	Directed Independent Study in International Construction	1-3
ICM 6910	Supervised Research	1-3
ICM 6930	Construction Communication and Research	3
ICM 6934	International Construction Research	1-6

Interior Design Departmental Courses

Code	Title	Credits
IND 5106	History of Interior Design I	3
IND 5136	History of Interior Design II	3
IND 5212C	Architectural Interiors I	5
IND 5227C	Advanced Architectural Interiors I	6
IND 5231C	Architectural Interiors II	5
IND 5326	Color Theory Planning and Practice	3
IND 5427C	Interior Design Construction Documents	4
IND 5434C	Interior Lighting	3
IND 5454C	Advanced Interior Design Detailing and Construction Documents	4

IND 5466	Interior Environmental Technology	3
IND 5508	Business and Professional Practices for Interior Designers	3
IND 5632	Interior Finishes and Materials	3
IND 5633	Readings in Design Studies	3
IND 5641	Environment and Behavior	3
IND 5937	Current Topics in Interior Design	1-3
IND 6639	Methods of Interior Design Research	3
IND 6906	Independent Studies and Readings	1-3
IND 6939	Creativity Applied	3
IND 6940	Supervised Teaching	1-5
IND 6941	Interior Design Internship	2-4
IND 6951	Project in Lieu of Thesis	6
IND 6971	Research for Master's Thesis	1-12

Landscape Architecture Departmental Courses

Code	Title	Credits
LAA 5331	Site Design Methodologies	3
LAA 6231	Landscape Architecture Theory	3
LAA 6236	Landscape Architecture Research Methods	3
LAA 6322	Landscape Architecture Professional Practice	3
LAA 6342	Landscape Architecture Criticism	1
LAA 6382	Ecological and Environmental Policy	3
LAA 6383	Landscape Ecology and Management	3
LAA 6525L	Advanced Landscape Construction Design	4
LAA 6656C	Advanced Landscape Architectural Design	1-6
LAA 6713	Cultural Landscapes	3
LAA 6905	Directed Study	1-3
LAA 6931	Water Conservation through Site Design and Green Roofs	3
LAA 6935	Gardens of the World	3
LAA 6941	Supervised Internship	3
LAA 6971	Research for Master's Thesis	2-6
LAA 6979	Terminal Project	1-6

Urban and Regional Planning Departmental Courses

Code	Title	Credits
URP 6007	Survey of Urban and Regional Planning	3
URP 6042	Urban Economy	3
URP 6059	Community Engagement	3
URP 6061	Planning Administration and Ethics	3
URP 6100	Planning Theory and History	3
URP 6131	Land Use Planning Law	3
URP 6132	Growth Management Seminar	3
URP 6203	Planning Research Design	1-3
URP 6223	Introduction to Urban Analytics	3
URP 6224	Intermediate Urban Analytics	3
URP 6231	Quantitative Data Analysis for Planners	3
URP 6270	Introduction to Planning Information Systems	3
URP 6271	Automation for Geospatial Modeling and Analysis	3
URP 6272	Urban Spatial Analysis	3
URP 6274	GPS for Planners: Introduction to Global Positioning System	1
URP 6275	Intermediate Planning Information Systems	3
URP 6276	Internet Geographic Information Systems	3

URP 6277	Land Use Visioning and Analysis	3
URP 6278	Web Mapping and Visualization	3
URP 6280	3D Geospatial Modeling and Visualization	3
URP 6341	Urban Planning Project	1-12
URP 6409	Sustainable Community Development	3
URP 6421	Environmental Land Use Planning and Management	3
URP 6424	Sustainable Urbanism in the Americas	3
URP 6428	Advanced Environmental Planning	3
URP 6429	Natural Resources Planning and Management	3
URP 6445	Planning for Climate Change	3
URP 6526	Health and the Built Environment	3
URP 6541	Economic Development Planning	3
URP 6542	Urban Land Economics	3
URP 6603	Development Review	3
URP 6610	International Development Planning	3
URP 6645	Sustainable Urbanism in Europe	3
URP 6646	International Perspectives in Urban and Regional Planning	3
URP 6711	Transportation and Land Use Coordination	3
URP 6716	Transportation Policy and Planning	3
URP 6743	Affordable Housing Law	3
URP 6745	Housing, Public Policy, and Planning	3
URP 6821	Transportation and Land-Use Modeling	3
URP 6855	Urban Form in Cities throughout the Americas	3
URP 6871	Planning and Design I	3
URP 6872	Planning and Design II	3
URP 6880	Defensible Space and CPTED in Urban Design	3
URP 6887	Advanced Defensible Space in Urban Design	3
URP 6905	Exploration and Directed Study	1-4
URP 6910	Supervised Research	1-5
URP 6920	Colloquium	1
URP 6931	Topical Seminar	1-4
URP 6941	Urban Planning Professional Development	1-3
URP 6971	Research for Master's Thesis	1-15
URP 6979	Master's Research Project	1-6

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3

DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Design, Construction and Planning (Ph.D.)

SLO 1

Knowledge

Each student will apply in-depth knowledge from their individual discipline.

SLO2

Skills

- Employ appropriate research methodologies.
- Each student will apply the critical thinking skills required of doctoral faculty and researchers.
- Communicates effectively both orally and in writing.

SLO3

Professional Behavior

Display ethical behaviors, and professional conduct in research.

Faculty

Professor

- Bruck, Julie Lehman
- Cox, Robert Francis
- Silver, Christopher

Associate Professor

- Carney, Jeffrey Andrew

Assistant Professor

- Alwisy, Aladdin
- Azad, Hassan
- Idris Jeelani, Fnu

- Mejia Puig, Luis Alfonso
- Sharston, Ryan
- Tepe, Emre
- Wang, Chaofeng

Affiliated Faculty

- Agapaki, Evangelia
Assistant Professor
- Alakshendra, Abhinav
Associate Professor
- Anumba, Chinemelu J.
Professor
- Baweja, Vandana
Associate Professor
- Bejleri, Ilir
Research Associate Professor
- Bosch, Sheila Jones
Associate Professor
- Castelblanco Bolivar, Gabriel Ernesto
Professor
- Costin, Aaron M.
Associate Professor
- Cunningham, Erin K.
Associate Professor
- Flood, Ian
Professor
- Frank, Kathryn I.
Associate Professor
- Franz, Bryan Willam
Associate Professor
- Gheisari, Masoud
Associate Professor
- Gold, Martin Arnold
Associate Professor
- Hailey, Charles L.
Professor
- Hctor, Thomas Scott
Research Associate Professor
- Hu, Lingqian
Professor
- Issa, Raja Raymond
Distinguished Professor
- Kio, Patricia N.
Assistant Professor
- Larkin, Erin C.
Assistant Professor
- Larsen, Kristin Esther
Professor
- Li, Jiayang
Assistant Professor
- Liu, Rui
Associate Professor
- Luo, Yi
Assistant Professor
- Minchin, Robert E.
Professor

- Muszynski, Larry C.
Associate Professor
- Nawari, Nawari O.
Professor
- Park, Nam Kyu
Associate Professor
- Peng, Zhong-Ren
Professor
- Platt, Lisa Sundahl
Assistant Professor
- Portillo, Margaret B.
Professor
- Ries, Robert
Professor
- Rifkind, David M.
Professor
- Saldana Ochoa, Karla Veronica
Assistant Professor
- Serrano, Nicholas
Assistant Professor
- Srinivasan, Ravi Shankar
Professor
- Steiner, Ruth Lorraine
Professor
- Tapp, Catherine Renee
Assistant Professor
- Thompson, Kevin R.
Associate Professor
- Valipoor, Shabboo
Associate Professor
- Von Meding, Jason Kyle
Associate Professor
- Wang, Shenhao
Assistant Professor
- Wang, Yan
Assistant Professor
- Watson, Maria Katherine
Assistant Professor
- Wong, Vivian Wen Hui
Assistant Professor
- Zou, Hui
Professor

Historic Preservation Program Information

The Master of Historic Preservation (MHP) program promotes interdisciplinary thinking and active problem-solving through research, documentation, conservation, and management of historic resources. Drawing from the disciplines housed within the College of Design, Construction and Planning, as well as other units across campus, Historic Preservation coursework addresses heritage at different scales (cultural landscapes, neighborhoods, architecture, interiors, and materials and building technologies) and presents a range of issues impacting the preservation of historical places including economic, legal, and sustainable practices, among others. Both the tangible (physical) and intangible (cultural) realms of heritage are explored. This program is

open to students with a bachelor's degree in any discipline from an accredited university. While experience and/or education in design/planning fields, technology, or history are useful, it is not mandatory for entering the program.

The University of Florida Master of Historic Preservation degree encompasses an interdisciplinary study of the basic and applied skills in historic preservation, anthropology, archeology, architecture, building construction, cultural tourism, history, interior design, landscape architecture, museum studies, and urban and regional planning.

Historic preservation problems are fundamentally human as well as physical problems and should be understood in terms of human motivations and actions as well as technical, legal, and historical solutions. To this end, the graduate program provides advanced training in theories and methodologies of the historic preservation and cultural conservation movements in the US and internationally. Programs are designed to foster integrative approaches to complex real-world problems.

The coursework totals 42 hours. A written thesis or research project meeting Graduate Requirements relating to historic preservation is required.

Degrees Offered

Degrees Offered with a Major in Historic Preservation

- Master of Historic Preservation

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Architecture Departmental Courses

Code	Title	Credits
ARC 5040	Introduction to Themed Environments	3
ARC 5041	Design and Documentation of Themed Environments	3
ARC 5042	Fabrication and Execution for Themed Environments	3
ARC 5043	Integration Practices for Built Environments	3
ARC 5921	Fundamentals of Coding and Computation - Introduction to Computer Programming for Architects	3
ARC 6044	Development and Operations for Themed Environments	3
ARC 6045C	Project Development Studio for Themed Environments	6
ARC 6116	Drawing toward Architecture	1-2
ARC 6212	Topics in Phenomena and Architecture	3
ARC 6228	Film and Architecture	3
ARC 6241	Advanced Studio I	1-9
ARC 6242	Research Methods	3
ARC 6281	Professional Practice	3
ARC 6306C	Public Interest Design: Contemporary Issues and Practice	3
ARC 6311C	Building Information Modeling	3
ARC 6355	Advanced Studio II	6
ARC 6356	Advanced Studio III	6
ARC 6357	Advanced Topics in Architectural Design	3

ARC 6386	Introduction to Healthcare Design	3	BCN 6584C	Building Energy Modeling	3
ARC 6399	Advanced Topics in Urban Design	3	BCN 6585	Sustainable Construction	3
ARC 6505	Architectural Structural Systems: Wood, Steel, and Concrete	4	BCN 6586	Construction Ecology and Metabolism	3
ARC 6512	Structural Modeling	3	BCN 6641	Construction Value Engineering	3
ARC 6611	Advanced Topics in Architectural Technology	3	BCN 6748	Construction Law	3
ARC 6621	Graduate Environmental Technology 2	3	BCN 6785	Construction Information Systems	3
ARC 6642	Architectural Acoustic Design Laboratory	3	BCN 6905	Directed Independent Study in Construction	1-3
ARC 6643	Architectural Acoustics	3	BCN 6933	Advanced Construction Management	1-5
ARC 6670	Lighting Design Seminar	3	BCN 6940	Supervised Teaching	1-3
ARC 6680	Architecture Energy and Ecology	3	BCN 6971	Research for Master's Thesis	1-15
ARC 6685	Life Safety, Sanitation, and Plumbing Systems	3	FES 6705	Communications in Emergency Management	3
ARC 6686	LEED for Sustainable Design and Construction	3	FES 6724	Fire and Emergency Services Response Planning	3
ARC 6705	Graduate Architectural History 3	3	FES 6726	Hazard Mitigation and Preparedness	3
ARC 6773	Strains of Modernism	3	FES 6735	International Emergency/Disaster Management	3
ARC 6793	Advanced Topics in Regional Architecture	3	FES 6736	Homeland Security and Emergency Management	3
ARC 6821	Preservation Problems and Processes	3	FES 6786	Research Methods in FES	3
ARC 6883	Vernacular Architecture & Sustainability	3	FES 6806	Disaster Response and Recovery	3
ARC 6911	Architectural Research	1-6	FES 6826	Emergency Services - Disaster Planning	3
ARC 6912	Architectural Research II	1-6	FES 6827	Business Continuity and Disaster Planning	3
ARC 6913	Architectural Research III	1-6	FES 6836	Impacts of Natural and Man-made Disasters on Buildings	3
ARC 6922	Machine Learning for Architects	3	FES 6916	Research for Master's Report	3
ARC 6923	AI & Ethics in Architecture	3	FES 6940	Practicum in FES	1-3
ARC 6933	Sustainable Site Design	3	FES 6971	Research for Master's Thesis	1-6
ARC 6934	European Approach to Sustainable Design	3	ICM 5905	Special Studies	1-3
ARC 6940	Supervised Teaching	1-5	ICM 6420	Commercial Management and Cost Control	3
ARC 6971	Research for Master's Thesis	1-15	ICM 6440	Construction Value Management	3
ARC 6979	Master's Research Project	1-10	ICM 6680	Principles of International Sustainable Construction	3

Construction Management Departmental Courses

Code	Title	Credits
BCN 5470	Construction Methods Improvements	3
BCN 5618C	Comprehensive Estimating	3
BCN 5625	Construction Cost Analysis	3
BCN 5705C	Project Management for Construction	3
BCN 5722	Advanced Construction Planning and Control	3
BCN 5729	Design-Build Delivery Methods	3
BCN 5737	Advanced Issues in Construction Safety and Health	3
BCN 5776	International Construction Business Management	3
BCN 5778	Facilities Operation and Maintenance	3
BCN 5789C	Construction Project Delivery	3
BCN 5874	Equipment and Methods for Heavy Construction	3
BCN 5885	Methods and Management for Heavy Construction	3
BCN 5905	Special Studies in Construction	1-5
BCN 5949	Graduate Construction Management Internship	1-3
BCN 5957	Advanced International Studies in Construction	1-4
BCN 6036	Research Methods in Construction	3
BCN 6558C	Building Integrated Renewable Energy Systems	3
BCN 6580	High-Performance Green Building Delivery Systems	3
BCN 6583	Sustainable Housing	3

ICM 6682	Construction Ecology and Metabolism	3
ICM 6684	High-Performance Green Building Delivery Systems	3
ICM 6710	Construction Human Resource Management	3
ICM 6716	Construction Productivity and Methods Improvement	3
ICM 6750	Managing Construction Information Technology	3
ICM 6761	Advanced Planning, Scheduling, and Logistics	3
ICM 6762	Construction Risk Management	3
ICM 6770	Advanced Project Safety Management	3
ICM 6775	Manufactured Construction Processes	3
ICM 6905	Directed Independent Study in International Construction	1-3
ICM 6910	Supervised Research	1-3
ICM 6930	Construction Communication and Research	3
ICM 6934	International Construction Research	1-6

Interior Design Departmental Courses

Code	Title	Credits
IND 5106	History of Interior Design I	3
IND 5136	History of Interior Design II	3
IND 5212C	Architectural Interiors I	5
IND 5227C	Advanced Architectural Interiors I	6
IND 5231C	Architectural Interiors II	5
IND 5326	Color Theory Planning and Practice	3
IND 5427C	Interior Design Construction Documents	4
IND 5434C	Interior Lighting	3

IND 5454C	Advanced Interior Design Detailing and Construction Documents	4
IND 5466	Interior Environmental Technology	3
IND 5508	Business and Professional Practices for Interior Designers	3
IND 5632	Interior Finishes and Materials	3
IND 5633	Readings in Design Studies	3
IND 5641	Environment and Behavior	3
IND 5937	Current Topics in Interior Design	1-3
IND 6639	Methods of Interior Design Research	3
IND 6906	Independent Studies and Readings	1-3
IND 6939	Creativity Applied	3
IND 6940	Supervised Teaching	1-5
IND 6941	Interior Design Internship	2-4
IND 6951	Project in Lieu of Thesis	6
IND 6971	Research for Master's Thesis	1-12

Landscape Architecture Departmental Courses

Code	Title	Credits
LAA 5331	Site Design Methodologies	3
LAA 6231	Landscape Architecture Theory	3
LAA 6236	Landscape Architecture Research Methods	3
LAA 6322	Landscape Architecture Professional Practice	3
LAA 6342	Landscape Architecture Criticism	1
LAA 6382	Ecological and Environmental Policy	3
LAA 6383	Landscape Ecology and Management	3
LAA 6525L	Advanced Landscape Construction Design	4
LAA 6656C	Advanced Landscape Architectural Design	1-6
LAA 6713	Cultural Landscapes	3
LAA 6905	Directed Study	1-3
LAA 6931	Water Conservation through Site Design and Green Roofs	3
LAA 6935	Gardens of the World	3
LAA 6941	Supervised Internship	3
LAA 6971	Research for Master's Thesis	2-6
LAA 6979	Terminal Project	1-6

Urban and Regional Planning Departmental Courses

Code	Title	Credits
URP 6007	Survey of Urban and Regional Planning	3
URP 6042	Urban Economy	3
URP 6059	Community Engagement	3
URP 6061	Planning Administration and Ethics	3
URP 6100	Planning Theory and History	3
URP 6131	Land Use Planning Law	3
URP 6132	Growth Management Seminar	3
URP 6203	Planning Research Design	1-3
URP 6223	Introduction to Urban Analytics	3
URP 6224	Intermediate Urban Analytics	3
URP 6231	Quantitative Data Analysis for Planners	3
URP 6270	Introduction to Planning Information Systems	3
URP 6271	Automation for Geospatial Modeling and Analysis	3
URP 6272	Urban Spatial Analysis	3
URP 6274	GPS for Planners: Introduction to Global Positioning System	1

URP 6275	Intermediate Planning Information Systems	3
URP 6276	Internet Geographic Information Systems	3
URP 6277	Land Use Visioning and Analysis	3
URP 6278	Web Mapping and Visualization	3
URP 6280	3D Geospatial Modeling and Visualization	3
URP 6341	Urban Planning Project	1-12
URP 6409	Sustainable Community Development	3
URP 6421	Environmental Land Use Planning and Management	3
URP 6424	Sustainable Urbanism in the Americas	3
URP 6428	Advanced Environmental Planning	3
URP 6429	Natural Resources Planning and Management	3
URP 6445	Planning for Climate Change	3
URP 6526	Health and the Built Environment	3
URP 6541	Economic Development Planning	3
URP 6542	Urban Land Economics	3
URP 6603	Development Review	3
URP 6610	International Development Planning	3
URP 6645	Sustainable Urbanism in Europe	3
URP 6646	International Perspectives in Urban and Regional Planning	3
URP 6711	Transportation and Land Use Coordination	3
URP 6716	Transportation Policy and Planning	3
URP 6743	Affordable Housing Law	3
URP 6745	Housing, Public Policy, and Planning	3
URP 6821	Transportation and Land-Use Modeling	3
URP 6855	Urban Form in Cities throughout the Americas	3
URP 6871	Planning and Design I	3
URP 6872	Planning and Design II	3
URP 6880	Defensible Space and CPTED in Urban Design	3
URP 6887	Advanced Defensible Space in Urban Design	3
URP 6905	Exploration and Directed Study	1-4
URP 6910	Supervised Research	1-5
URP 6920	Colloquium	1
URP 6931	Topical Seminar	1-4
URP 6941	Urban Planning Professional Development	1-3
URP 6971	Research for Master's Thesis	1-15
URP 6979	Master's Research Project	1-6

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3

DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Historic Preservation (MHP)

SLO 1 Knowledge

Identify, describe, and synthesize the substantive body of literature on a specialized topic within the discipline and field of Historic Preservation.

SLO 2 Skills

Identify, formulate, test, and analyze research questions in Historic Preservation.

SLO 3 Professional Behavior

Engage and work with members of a community and professionals in historic preservation and other allied disciplines.

Faculty

Affiliated Faculty

- Hailey, Charles L.
Professor
- Larkin, Erin C.
Assistant Professor
- Larsen, Kristin Esther
Professor
- Silver, Christopher
Professor
- Stevenson, Linda D.
Lecturer

Integrated Sustainable Development Program Information

The Master of Integrated Sustainable Development (M.I.S.D.) is an interdisciplinary graduate degree program offered by the University of Florida (UF) College of Design, Construction and Planning (DCP) Sustainability and the Built Environment (SBE) Program. The M.I.S.D. is a STEM (Science, Technology, Engineering, and Mathematics) degree delivering education within the planning, design, construction, and operations of more sustainable and resilient built environments. Through a mix of pedagogical approaches, MISD students will learn the skills and strategies to facilitate a quadruple bottom line of ecological, cultural, social, and economic sustainability across local, state, national, and international scales.

The M.I.S.D. curriculum focuses on collaborative and integrative design, construction, planning, and engineering problem-solving, as well as leadership and management, in the built environment. MISD students are critical thinkers, managers of complexity, and strategists capable of creating comprehensive assessments and solutions to cross-disciplinary problems with social, political, economic, ethical, and technical components.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN integrated sustainable development

- Master of Integrated Sustainable Development (M.I.S.D.)

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Master of Integrated Sustainable Development (M.I.S.D.) COURSES

Required Courses

Code	Title	Credits
BCN 6584C	Building Energy Modeling	3
BCN 6585	Sustainable Construction	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6230	Integrated Sustainable Development Practicum	6

Electives (select five out of the following courses from a minimum of two disciplines)

Code	Title	Credits
ARC 6311C	Building Information Modeling	3
ARC 6883	Vernacular Architecture & Sustainability	3
ARC 6912	Architectural Research II	1-6
ARC 6621	Graduate Environmental Technology 2	3
BCN 6558C	Building Integrated Renewable Energy Systems	3
BCN 6580	High-Performance Green Building Delivery Systems	3
CGN 5605	Public Works Planning	3
CGN 5606	Public Works Management	3
EES 6007	Advanced Energy and Environment	3

ENV 5306	Municipal Refuse Disposal	3
ENV 6511	Biological Wastewater Treatment	3
ENV 6043	Life Cycle Assessment	3
LAA 6382	Ecological and Environmental Policy	3
TTE 5006	Advanced Urban Transportation Planning	3
URP 6645	Sustainable Urbanism in Europe	3
URP 6716	Transportation Policy and Planning	3
URP 6711	Transportation and Land Use Coordination	3
URP 6100	Planning Theory and History	3
URP 6421	Environmental Land Use Planning and Management	3
URP 6541	Economic Development Planning	3

Student Learning Outcomes

Integrated Sustainable Development (M.I.S.D.)

SLO 1 Knowledge

Delineate and apply principles of sustainability to problems of the built environment.

SLO 2 Skills

Understand the collaborative roles of an integrated project team (with professionals from a range of disciplines including civil/environmental engineering, architecture, construction management, interior design, landscape architecture, and urban and regional planning) in the delivery of sustainable development projects.

SLO 3 Professional Behavior

Demonstrate the capacity to undertake return on investment analysis of sustainable development projects for the built environment.

SLO 4

Apply a wide range of skills, tools and strategies to sustainable problem-solving combining engineering capabilities, innovation, design, and soft skills, like communication and facilitation.

Faculty

Professor

- Bruck, Julie Lehman
- Cox, Robert Francis
- Silver, Christopher

Associate Professor

- Carney, Jeffrey Andrew

Assistant Professor

- Alwisy, Aladdin
- Azad, Hassan
- Idris Jeelani, Fnu
- Mejia Puig, Luis Alfonso
- Sharston, Ryan
- Tepe, Emre
- Wang, Chaofeng

Affiliated Faculty

- Agapaki, Evangelia
Assistant Professor

- Alakshendra, Abhinav
Associate Professor
- Anumba, Chinemelu J.
Professor
- Baweja, Vandana
Associate Professor
- Bejleri, Ilir
Research Associate Professor
- Bosch, Sheila Jones
Associate Professor
- Castelblanco Bolivar, Gabriel Ernesto
Professor
- Costin, Aaron M.
Associate Professor
- Cunningham, Erin K.
Associate Professor
- Flood, Ian
Professor
- Frank, Kathryn I.
Associate Professor
- Franz, Bryan Willam
Associate Professor
- Gheisari, Masoud
Associate Professor
- Gold, Martin Arnold
Associate Professor
- Hailey, Charles L.
Professor
- Hctor, Thomas Scott
Research Associate Professor
- Hu, Lingqian
Professor
- Issa, Raja Raymond
Distinguished Professor
- Kio, Patricia N.
Assistant Professor
- Larkin, Erin C.
Assistant Professor
- Larsen, Kristin Esther
Professor
- Li, Jiayang
Assistant Professor
- Liu, Rui
Associate Professor
- Luo, Yi
Assistant Professor
- Minchin, Robert E.
Professor
- Muszynski, Larry C.
Associate Professor
- Nawari, Nawari O.
Professor
- Park, Nam Kyu
Associate Professor
- Peng, Zhong-Ren
Professor
- Platt, Lisa Sundahl

Assistant Professor

- Portillo, Margaret B.
Professor
- Ries, Robert
Professor
- Rifkind, David M.
Professor
- Saldana Ochoa, Karla Veronica
Assistant Professor
- Serrano, Nicholas
Assistant Professor
- Srinivasan, Ravi Shankar
Professor
- Steiner, Ruth Lorraine
Professor
- Tapp, Catherine Renee
Assistant Professor
- Thompson, Kevin R.
Associate Professor
- Valipoor, Shabboo
Associate Professor
- Von Meding, Jason Kyle
Associate Professor
- Wang, Shenhao
Assistant Professor
- Wang, Yan
Assistant Professor
- Watson, Maria Katherine
Assistant Professor
- Wong, Vivian Wen Hui
Assistant Professor
- Zou, Hui
Professor

Interior Design Department

Chair: R. Rengel

Graduate Coordinator: S. Bosch

Doctor of Philosophy:

The College offers an interdisciplinary program leading to the Doctor of Philosophy degree in design, construction, and planning. Areas of specialization within this program include architecture, building construction, interior design, landscape architecture, and urban and regional planning. For information, write to

The Ph.D. Director
College of Design, Construction, and Planning Doctoral Program
331 ARCH, P.O. Box 115701.

Master of Interior Design:

The Master of Interior Design (M.I.D.) provides opportunities for students to direct their attention toward a variety of topics, including

- Design pedagogy and processes
- Sustainable, healthy, safe, and secure environments
- Creative performance and innovation
- Built heritage conservation

Regardless of the study emphasis selected by the student, the M.I.D. program has a central focus with three categories of course work:

- Design studio
- Seminars in current interior design topics
- Theories and methods of research.

All M.I.D. students must complete an approved research topic with a written thesis. Requirements for the M.I.D. and Ph.D. degrees are given in the General Information section of this catalog.

Applications:

All applications must include transcripts for all previous academic work, and if the applicant's native language is not English, a satisfactory score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute. This information must be received in the Office of the Registrar by February 2. In addition to satisfying University requirements for admission, the applicants are required to submit to the Department of Interior Design the following:

- A portfolio of your design work (if you received a design-based degree). The portfolio should be emailed to the department as a pdf to mmatchkie@dcp.ufl.edu or sent via WeTransfer as a pdf to mmatchkie@dcp.ufl.edu.
- A written essay on your goals and aspirations related to graduate studies; attach to your application or email to mmatchkie@dcp.ufl.edu.
- Three letters of recommendation; directly sent to the applications system via the on-line request you set up or emailed to the department to mmatchkie@dcp.ufl.edu.
- A personal interview is not required, but many applicants choose to visit the campus and Department as a part of the application process.

Students enrolled in the Bachelor of Interior Design program at the University of Florida may apply to the M.I.D. program during their junior year by applying for a Combination Degree (see below). The college currently offers a combination degree between a Bachelor of Design and the Master of Interior Design.

The Department reserves the right to retain student course work for the purposes of record, exhibition, or instruction. Field trips are required for all students; students should plan to have adequate funds available. Students are required to purchase a computer for course work. It may be necessary to assess studio fees to defray costs of base maps, plans, and other generally used materials.

Admission: Applications are processed through February 2 for fall term and all applicants are encouraged to apply as soon as possible. Admission decisions are made between February and the end of April. All new students begin their studies in the fall to coincide with curriculum sequencing.

Graduate course requirements according to background: After assessment of previous design work, leveling courses may be required to prepare the student for the M.I.D. 36 hours of graduate course work. Therefore, each student entering the Master of Interior Design program works with the graduate coordinator to evaluate the student's unique background to determine the specific courses needed to facilitate interest and experience. Estimated credit hours and length of study time

vary according to each student's individual baccalaureate degree and experience.

There are four options.

- For students enrolled in the Bachelor of Design program at the University of Florida, 12 hours of graduate-level course work in the senior year can be counted for both the undergraduate and the M.I.D. degrees. An additional 24 graduate credit hours are required. Expect at least 1 additional year to complete the M.I.D. (Combination Degree form found on the Graduate School site)
- For students who graduated from a Council of Interior Design Accreditation (CIDA) accredited first professional degree program within an architectural framework, the course of study is estimated to be 36 graduate credit hours. Expect 2 years to complete the M.I.D.
- For students who graduated from a design-related (architecture or interior design) baccalaureate degree program, the course of study is estimated to be a maximum of 59 graduate credit hours (includes the 36-hour M.I.D.). Expect 3 years to complete leveling courses and the master's degree.
- For students with a bachelor's degree in a field other than design, the course of study is estimated to be 93 undergraduate and graduate credit hours. Expect 3 to 4 years to complete leveling courses and the M.I.D.

Estimates of the number of credit hours and length of study time may be adjusted based on the individual student's previous preparation including experience as a practicing designer, architect, or other professional.

Program requirements: After leveling courses are completed and with approval by the graduate coordinator and supervisory committee chair, a student completes 24 hours of departmentally approved graduate work in the Department of Interior Design. In addition, with the graduate coordinator's approval, the student is required to take 3 hours of course work in graduate statistics and 9 hours of multidisciplinary graduate electives that reinforce and extend the research.

Courses from such academic units as Psychology, Anthropology, Sociology, Engineering, Education, and Business Administration provide possible electives. The College of Design, Construction and Planning offers the Certificate in Historic Preservation. If the focus of a student is the renovation and preservation of built environments, then historic preservation courses leading to a certificate would strengthen the research and design effort. Likewise, existing appropriate courses in Architecture, Landscape Architecture, Urban and Regional Planning, and Building Construction offer both collaborative study and research opportunities for M.I.D. students.

Each student must select a two-member supervisory committee to guide course selection and to guide thesis selection, study, and production.

Majors

- Interior Design (p. 99)

Faculty

Professor

- Portillo, Margaret B.
- Rengel Chardon, Roberto

Associate Professor

- Bosch, Sheila Jones
- Cunningham, Erin K.
- Meneely, Jason
- Park, Nam Kyu
- Valipoor, Shabboo

Assistant Professor

- Platt, Lisa Sundahl

Lecturer

- Okken, Genesis M.

Research Assistant Professor

- Carr, Clarissa L.

Affiliated Faculty

- Mejia Puig, Luis Alfonso
Assistant Professor

Interior Design

Program Information

The Master of Interior Design (MID) educates students to become professionals in practice, to engage in research, and to develop a specialization in the design of the built environment. In addition to coursework, the main requirement for the MID degree is a written research thesis, adding to the greater body of knowledge.

The UF-ID MID will

- Aid design and problem-solving skills to achieve excellence in the design of interiors
- Enable students to propose and conduct research that adds to the body of knowledge in the field, building on previous research findings
- Explore a specialized area of interest and expertise

MID graduate students can join practices within interior design and architecture firms or other specialized fields; can achieve advanced study in areas of specialization often of interest to contract public interior design firms; have the opportunity to pursue entry-level teaching positions within interior design programs; can enter Ph.D. Programs for advanced research specialization(s) in interior design or related design disciplines; and are offered the opportunity to disseminate knowledge through publications, conferences, teaching, and collaboration with various professionals in related fields.

For more information, visit <https://dcp.ufl.edu/interior/academics-pathways/>

Degrees Offered

Degrees Offered with a Major in Interior Design

- Master of Interior Design
 - without a concentration
 - concentration in Historic Preservation
 - concentration in Sustainable Design

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Interior Design Departmental Courses

Code	Title	Credits
IND 5106	History of Interior Design I	3
IND 5136	History of Interior Design II	3
IND 5212C	Architectural Interiors I	5
IND 5227C	Advanced Architectural Interiors I	6
IND 5231C	Architectural Interiors II	5
IND 5326	Color Theory Planning and Practice	3
IND 5427C	Interior Design Construction Documents	4
IND 5434C	Interior Lighting	3
IND 5454C	Advanced Interior Design Detailing and Construction Documents	4
IND 5466	Interior Environmental Technology	3
IND 5508	Business and Professional Practices for Interior Designers	3
IND 5632	Interior Finishes and Materials	3
IND 5633	Readings in Design Studies	3
IND 5641	Environment and Behavior	3
IND 5937	Current Topics in Interior Design	1-3
IND 6639	Methods of Interior Design Research	3
IND 6906	Independent Studies and Readings	1-3
IND 6939	Creativity Applied	3
IND 6940	Supervised Teaching	1-5
IND 6941	Interior Design Internship	2-4
IND 6951	Project in Lieu of Thesis	6
IND 6971	Research for Master's Thesis	1-12

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3

DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Interior Design (MID)

- SLO 1 Knowledge**
Illustrate an understanding of a specialized topic within the knowledge base of Interior Design
- SLO 2 Skills**
Identify, formulate, test and analyze research questions in interior design
- SLO 3 Professional Behavior**
Engage in field experience

Landscape Architecture Department

Chair: J. Bruck

Graduate Coordinator: A. Nawre

The mission of the Department of Landscape Architecture is to conduct research to enhance the understanding and practice of the profession of landscape architecture, and address societal challenges; train practitioners and scholars who are committed to advancing the efficacy, impact and knowledge of the discipline of landscape architecture; and provide service to the diverse communities of our state, region and abroad. The Master of Landscape Architecture seeks excellence through professional practice and service, and through research and scholarly pursuit.

The department offers a combination bachelor's/master's degree program with the Bachelor of Sustainability and the Built Environment. The department also offers a combination bachelor/master degree program for current UF landscape architecture undergraduate students who intend to complete a graduate landscape architecture degree at UF. Please contact a College of Design, Construction and Planning Advisor and/or Graduate Coordinator for the Department of Landscape

Architecture to learn more and for information about application procedures for both combination degree programs.

Interstate field trips are required as a part of the normal program curriculum. Students should plan to have adequate funds for field trips, studio materials, and use of the Infinity Fab Lab. Students are also required to own a laptop computer meeting minimum department requirements. These specifications are available through the Department of Landscape Architecture's website at URL: <http://www.dcp.ufl.edu/landscape> (<http://www.dcp.ufl.edu/landscape/>).

The graduate program in landscape architecture offers flexibility in meeting the needs of applicants with varied backgrounds. Students entering the graduate program in landscape architecture follow one of the four following tracks:

First Professional MLA Program

Graduate students who do not possess an LAAB accredited professional degree in landscape architecture are invited to enroll in the First Professional MLA program.

The First Professional MLA Program aids the development of basic analytical, design and graphic skills. Upon successful completion of the First Professional Summer term, students advance into a two-semester sequence of articulation courses that provide a foundation of applied landscape design and planning theory as well as competencies in landscape construction.

MLA Advanced Graduate Studies Program

Graduate students having completed the summer and first year of the First Professional program or entering the MLA program with an LAAB accredited professional baccalaureate degree in landscape architecture commence a two-year program of advanced graduate coursework towards the completion of the MLA degree.

Graduate students with a non-accredited or non-LAAB accredited degree in landscape architecture may be required to take additional coursework beyond the two-year program of advanced graduate coursework to develop core competencies required for advanced graduate study.

MLA Research Degree

Graduate students with an LAAB accredited professional degree in landscape architecture and a significant history of achievement in professional practice may tailor a program of advanced study to meet their specific needs.

The normal tenure of advanced graduate study is five semesters which includes a summer semester internship. Students complete a minimum of 52 credit hours composed of lecture courses, seminars, design and construction studios, internship and individual study (special studies, supervised research and thesis or terminal project).

This time period would be extended should a student elect to expand the course work or seek a concurrent degree in a related field.

Design studios: Graduate design studios build on required lecture and seminar courses. A core of three advanced design studios are typically-oriented focusing on issues of human, ecological and regional concern. Each studio requires students to engage a method appropriate to the studio's selected projects, to analyze the findings generated by this research and to use the findings to build a rational argument that leads to a defensible design position. Interdisciplinary and multidisciplinary

collaborations are encouraged on both a formal and an informal basis. Graduate studio projects also deal with current issues related to the mission of the Department with an additional focus on research and community service.

Thesis or terminal project: The Department recognizes that students have different professional goals and personal strengths and interests. A thesis is appropriate for students interested in further research or teaching, or in pursuing advanced degrees. A project (with a significant research component) is appropriate for students interested in design or project-oriented aspects of landscape architecture, or if their specific areas of interest suggest a nontraditional approach.

Programs, centers, and institutes: The College of Design, Construction, and Planning has several research centers and institutes. Please see the College's webpage for more information (<https://dcp.ufl.edu/research/centers-institutes/>).

Graduate advisement: Students are initially advised by the Graduate Coordinator. They have guided the student's application through the acceptance process and is familiar with the student's background and needs. A plan of study is developed that includes required and optional courses. By the end of the second semester of the MLA1 year, each student is required to form a supervisory committee composed of two faculty members. The primary purpose of the graduate committee is to advise the student on educational objectives and the thesis or terminal project course work.

Application Procedure

Details of application procedure are found on the Department of Landscape Architecture's website. Applicants are encouraged to familiarize themselves with the details of the application procedures and the application requirements. Applications will ONLY be considered for the track for which they have been submitted. Make certain you are applying to the correct track based on your background and credentials and the criteria detailed above.

Application Dates

Applications are to be completed and submitted prior to the deadline noted on the Department's website. Unless otherwise noted, applications must be received no later than February 1st. Early applications are encouraged.

Application materials to be submitted online and/or to the Office of the Registrar.

Application materials include the online application form accompanied by official transcripts, Letters of Recommendation, GRE scores, and TOEFL scores (applicants with English as a second language) to:

Office of the Registrar
Admissions Section
Criser Hall
University of Florida
Gainesville, Florida 32611.

In addition, applicants must also submit a letter of intention to the Department of Landscape Architecture.

Application Portfolio

All applicants are encouraged to submit a portfolio of creative works.

Applicants with a baccalaureate landscape architecture degree or other design affiliated degree are required to submit a portfolio that both exhibits creative work experience and shows evidence of acquired technical proficiencies in, or related to, the practice of landscape architecture.

All portfolio must be digital. PDF is preferred.

Application Status

Applications will be processed once all material has been received and must be complete prior to the application deadline. Applicants will be contacted by the program's Academic Assistant if their application is incomplete. Please respond quickly if you have been contacted to increase the chances of your application being considered in the current review period. Only completed applications will be processed for review.

Once the application has been processed for review, applicants will receive written notification of their application status, generally sometime in the middle of March. Please do not contact the department with inquiries of your application status prior to the end of March.

Preparatory courses (see Undergraduate Catalog):

Code	Title	Credits
LAA 2330	Site Analysis	3
LAA 2360C	Principles of Landscape Architecture	5
LAA 2532	Landscape Management	3
LAA 2710	History of Landscape Architecture	3
LAA 3350C	Site Design and Planning Studio	5
LAA 3352C	Planting Design Studio	5
LAA 3420	Landscape Construction 1	5
LAA 3421	Landscape Construction 2	5
HOS 5117C	Horticultural Plant Morphology and Identification	3

Majors

- Landscape Architecture (p. 102)

Faculty

Associate Professor

- Nawre, Alpa
- Thompson, Kevin R.

Assistant Professor

- Galinski, Andrea Rene
- Li, Jiayang
- Luo, Yi
- Serrano, Nicholas

Research Associate Professor

- Hctor, Thomas Scott
- Volk, Michael Ives

Lecturer

- Manley, Daniel P.
- Shankar, Aishwarya

Assistant Scholar

- Bohnett, Eve
- Farrah, Daniel Elias
- Nettles, Belinda
- Smith, Daniel J.

Affiliated Faculty

- Bruck, Julie Lehman
Professor

Landscape Architecture

Program Information

The Department of Landscape Architecture offers graduate programs leading to the Master of Landscape Architecture (MLA) degree in Landscape Architecture. A Ph.D. degree with a concentration in Landscape Architecture is also offered through the College of Design, Construction and Planning. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Master of Landscape Architecture: The First Professional MLA is a Landscape Architecture Accreditation Board (LAAB) accredited professional Master's degree in Landscape Architecture. Graduation from an accredited program is an essential first step toward licensing in Florida and other states that regulate the practice of landscape architecture.

For more information, please see our website: <http://www.dcp.ufl.edu/landscape> (<http://www.dcp.ufl.edu/landscape/>).

Degrees Offered

Degrees Offered with a Major in Landscape Architecture

- Master of Landscape Architecture
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Historic Preservation
 - concentration in Sustainable Design
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Landscape Architecture Departmental Courses

Code	Title	Credits
LAA 5331	Site Design Methodologies	3
LAA 6231	Landscape Architecture Theory	3
LAA 6236	Landscape Architecture Research Methods	3
LAA 6322	Landscape Architecture Professional Practice	3
LAA 6342	Landscape Architecture Criticism	1
LAA 6382	Ecological and Environmental Policy	3
LAA 6383	Landscape Ecology and Management	3
LAA 6525L	Advanced Landscape Construction Design	4

LAA 6656C	Advanced Landscape Architectural Design	1-6
LAA 6713	Cultural Landscapes	3
LAA 6905	Directed Study	1-3
LAA 6931	Water Conservation through Site Design and Green Roofs	3
LAA 6935	Gardens of the World	3
LAA 6941	Supervised Internship	3
LAA 6971	Research for Master's Thesis	2-6
LAA 6979	Terminal Project	1-6

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Landscape Architecture (MLA)

SLO 1 Knowledge

Integrate concepts from the general body of knowledge of the profession of Landscape Architecture in design decision making

SLO 2 Skills

Apply core professional skills in landscape architecture

SLO 3 Skills

Combine and analyze information from multiple sources to support design decision making

SLO 4 Skills

Produce professional visual, oral and written communications

SLO 5 Skills

Devise research methodologies and conclusions appropriate to individual area of interest

SLO 6 Professional Behavior

Display ethical behaviors and professional conduct

M.E. Rinker, Sr. School of Construction Management

School Director: R. Cox

Director of Graduate Programs and Research: M. Gheisari

The mission of the M. E. Rinker, Sr. School of Construction Management is to be the center of excellence for construction. The Rinker School will pursue this by: Promoting professional and ethical behavior in education and practice, advancing the industry by creating new knowledge through research and scholarly activities, educating individuals in principles, knowledge and skills required to be successful in their professional careers, and providing service and transferring knowledge to the citizens of Florida, the construction industry, professional societies, the nation, and the world. The Rinker School will achieve this mission by fostering a core culture of value and quality.

Graduate Degrees offered include:

Construction Management

- Master of Construction Management (M.C.M.) – Non-Thesis Option
- Master of Science in Construction Management (M.S.C.M.) – Thesis Option
- Doctor of Philosophy in Design, Construction and Planning – Construction Management Concentration

Fire and Emergency Sciences

- Master of Fire and Emergency Sciences (M.S.F.E.S.) – Online Non-Thesis

The degree and admission requirements for the Ph.D. program are found at <https://dcp.ufl.edu/rinker/academics/cm/phd/>.

The degree and admission requirements for the M.S.C.M. and M.C.M. are found at <https://dcp.ufl.edu/rinker/academics/cm/masters/>.

The degree and admission requirements for the M.S.F.E.S. are found at <https://dcp.ufl.edu/rinker/academics/online/master-of-fire-and-emergency-sciences/>.

The research fields in which the Rinker School specializes are listed at <https://dcp.ufl.edu/rinker/research/>.

Additional information regarding the Rinker School is available at <https://dcp.ufl.edu/rinker/>.

Majors

- Construction Management (p. 104)
- Fire and Emergency Sciences (p. 106)
- Sustainable Construction (p. 108)

Faculty

Professor

- Anumba, Chinemelu J.
- Castelblanco Bolivar, Gabriel Ernesto
- Flood, Ian
- Minchin, Robert E.
- Ries, Robert
- Srinivasan, Ravi Shankar

Associate Professor

- Costin, Aaron M.
- Franz, Bryan Willam
- Gheisari, Masoud
- Liu, Rui
- Muszynski, Larry C.
- Von Meding, Jason Kyle

Assistant Professor

- Agapaki, Evangelia
- Watson, Maria Katherine

Distinguished Professor

- Issa, Raja Raymond

Senior Lecturer

- Armaghani, Bahar A.
- Sullivan, James G.

Affiliated Faculty

- Alwisy, Aladdin
Assistant Professor
- Cox, Robert Francis
Professor
- Idris Jeelani, Fnu
Assistant Professor
- Wang, Chaofeng
Assistant Professor
- Wong, Vivian Wen Hui
Assistant Professor

Construction Management Program Information

The Rinker School offers two master's degree pathways. While both have the same number of credit hours, they differ slightly in terms of coursework structure and research requirements:

- **Master of Construction Management (M.C.M.) – Non-Thesis Option:** This non-thesis option is coursework-only and designed for students who intend to enter the construction industry directly after graduation. The M.C.M. requires 30 semester hours of coursework, plus 6 semester hours of leveling courses for students who do not hold an undergraduate degree in Construction Management accredited by the American Council for Construction Education (ACCE).
- **Master of Science in Construction Management (M.S.C.M.) – Thesis Option:** This thesis option is designed for students who are interested in conducting research or planning to pursue a Ph.D. in the future. The thesis option provides an in-depth research experience, allowing students to work closely with a faculty advisor and thesis committee on construction-related topics. The M.S.C.M. also requires 30 semester hours of coursework, plus 6 semester hours of leveling courses for students who do not hold an undergraduate degree in Construction Management accredited by the *American Council for Construction Education (ACCE)*. The M.S.C.M. includes 6 semester hours of BCN 6971 (Research for Master's Thesis), dedicated to research and thesis writing, along with BCN 6036 (Research Methods in Construction).

Further details regarding both degrees are found at <https://dcp.ufl.edu/rinker/academics/cm/masters/>.

Combination program: The Rinker School participates in a combination degree program between the Bachelor of Science in Construction Management (B.S.C.M.) and the Master of Science in Construction Management (M.S.C.M.). The program allows participating undergraduate students to take 12 semester hours of graduate coursework while completing their undergraduate degree, shortening the duration of the M.S.C.M. to one year. To be eligible to apply, B.S.C.M. students must have an upper-division grade point average of at least 3.4 and have the approval of the Rinker School's undergraduate and graduate programs.

Degrees Offered

Degrees Offered with a Major in Construction Management

- Master of Construction Management
 - without a concentration
 - concentration in Hydrologic Sciences
- Master of Science in Construction Management
 - without a concentration
 - concentration in Hydrologic Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Construction Management Departmental Courses

Code	Title	Credits
BCN 5470	Construction Methods Improvements	3
BCN 5618C	Comprehensive Estimating	3
BCN 5625	Construction Cost Analysis	3
BCN 5705C	Project Management for Construction	3
BCN 5722	Advanced Construction Planning and Control	3
BCN 5729	Design-Build Delivery Methods	3
BCN 5737	Advanced Issues in Construction Safety and Health	3
BCN 5776	International Construction Business Management	3
BCN 5778	Facilities Operation and Maintenance	3
BCN 5789C	Construction Project Delivery	3
BCN 5874	Equipment and Methods for Heavy Construction	3
BCN 5885	Methods and Management for Heavy Construction	3
BCN 5905	Special Studies in Construction	1-5
BCN 5949	Graduate Construction Management Internship	1-3
BCN 5957	Advanced International Studies in Construction	1-4
BCN 6036	Research Methods in Construction	3
BCN 6558C	Building Integrated Renewable Energy Systems	3
BCN 6580	High-Performance Green Building Delivery Systems	3
BCN 6583	Sustainable Housing	3
BCN 6584C	Building Energy Modeling	3
BCN 6585	Sustainable Construction	3
BCN 6586	Construction Ecology and Metabolism	3
BCN 6641	Construction Value Engineering	3
BCN 6748	Construction Law	3
BCN 6785	Construction Information Systems	3
BCN 6905	Directed Independent Study in Construction	1-3
BCN 6933	Advanced Construction Management	1-5
BCN 6940	Supervised Teaching	1-3
BCN 6971	Research for Master's Thesis	1-15
FES 6705	Communications in Emergency Management	3
FES 6724	Fire and Emergency Services Response Planning	3
FES 6726	Hazard Mitigation and Preparedness	3
FES 6735	International Emergency/Disaster Management	3
FES 6736	Homeland Security and Emergency Management	3
FES 6786	Research Methods in FES	3
FES 6806	Disaster Response and Recovery	3
FES 6826	Emergency Services - Disaster Planning	3
FES 6827	Business Continuity and Disaster Planning	3
FES 6836	Impacts of Natural and Man-made Disasters on Buildings	3
FES 6916	Research for Master's Report	3
FES 6940	Practicum in FES	1-3
FES 6971	Research for Master's Thesis	1-6
ICM 5905	Special Studies	1-3
ICM 6420	Commercial Management and Cost Control	3

ICM 6440	Construction Value Management	3
ICM 6680	Principles of International Sustainable Construction	3
ICM 6682	Construction Ecology and Metabolism	3
ICM 6684	High-Performance Green Building Delivery Systems	3
ICM 6710	Construction Human Resource Management	3
ICM 6716	Construction Productivity and Methods Improvement	3
ICM 6750	Managing Construction Information Technology	3
ICM 6761	Advanced Planning, Scheduling, and Logistics	3
ICM 6762	Construction Risk Management	3
ICM 6770	Advanced Project Safety Management	3
ICM 6775	Manufactured Construction Processes	3
ICM 6905	Directed Independent Study in International Construction	1-3
ICM 6910	Supervised Research	1-3
ICM 6930	Construction Communication and Research	3
ICM 6934	International Construction Research	1-6

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1

DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Construction Management (MCM)

SLO 1 Apply Basic Statistics BCN 6036: Exam; 80% of students earn 77% or higher

SLO 2 Formulate a plan to solve a problem BCN 6036: 75% of students earn 77% or higher on both the written paper and the verbal presentation

SLO 3 Convey a Research Plan to interested parties utilizing proper written and verbal communication skills BCN 6036: 75% of students earn 77% or higher on both the written paper and the verbal presentation

SLO 4 Identify and exhibit professional and ethical behavior BCN 6036: 75% of students earn 77% or higher on their presentation dealing with ethical research

Construction Management (MSCM)

SLO 1 Identify rigorous problems in the construction management discipline Thesis Defense: 100% of students earn an average rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 2 Create a literature review on a selected topic that encapsulates the latest research on the topic Thesis Defense: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 3 Devise and apply research methods to solve problems and generate new knowledge Thesis Defense: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 4 Communicate effectively in writing Thesis Defense: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 5 Communicate effectively in professional situations Thesis Defense: 100% of students earn an average Rating of 3 or higher, and 80% of students will earn an average rating of 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

Faculty

Professor

- Anumba, Chinemelu J.
- Castelblanco Bolivar, Gabriel Ernesto

- Flood, Ian
- Minchin, Robert E.
- Ries, Robert
- Srinivasan, Ravi Shankar

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- Gheisari, Masoud
- Liu, Rui
- Muszynski, Larry C.
- Von Meding, Jason Kyle

Assistant Professor

- Agapaki, Evangelia
- Watson, Maria Katherine

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- Issa, Raja Raymond

Senior Lecturer

- Armaghani, Bahar A.
- Sullivan, James G.

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- Alwisy, Aladdin
Assistant Professor
- Cox, Robert Francis
Professor
- Idris Jeelani, Fnu
Assistant Professor
- Wang, Chaofeng
Assistant Professor
- Wong, Vivian Wen Hui
Assistant Professor

Fire and Emergency Sciences

Program Information

The Master of Science in Fire and Emergency Sciences degree program focuses on Emergency Services/Disaster Management (ES/DM) and is designed for individuals who are seeking knowledge in emergency planning, hazard mitigation and preparedness, disaster response and recovery, and homeland security. The goal is to create broad experience that includes the many elements of current cases in ES/DM and emphasizes both the critical thinking and leadership skills necessary to advance in the field.

The M.S.F.E.S. degree provides post-professional advancement for the critical technical issues beyond the initial emergency science practices and administrative studies. Major research topics include interdisciplinary studies in material sciences, suppression systems, advanced planning and geographic systems, pre- and post-disaster mitigation planning, computer applications, and technological innovations.

The M.S.F.E.S. is an online distance education program. All courses are conveniently delivered utilizing a web-based e-Learning system. Students must complete 33 credits/11 FES classes in order to fulfill the degree requirements. The classes are selected with the FES Academic Advisor.

For more information, please see the program website: <https://dcp.ufl.edu/rinker/academics/online/master-of-fire-and-emergency-sciences/>.

Degrees Offered

Degrees Offered with a Major in Fire and Emergency Sciences

- Master of Science in Fire and Emergency Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Construction Management Departmental Courses

Code	Title	Credits
BCN 5470	Construction Methods Improvements	3
BCN 5618C	Comprehensive Estimating	3
BCN 5625	Construction Cost Analysis	3
BCN 5705C	Project Management for Construction	3
BCN 5722	Advanced Construction Planning and Control	3
BCN 5729	Design-Build Delivery Methods	3
BCN 5737	Advanced Issues in Construction Safety and Health	3
BCN 5776	International Construction Business Management	3
BCN 5778	Facilities Operation and Maintenance	3
BCN 5789C	Construction Project Delivery	3
BCN 5874	Equipment and Methods for Heavy Construction	3
BCN 5885	Methods and Management for Heavy Construction	3
BCN 5905	Special Studies in Construction	1-5
BCN 5949	Graduate Construction Management Internship	1-3
BCN 5957	Advanced International Studies in Construction	1-4
BCN 6036	Research Methods in Construction	3
BCN 6558C	Building Integrated Renewable Energy Systems	3
BCN 6580	High-Performance Green Building Delivery Systems	3
BCN 6583	Sustainable Housing	3
BCN 6584C	Building Energy Modeling	3
BCN 6585	Sustainable Construction	3
BCN 6586	Construction Ecology and Metabolism	3
BCN 6641	Construction Value Engineering	3
BCN 6748	Construction Law	3
BCN 6785	Construction Information Systems	3
BCN 6905	Directed Independent Study in Construction	1-3
BCN 6933	Advanced Construction Management	1-5
BCN 6940	Supervised Teaching	1-3
BCN 6971	Research for Master's Thesis	1-15
FES 6705	Communications in Emergency Management	3

FES 6724	Fire and Emergency Services Response Planning	3
FES 6726	Hazard Mitigation and Preparedness	3
FES 6735	International Emergency/Disaster Management	3
FES 6736	Homeland Security and Emergency Management	3
FES 6786	Research Methods in FES	3
FES 6806	Disaster Response and Recovery	3
FES 6826	Emergency Services - Disaster Planning	3
FES 6827	Business Continuity and Disaster Planning	3
FES 6836	Impacts of Natural and Man-made Disasters on Buildings	3
FES 6916	Research for Master's Report	3
FES 6940	Practicum in FES	1-3
FES 6971	Research for Master's Thesis	1-6
ICM 5905	Special Studies	1-3
ICM 6420	Commercial Management and Cost Control	3
ICM 6440	Construction Value Management	3
ICM 6680	Principles of International Sustainable Construction	3
ICM 6682	Construction Ecology and Metabolism	3
ICM 6684	High-Performance Green Building Delivery Systems	3
ICM 6710	Construction Human Resource Management	3
ICM 6716	Construction Productivity and Methods Improvement	3
ICM 6750	Managing Construction Information Technology	3
ICM 6761	Advanced Planning, Scheduling, and Logistics	3
ICM 6762	Construction Risk Management	3
ICM 6770	Advanced Project Safety Management	3
ICM 6775	Manufactured Construction Processes	3
ICM 6905	Directed Independent Study in International Construction	1-3
ICM 6910	Supervised Research	1-3
ICM 6930	Construction Communication and Research	3
ICM 6934	International Construction Research	1-6

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3

DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Fire & Emergency Services (MSFES)

SLO 1 Assess complex communication technology systems, both current and emerging, for disaster management
80% of the students earn an 80% or higher

SLO 2 Manage the application of safety, health, and environmental regulations relevant to disaster management
80% of the students earn an 80% or higher

SLO 3 Assess leadership skills for disaster management
80% of students earn an 80% or higher

SLO 4 Organize human resources for disaster situation
80% of the students earn an 80% or higher

SLO 5 Formulate effective organizational management skills associated with disaster management
80% of the students earn an 80% or higher

SLO 6 Create verbal and written communication as it relates to disaster management
80% of the students earn an 80% or higher

Faculty

Professor

- Anumba, Chinemelu J.
- Castelblanco Bolivar, Gabriel Ernesto
- Flood, Ian
- Minchin, Robert E.
- Ries, Robert
- Srinivasan, Ravi Shankar

Associate Professor

- Costin, Aaron M.
- Franz, Bryan Willam
- Gheisari, Masoud
- Liu, Rui
- Muszynski, Larry C.
- Von Meding, Jason Kyle

Assistant Professor

- Agapaki, Evangelia
- Watson, Maria Katherine

Distinguished Professor

- Issa, Raja Raymond

Senior Lecturer

- Armaghani, Bahar A.
- Sullivan, James G.

Affiliated Faculty

- Alwisy, Aladdin
Assistant Professor
- Cox, Robert Francis
Professor
- Idris Jeelani, Fnu
Assistant Professor
- Wang, Chaofeng
Assistant Professor
- Wong, Vivian Wen Hui
Assistant Professor

Sustainable Construction

Program Information

The Major in Sustainable Construction inside of a Master of Science in Construction Management degree will prepare students to effectively contribute to the design, construction, operation and maintenance of a high performance-built environment comprised of green, energy-efficient buildings, renewable energy systems, and efficient infrastructure. Its objectives are to address:

1. Issues of built infrastructure related water, energy, and material resource efficiencies.
2. Alternative practices that can significantly reduce the environmental impacts of the built environment.
3. Exploring emerging disciplines in sustainable construction.

The resulting degree awarded upon successful completion of the program will be a Master of Science in Construction Management (thesis) with a Major in Sustainable Construction.

In addition to writing a sustainability themed thesis, students must complete the following coursework:

Code	Title	Credits
BCN 6583	Sustainable Housing	3
BCN 6584C	Building Energy Modeling	3

BCN 6585	Sustainable Construction	3
BCN 6641	Construction Value Engineering	3

Degrees Offered

Degrees Offered with a Major in Sustainable Construction

- Master of Science in Construction Management

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Construction Management Departmental Courses

Code	Title	Credits
BCN 5470	Construction Methods Improvements	3
BCN 5618C	Comprehensive Estimating	3
BCN 5625	Construction Cost Analysis	3
BCN 5705C	Project Management for Construction	3
BCN 5722	Advanced Construction Planning and Control	3
BCN 5729	Design-Build Delivery Methods	3
BCN 5737	Advanced Issues in Construction Safety and Health	3
BCN 5776	International Construction Business Management	3
BCN 5778	Facilities Operation and Maintenance	3
BCN 5789C	Construction Project Delivery	3
BCN 5874	Equipment and Methods for Heavy Construction	3
BCN 5885	Methods and Management for Heavy Construction	3
BCN 5905	Special Studies in Construction	1-5
BCN 5949	Graduate Construction Management Internship	1-3
BCN 5957	Advanced International Studies in Construction	1-4
BCN 6036	Research Methods in Construction	3
BCN 6558C	Building Integrated Renewable Energy Systems	3
BCN 6580	High-Performance Green Building Delivery Systems	3
BCN 6583	Sustainable Housing	3
BCN 6584C	Building Energy Modeling	3
BCN 6585	Sustainable Construction	3
BCN 6586	Construction Ecology and Metabolism	3
BCN 6641	Construction Value Engineering	3
BCN 6748	Construction Law	3
BCN 6785	Construction Information Systems	3
BCN 6905	Directed Independent Study in Construction	1-3
BCN 6933	Advanced Construction Management	1-5
BCN 6940	Supervised Teaching	1-3
BCN 6971	Research for Master's Thesis	1-15
FES 6705	Communications in Emergency Management	3
FES 6724	Fire and Emergency Services Response Planning	3
FES 6726	Hazard Mitigation and Preparedness	3
FES 6735	International Emergency/Disaster Management	3

FES 6736	Homeland Security and Emergency Management	3
FES 6786	Research Methods in FES	3
FES 6806	Disaster Response and Recovery	3
FES 6826	Emergency Services - Disaster Planning	3
FES 6827	Business Continuity and Disaster Planning	3
FES 6836	Impacts of Natural and Man-made Disasters on Buildings	3
FES 6916	Research for Master's Report	3
FES 6940	Practicum in FES	1-3
FES 6971	Research for Master's Thesis	1-6
ICM 5905	Special Studies	1-3
ICM 6420	Commercial Management and Cost Control	3
ICM 6440	Construction Value Management	3
ICM 6680	Principles of International Sustainable Construction	3
ICM 6682	Construction Ecology and Metabolism	3
ICM 6684	High-Performance Green Building Delivery Systems	3
ICM 6710	Construction Human Resource Management	3
ICM 6716	Construction Productivity and Methods Improvement	3
ICM 6750	Managing Construction Information Technology	3
ICM 6761	Advanced Planning, Scheduling, and Logistics	3
ICM 6762	Construction Risk Management	3
ICM 6770	Advanced Project Safety Management	3
ICM 6775	Manufactured Construction Processes	3
ICM 6905	Directed Independent Study in International Construction	1-3
ICM 6910	Supervised Research	1-3
ICM 6930	Construction Communication and Research	3
ICM 6934	International Construction Research	1-6

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3

DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

M.E. Rinker Sr. School of Construction Management (MSCM) Sustainable Construction

SLO 1 Identify contemporary problems in the construction management discipline

Thesis Defense: 100% of students earn an average Rating of 3 or higher, 80% of students will earn a 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 2 Create a rigorous literature review on a selected topic

Thesis Defense: 100% of students earn an average Rating of 3 or higher, 80% of students will earn a 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 3 Develop and apply research methods to solve problems and generate new knowledge

Thesis Defense: 100% of students earn an average Rating of 3 or higher, 80% of students will earn a 4 or higher, from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 4 Communicate effectively in writing

Thesis Defense: 100% of students earn an average Rating of 3, 80% of students will earn a 4 or higher, or higher from their committee members as recorded on the Thesis Defense Assessment Rubric

SLO 5 Communicate effectively in professional situations

Thesis Defense: 100% of students earn an average Rating of 3, 80% of students will earn a 4 or higher, or higher from their committee members as recorded on the Thesis Defense Assessment Rubric

Faculty

Professor

- Anumba, Chinemelu J.
- Castelblanco Bolivar, Gabriel Ernesto
- Flood, Ian
- Minchin, Robert E.

- Ries, Robert
- Srinivasan, Ravi Shankar

Associate Professor

- Costin, Aaron M.
- Franz, Bryan Willam
- Gheisari, Masoud
- Liu, Rui
- Muszynski, Larry C.
- Von Meding, Jason Kyle

Assistant Professor

- Agapaki, Evangelia
- Watson, Maria Katherine

Distinguished Professor

- Issa, Raja Raymond

Senior Lecturer

- Armaghani, Bahar A.
- Sullivan, James G.

Affiliated Faculty

- Alwisy, Aladdin
Assistant Professor
- Cox, Robert Francis
Professor
- Idris Jeelani, Fnu
Assistant Professor
- Wang, Chaofeng
Assistant Professor
- Wong, Vivian Wen Hui
Assistant Professor

School of Architecture

Director: J. Alread

Graduate Coordinator: B. Walters

The School of Architecture recognizes design as a synthesis of thinking, analyzing and making — an iterative process that engages, issues of space, historical precedent, sustainability, ecology, urbanity, landscape, built-form, and construction toward innovation. As Florida will soon support the third largest population in the US, the challenges of rapid growth within sensitive natural ecologies, fluctuating tourism, humid and hot climate, multiple urban centers, sprawling suburbs, dwindling agriculture, lack of mass transit, and extensive coastal hurricane threats requires integrative and collaborative design strategies for the future.

The School of Architecture is uniquely positioned to respond to these issues by deploying studio-based design methodologies in collaboration with a new generation of experts in engineering, ecology, business, anthropology, energy, fine arts, medicine and construction. Within the University of Florida, the State's flagship research institution, a trove of researchers and faculty dedicated to academic excellence and interdisciplinary collaboration are focused on the demands of changing culture. The SoA is one of seven programs associated within the College of Design, Construction and Planning — Architecture, Landscape

Architecture, Planning, Preservation, Sustainability and the Built Environment, Interior Design and Building Construction. SoA faculty and students, working independently and collaboratively across disciplines through teaching, research and practice, have garnered international, national, state and local design awards, publish regularly and secure national, state and local grant funding for research based service learning and design projects. This body of work poses theoretical, poetic, cultural and practical questions and suggests responses through the discipline of design.

The GISoA is focused on research-based design that explores critical issues of a changing culture — climate, energy, infrastructure, transportation and population growth/redistribution. Students are engaged in design as a collaborative and integrative methodology addressing both real and speculative projects through coordinated studios, seminars and workshops. To support this effort, nationally recognized award winning Architects from practice and the academy in the US and abroad collaborate with faculty and students in studio and intensive issue-oriented workshops strategically scheduled during the academic year.

Majors

- Architecture (p. 111)

Faculty

Professor

- Alread, Jason Scott
- Hailey, Charles L.
- Kohen, Martha
- Nawari, Nawari O.
- Rifkind, David M.
- Zou, Hui

Associate Professor

- Baweja, Vandana
- Belton, Stephen Clair
- Clark, Nancy M.
- Cohen, Donna L.
- Gold, Martin Arnold
- Maze, John Marshall
- Mcglothlin, Mark Andrew
- Walters, Bradley Scott

Assistant Professor

- Gamble, Sarah P.
- Kio, Patricia N.
- Saldana Ochoa, Karla Veronica

Other

- GACSY, BRITTANY
- Grant, Steven W.
- Najle, Lucas E.

Lecturer

- Bender, Stephen D.
- Huang, Lisa
- Monk, Judith S.
- Montoya, Michael A.
- Sprowls, Peter
- Stevenson, Linda D.

Senior Lecturer

- Wang, Albertus Sun

Affiliated Faculty

- Azad, Hassan
Assistant Professor
- Carney, Jeffrey Andrew
Associate Professor
- Larkin, Erin C.
Assistant Professor
- Platt, Lisa Sundahl
Assistant Professor
- Sharston, Ryan
Assistant Professor
- Von Meding, Jason Kyle
Associate Professor

Architecture

Program Information

Doctor of Philosophy: The college offers an interdisciplinary program leading to the Doctor of Philosophy degree in design, construction, and planning. Areas of specialization in this program include architecture, building construction, interior design, landscape architecture, and urban and regional planning. For information, write to the:

Ph.D. Director
College of Design, Construction, and Planning Doctoral Program
331 ARCH
Box 115701.

Master of Architecture: In the United States, most registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit professional degree programs in architecture offered by institutions with U.S. regional accreditation, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted an eight-year term, an eight-year term with conditions, or a two-year term of continuing accreditation, or a three-year term of initial accreditation, depending on the extent of its conformance with established education standards. Doctor of Architecture and Master of Architecture degree programs may require a non-accredited undergraduate degree in architecture for admission. However, the non-accredited degree is not, by itself, recognized as an accredited degree.

The University of Florida School of Architecture offers the following NAAB-accredited degree programs:

- Master of Architecture (M.Arch) – Track I: Undergraduate pre-professional degree with architecture major + 52 graduate semester credit hours
- Master of Architecture (M.Arch) – Track II: Undergraduate professional degree + 30 graduate semester credit hours
- Master of Architecture (M.Arch) – Track III: Undergraduate degree with non-architecture major + 48 preparatory semester credits + 52 graduate semester credit hours

Next accreditation visit for all programs: 2022.

During graduate studies, each student has the opportunity to focus on one or more areas, including design, history and theory, urban design, preservation, structures, and technology. Concentrations and certificates are available in themed environments integration, historic preservation, sustainable architecture, and sustainable design. The student's overall college experience, both undergraduate and graduate programs, is intended to be a complete unit of professional education leading to practice in architecture or related fields.

- *Master of Architecture – Track I (Undergraduate pre-professional degree with architecture major + 52 graduate semester credit hours):* For those students who have a 4-year pre-professional baccalaureate degree in architecture from an accredited institution, 2 years in residence (52 credits) are normally required to complete the Master of Architecture degree. Notification of program length is part of the letter of acceptance and is determined by portfolio and transcript review. ARC 6241 Advanced Studio I (1-9 cr.), ARC 6355 Advanced Studio II (6 cr.), and ARC 6356 Advanced Studio III (6 cr.) are required of all graduate students in this track and are prerequisites for the required thesis or master's project. Course sequences in history and theory, technology, structures, and professional practice must also be completed.
- *Master of Architecture – Track II (Professional degree + 30 graduate semester credit hours):* For students with a professional degree in architecture from a NAAB-accredited professional degree program, a 1-year degree program is available. In these cases, a specialized curriculum is developed that complements the needs of the applicant. Minimum registration is 30 credits; however, the minimum may increase if transcript reviews show that further course work is needed to meet registration and curriculum requirements. ARC 6356 (<https://catalog.ufl.edu/search/?P=ARC%206356>) Advanced Studio III (6 cr.) is a prerequisite for the thesis or master's project.
- *Master of Architecture – Track III (Undergraduate degree with non-architecture major + 48 preparatory semester credits + 52 graduate semester credit hours):* For students with a baccalaureate degree in a nonrelated academic area and have completed fewer than 4 design studio courses, 4 years of residence (100 credits, approximately) are normally required to complete the Master of Architecture degree. Notification of program length is part of the letter of acceptance and is determined by portfolio and transcript review. ARC 4071 Core Studio 1 (6 cr.), ARC 4072 Core Studio 2 (6 cr.), ARC 4073 Core Studio 3 (6 cr.), ARC 4074 Core Studio 4 (6 cr.), ARC 6241 Advanced Studio I (1-9 cr.), ARC 6355 Advanced Studio II (6 cr.), and ARC 6356 Advanced Studio III (6 cr.) are required of all graduate students in this track and are prerequisites for the required thesis or project. Undergraduate courses 3000 and 4000 level in the major do not count toward the 52-hour minimum requirements for the graduate degree. Course sequences in history and theory, materials and methods, technology, structures, and practice must be completed.

Student work: The School may retain student work for the purpose of record, exhibition, or instruction.

Master of Science in Architectural Studies: The M.S.A.S. is a nonprofessional degree for advanced investigations in specialized areas, including themed environments integration, pedagogy, sustainable design, acoustics, computational design, community design, history/theory/criticism, building technology, preservation, or practice. Students with a bachelor's degree in any discipline from an accredited university are eligible to apply to this program. The proposed area of focus should be precisely defined in the application. This is a 3- to 4-semester program (32 hours minimum) that includes a thesis. (No more than 6 hours of ARC 6971 Research for Master's Thesis (1-15 cr.) may be counted in the minimum credit hours for the degree.) Interdisciplinary study is encouraged. Concentrations and certificates are available in themed environments integration, historic preservation, sustainable architecture, and sustainable design.

Requirements for the M.Arch., M.S.A.S., and Ph.D. degrees are described in the General Information section of this catalog.

Applications: For the Master of Architecture (M.Arch) degree programs, all applications for fall term graduate admission (including official transcripts, GRE scores, and TOEFL scores, if necessary) must be received by the Office of the Registrar by January 1. In addition to satisfying University requirements for admission, applicants are required to submit to the Graduate Program Assistant, School of Architecture, 231 ARCH, Box 115702, the following: a portfolio of their creative work; a scholarly statement of intent and objectives; and three letters of recommendation. This material must be received by January 1 to be considered for admission in the next fall term. Students may apply after the January 15 deadline but will only be considered if spaces become available.

For the Master of Science in Architectural Studies (M.S.A.S.) degree programs, all applications (including official transcripts, GRE scores, and TOEFL scores, if necessary) must be received by the Office of the Registrar by February 15 to be considered for the following fall semester or by September 15 to be considered for the following spring semester. In addition to satisfying University requirements for admission, applicants are required to submit to the Graduate Program Assistant, School of Architecture, 231 ARCH, Box 115702, the following: a scholarly statement of intent and objectives; three letters of recommendation; and a portfolio of their creative work (if applicable to the course of study). Students may apply after the fall or spring deadlines will only be considered if spaces become available.

Field trips are required of all students; students should plan to have adequate funds available. It may be necessary to assess studio fees to defray costs of base maps and other generally used materials.

Degrees Offered

Degrees Offered with a Major in Architecture

- Master of Science in Architectural Studies
 - without a concentration
 - concentration in Historic Preservation
 - concentration in Sustainable Architecture
 - concentration in Sustainable Design
 - concentration in Themed Environments Integration
- Master of Architecture

- without a concentration
- concentration in Historic Preservation
- concentration in Sustainable Architecture
- concentration in Sustainable Design

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Architecture Program Core Courses

Code	Title	Credits
ARC 6512	Structural Modeling	3
ARC 6116	Drawing toward Architecture	1-2
ARC 6311C	Building Information Modeling	3
DCP 6218	Developing Sustainable Projects	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6715	Built Heritage Documentation II	3
DCP 6971	Research for Master's Thesis	1-9
URP 6272	Urban Spatial Analysis	3

School of Architecture Courses

Code	Title	Credits
ARC 5040	Introduction to Themed Environments	3
ARC 5041	Design and Documentation of Themed Environments	3
ARC 5042	Fabrication and Execution for Themed Environments	3
ARC 5043	Integration Practices for Built Environments	3
ARC 5921	Fundamentals of Coding and Computation - Introduction to Computer Programming for Architects	3
ARC 6044	Development and Operations for Themed Environments	3
ARC 6045C	Project Development Studio for Themed Environments	6
ARC 6116	Drawing toward Architecture	1-2
ARC 6212	Topics in Phenomena and Architecture	3
ARC 6228	Film and Architecture	3
ARC 6241	Advanced Studio I	1-9
ARC 6242	Research Methods	3
ARC 6281	Professional Practice	3
ARC 6306C	Public Interest Design: Contemporary Issues and Practice	3
ARC 6311C	Building Information Modeling	3
ARC 6355	Advanced Studio II	6
ARC 6356	Advanced Studio III	6
ARC 6357	Advanced Topics in Architectural Design	3
ARC 6386	Introduction to Healthcare Design	3
ARC 6399	Advanced Topics in Urban Design	3
ARC 6505	Architectural Structural Systems: Wood, Steel, and Concrete	4
ARC 6512	Structural Modeling	3
ARC 6611	Advanced Topics in Architectural Technology	3
ARC 6621	Graduate Environmental Technology 2	3
ARC 6642	Architectural Acoustic Design Laboratory	3
ARC 6643	Architectural Acoustics	3
ARC 6670	Lighting Design Seminar	3
ARC 6680	Architecture Energy and Ecology	3
ARC 6685	Life Safety, Sanitation, and Plumbing Systems	3

ARC 6686	LEED for Sustainable Design and Construction	3
ARC 6705	Graduate Architectural History 3	3
ARC 6773	Strains of Modernism	3
ARC 6793	Advanced Topics in Regional Architecture	3
ARC 6821	Preservation Problems and Processes	3
ARC 6883	Vernacular Architecture & Sustainability	3
ARC 6911	Architectural Research	1-6
ARC 6912	Architectural Research II	1-6
ARC 6913	Architectural Research III	1-6
ARC 6922	Machine Learning for Architects	3
ARC 6923	AI & Ethics in Architecture	3
ARC 6933	Sustainable Site Design	3
ARC 6934	European Approach to Sustainable Design	3
ARC 6940	Supervised Teaching	1-5
ARC 6971	Research for Master's Thesis	1-15
ARC 6979	Master's Research Project	1-10

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12

DGP 7980	Research for Doctoral Dissertation	1-15
DGP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Architecture (MS)

SLO 1 Knowledge

Acquire, interpret and analyze information as it relates to the design process. Use critical thinking and specialized knowledge of architectural systems to identify and assess problems. Develop design responses in a competent and ethical manner

SLO 2 Skills

Develop an area of focus and a self-directed inquiry. Work collaboratively toward integrative proposals

SLO 3 Professional Behavior

Engage in the advancement of the discipline

Engage the economic, ethical, and aesthetic aspects of professional practice

Master of Science in Architectural Studies

SLO 1 Knowledge

Acquire, interpret and analyze information as it relates to the design process. Use critical thinking and specialized knowledge of architectural systems to identify and assess problems. Develop design responses in a competent and ethical manner

SLO 2 Skills

Develop an area of focus and a self-directed inquiry. Work collaboratively toward integrative proposals

SLO 3 Professional Behavior

Engage in the advancement of the discipline. Engage the economic, ethical, and aesthetic aspects of professional practice

Urban and Regional Planning Department

Director of School of Landscape Architecture and Planning: K. Larsen
Chair: L. Hu

Graduate Coordinator: L. Dedenbach

Graduate Coordinator of Online Degree program: T. Hawkins

The mission of the Department of Urban and Regional Planning is to educate the next generation of planning professionals to be good stewards of our built and natural environments, to conduct innovative research that improves quality of life for all, and to provide planning services to communities.

Doctor of Philosophy: The College offers an interdisciplinary program leading to the Doctor of Philosophy degree in Design, Construction, and Planning. Areas of specialization within this program include architecture, building construction, interior design, landscape architecture, and urban and regional planning. For information, please see the Design, Construction, and Planning (Ph.D.) (<http://gradcatalog.ufl.edu/graduate/colleges-departments/design-construction-planning/other-programs/design-construction-planning-phd/>) program page in this catalog, or the DCP Ph.D. website: <https://dcp.ufl.edu/urp/academics/ph-d/>.

Master of Urban and Regional Planning: The Department of Urban and Regional Planning offers graduate work leading to the degree of Master of Urban and Regional Planning (M.U.R.P.). The fifty-two credit graduate degree program can be earned on campus or online. The Planning Accreditation Board has accredited the campus-based program; students typically complete the campus-based degree program in two academic years. The online program targets practicing professionals with its flexible scheduling and sequencing of classes. Students with a master's degree in a related field may obtain approval from the Department to transfer up to 18 credit hours toward the 52-credit requirement. The department encourages students with any undergraduate degree who are interested in the field of planning to apply for admission.

The Department of Urban and Regional Planning and the Levin College of Law offer a joint degree program. The four-year program leads to a Juris Doctor and a Master of Urban and Regional Planning (<https://www.law.ufl.edu/areas-of-study/degree-programs/joint-degree-programs/>). Students may pursue Concurrent Degrees in Latin American Studies and in Transportation Engineering. Concurrent degrees allow the sharing of 9 credits between the two degrees. Areas of concentration with other programs in the Graduate School may be developed to meet the individual needs of students.

The department offers a combination undergraduate/graduate degree program with several UF departments and colleges including Sustainability and the Built Environment, Political Science, Forestry, and more. Please contact a College of Design, Construction and Planning Advisor and/or Graduate Coordinator for Urban and Regional Planning to learn more and for information about application and approval procedures.

In addition to coursework, the student is required to complete an internship with a public agency or private planning firm and to complete a master's thesis or research project (in lieu of thesis) with faculty approval. The Department reserves the right to retain student work for purposes of record, exhibition, or instruction.

Complete descriptions of the requirements for the above-mentioned degrees are provided in the Graduate Degrees (p. 778) section of this catalog.

For more information, please see the program page below and our website: <http://www.dcp.ufl.edu/urp> (<http://www.dcp.ufl.edu/urp/>).

Majors

- Urban Analytics (p. 115)
- Urban and Regional Planning (p. 116)

Faculty

Professor

- Hu, Lingqian
- Larsen, Kristin Esther
- Peng, Zhong-Ren
- Steiner, Ruth Lorraine

Associate Professor

- Alakshendra, Abhinav
- Frank, Kathryn I.

Assistant Professor

- Larkin, Erin C.
- Tapp, Catherine Renee
- Wang, Shenhao
- Wang, Yan
- Wong, Vivian Wen Hui

Research Associate Professor

- Bejleri, Ilir

Assistant Scientist

- Chen, Changjie

Lecturer

- Dedenbach, Laura J.
- Dost, Kyle
- Hawkins, William Thomas
- Knowles, Harold S.

Affiliated Faculty

- Silver, Christopher
Professor
- Tepe, Emre
Assistant Professor

Urban Analytics

Overview

PROGRAM INFORMATION

The Master of Science (M.S.) with a major in Urban Analytics program at the University of Florida is designed to equip students with a strong foundation in computing, data analysis and visualization skills for urban science. What sets our program apart is its focus on artificial intelligence with an interdisciplinary support, offering a holistic perspective that goes beyond the limitations of single-discipline urban analytics degrees.

The 36-credit, two-year degree program will offer students a variety of courses in different clusters about urban and regional planning theory (6 credits required), methods (9 credits required), data science (3 credits required), Artificial Intelligence (9 credits required) and database (3 credits required) in collaboration with departments in the College of Engineering. Incoming students will begin the program in the fall semester. Based on their terminal project topic, each student will enroll in URP 6979 for their 6 credits of master's research project.

Each student will develop a solid base of understanding for data science and AI technologies and have a strong domain knowledge in urban studies and urban planning, understand social justice and equity, become an expert in their chosen field of research, and develop the skills necessary to pursue an independent research and practice agenda in both academia and industry.

Upon completion of this degree, students will be able to think critically and apply AI and Machine Learning methodologies to complex spatial analysis and environmental, and urban planning problems, and integrate technologies with analysis.

For more information, please see our website: <https://dcp.ufl.edu/urp/urban-analytics/>

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN URBAN Analytics

- Master of Science

Courses

URBAN AND REGIONAL PLANNING DEPARTMENTAL COURSES

Code	Title	Credits
URP 6007	Survey of Urban and Regional Planning	3
URP 6042	Urban Economy	3
URP 6059	Community Engagement	3
URP 6061	Planning Administration and Ethics	3
URP 6100	Planning Theory and History	3
URP 6131	Land Use Planning Law	3
URP 6132	Growth Management Seminar	3
URP 6203	Planning Research Design	1-3
URP 6223	Introduction to Urban Analytics	3
URP 6224	Intermediate Urban Analytics	3
URP 6231	Quantitative Data Analysis for Planners	3
URP 6270	Introduction to Planning Information Systems	3
URP 6271	Automation for Geospatial Modeling and Analysis	3
URP 6272	Urban Spatial Analysis	3
URP 6274	GPS for Planners: Introduction to Global Positioning System	1
URP 6275	Intermediate Planning Information Systems	3
URP 6276	Internet Geographic Information Systems	3
URP 6277	Land Use Visioning and Analysis	3
URP 6278	Web Mapping and Visualization	3
URP 6280	3D Geospatial Modeling and Visualization	3
URP 6341	Urban Planning Project	1-12
URP 6409	Sustainable Community Development	3
URP 6421	Environmental Land Use Planning and Management	3
URP 6424	Sustainable Urbanism in the Americas	3
URP 6428	Advanced Environmental Planning	3
URP 6429	Natural Resources Planning and Management	3
URP 6445	Planning for Climate Change	3
URP 6526	Health and the Built Environment	3
URP 6541	Economic Development Planning	3
URP 6542	Urban Land Economics	3
URP 6603	Development Review	3
URP 6610	International Development Planning	3
URP 6645	Sustainable Urbanism in Europe	3
URP 6646	International Perspectives in Urban and Regional Planning	3
URP 6711	Transportation and Land Use Coordination	3
URP 6716	Transportation Policy and Planning	3
URP 6743	Affordable Housing Law	3
URP 6745	Housing, Public Policy, and Planning	3
URP 6821	Transportation and Land-Use Modeling	3

URP 6855	Urban Form in Cities throughout the Americas	3
URP 6871	Planning and Design I	3
URP 6872	Planning and Design II	3
URP 6880	Defensible Space and CPTED in Urban Design	3
URP 6887	Advanced Defensible Space in Urban Design	3
URP 6905	Exploration and Directed Study	1-4
URP 6910	Supervised Research	1-5
URP 6920	Colloquium	1
URP 6931	Topical Seminar	1-4
URP 6941	Urban Planning Professional Development	1-3
URP 6971	Research for Master's Thesis	1-15
URP 6979	Master's Research Project	1-6

COLLEGE OF DESIGN, CONSTRUCTION, AND PLANNING COURSES

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3
DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Urban and Regional Planning Program Information

The Department of Urban and Regional Planning offers the degree of Master of Urban and Regional Planning (M.U.R.P.). The 52-credit graduate program is usually completed in two academic years. Students with a master's degree in a related field may obtain approval from the Department to transfer up to 18 credit hours toward the 52-credit requirement. The Department encourages students with any undergraduate degree who are interested in the field of planning to apply for admission.

The M.U.R.P. degree is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning, for having achieved the highest applicable standards for graduate education in the field of planning. Graduates of the Department are prepared to practice urban and regional planning. Complete descriptions of the requirements for the M.U.R.P. and Ph.D. degrees are provided in the General Information section of this catalog.

The Urban and Regional Planning curriculum is designed to provide a set of core studies and contextual projects that prepare the graduate for the practice of planning in public or private agencies at both national and international levels. The core studies include history and theory of planning; planning methods; and related studies in community and regional social, natural, and economic systems. Contextual projects include, among many subject areas, urban design, transportation, regional planning, community redevelopment and preservation, housing, real estate, and economic development. Interstate field trips are required as a part of the normal program curriculum. Students should plan to have adequate funds for field trips and for studio materials.

The program emphasizes planning, policy, and design for the built and natural environments. Areas of specialized knowledge include land use and transportation, urban design, housing, community and economic development, information technologies for planning, and environmental planning. Students are also encouraged to take advantage of the interdisciplinary faculty, course offerings, and other resources available in the College of Design, Construction, and Planning and throughout the University.

The Department has several research centers: The Geo-facilities Planning and Information Center (GeoPlan), the Center for International Design and Planning (CIDP), the Center for Building Better Communities (CBBC), and the Center for Health and the Built Environment (CHBE).

Combination Degree: The college participates in combination degree programs between any UF undergraduate degree and a Master of Urban and Regional Planning. Please consult the academic unit for more information or if interested in participating in this program.

For more information, please see our website: <https://dcp.ufl.edu/urp/academics/>

Degrees Offered

Degrees Offered with a Major in Urban and Regional Planning

- Master of Urban and Regional Planning
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Historic Preservation
 - concentration in Sustainable Design
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Urban and Regional Planning Courses

Code	Title	Credits
URP 6276	Internet Geographic Information Systems	3
URP 6277	Land Use Visioning and Analysis	3
URP 6610	International Development Planning	3
URP 6711	Transportation and Land Use Coordination	3
URP 6743	Affordable Housing Law	3
URP 6855	Urban Form in Cities throughout the Americas	3
URP 6887	Advanced Defensible Space in Urban Design	3

Urban and Regional Planning Departmental Courses

Code	Title	Credits
URP 6007	Survey of Urban and Regional Planning	3
URP 6042	Urban Economy	3
URP 6059	Community Engagement	3
URP 6061	Planning Administration and Ethics	3
URP 6100	Planning Theory and History	3
URP 6131	Land Use Planning Law	3
URP 6132	Growth Management Seminar	3
URP 6203	Planning Research Design	1-3
URP 6223	Introduction to Urban Analytics	3
URP 6224	Intermediate Urban Analytics	3
URP 6231	Quantitative Data Analysis for Planners	3
URP 6270	Introduction to Planning Information Systems	3
URP 6271	Automation for Geospatial Modeling and Analysis	3
URP 6272	Urban Spatial Analysis	3
URP 6274	GPS for Planners: Introduction to Global Positioning System	1
URP 6275	Intermediate Planning Information Systems	3
URP 6276	Internet Geographic Information Systems	3
URP 6277	Land Use Visioning and Analysis	3
URP 6278	Web Mapping and Visualization	3
URP 6280	3D Geospatial Modeling and Visualization	3
URP 6341	Urban Planning Project	1-12
URP 6409	Sustainable Community Development	3
URP 6421	Environmental Land Use Planning and Management	3
URP 6424	Sustainable Urbanism in the Americas	3

URP 6428	Advanced Environmental Planning	3
URP 6429	Natural Resources Planning and Management	3
URP 6445	Planning for Climate Change	3
URP 6526	Health and the Built Environment	3
URP 6541	Economic Development Planning	3
URP 6542	Urban Land Economics	3
URP 6603	Development Review	3
URP 6610	International Development Planning	3
URP 6645	Sustainable Urbanism in Europe	3
URP 6646	International Perspectives in Urban and Regional Planning	3
URP 6711	Transportation and Land Use Coordination	3
URP 6716	Transportation Policy and Planning	3
URP 6743	Affordable Housing Law	3
URP 6745	Housing, Public Policy, and Planning	3
URP 6821	Transportation and Land-Use Modeling	3
URP 6855	Urban Form in Cities throughout the Americas	3
URP 6871	Planning and Design I	3
URP 6872	Planning and Design II	3
URP 6880	Defensible Space and CPTED in Urban Design	3
URP 6887	Advanced Defensible Space in Urban Design	3
URP 6905	Exploration and Directed Study	1-4
URP 6910	Supervised Research	1-5
URP 6920	Colloquium	1
URP 6931	Topical Seminar	1-4
URP 6941	Urban Planning Professional Development	1-3
URP 6971	Research for Master's Thesis	1-15
URP 6979	Master's Research Project	1-6

College of Design, Construction, and Planning Courses

Code	Title	Credits
DCP 6205	Ecological Issues in Sustainability and the Built Environment	3
DCP 6212	Sustainable Design Issues: Ecology, Architecture, and Planning	4
DCP 6217C	WELL Building Strategies (WELL Practicum)	6
DCP 6218	Developing Sustainable Projects	3
DCP 6221	Economics of Sustainability in the Built Environment	3
DCP 6227	Life Cycle Assessment for Sustainable Buildings	3
DCP 6230	Integrated Sustainable Development Practicum	6
DCP 6231C	Green Building Strategies	6
DCP 6301	Sustainable Planning and Design Studio	6
DCP 6701	World Heritage Research and Stewardship	3
DCP 6710	History and Theory of Historic Preservation	3
DCP 6711C	Built Heritage: History and Materials Conservation I	3
DCP 6712C	Built Heritage: History and Materials Conservation II	3
DCP 6714C	Built Heritage Documentation I	3
DCP 6715	Built Heritage Documentation II	3
DCP 6716	Cultural Resource Management	3
DCP 6718	Current Topics in Historic Preservation	3
DCP 6730	Preservation Policy	3
DCP 6905	Independent Study	1-3

DCP 6931	Special Topics in Design, Construction, and Planning	1-4
DCP 6943	Cultural Resource Survey	3
DCP 6971	Research for Master's Thesis	1-9
DCP 6979	Master's Research Project	1-6
DCP 7790	Doctoral Core 1: Paradigms and Theories of Inquiry	3
DCP 7794	Doctoral Core 4: Research Assessment and Professional Preparation	1
DCP 7911	Doctoral Core 2: Foundations of Research Design and Methodologies	3
DCP 7940	Supervised Teaching	1-3
DCP 7949	Professional Internship	1-5
DCP 7979	Advanced Research	1-12
DCP 7980	Research for Doctoral Dissertation	1-15
DCP 7981	Doctoral Core 3: Academic Writing for Publication	3

Student Learning Outcomes

Urban & Regional Planning (MURP)

SLO 1 Knowledge

Apply knowledge of human settlement, historical and contemporary practice, and policy and processes relevant to urban and regional planning concepts and theories

SLO 2 Skills

Apply oral, written, and critical thinking skills required of master's students within their area of specialization

SLO 3 Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication

College of Education

Dean: G. Good

Graduate study in education allows individuals with bachelor's degrees in agriculture, business, education, engineering, mathematics, sciences, humanities, foreign languages, preprofessional studies, and other fields to prepare for rewarding professional careers in education and related fields.

The College of Education offers 19 master's or specialist programs, 12 doctoral programs, and a J.D./Ph.D. program with the College of Law through its three schools:

1. Human Development and Organizational Studies in Education (p. 118)
2. Special Education, School Psychology and Early Childhood Studies (<https://gradcatalog.ufl.edu/graduate/colleges-departments/education/special-education-psychology-early-childhood-studies/>)
3. School of Teaching and Learning (p. 145)

Follow these links for more information about UF's College of Education graduate programs:

<https://education.ufl.edu/program-directory/#graduate>

<https://education.ufl.edu/program-directory/> (<https://education.ufl.edu/program-directory/>)

Departments

- Human Development and Organizational Studies in Education (p. 118)
 - Anatomical Sciences Education (p. 119)
 - Counseling and Counselor Education (p. 120)
 - Educational Leadership (p. 122)
 - Higher Education Administration (p. 126)
 - Marriage and Family Counseling (p. 128)
 - Mental Health Counseling (p. 131)
 - Program Evaluation in Educational Environments (p. 134)
 - Research and Evaluation Methodology (p. 136)
 - School Counseling and Guidance (p. 139)
 - Student Personnel in Higher Education (p. 142)
- School of Teaching and Learning (p. 145)
 - Anatomical Sciences Education (p. 146)
 - Curriculum and Instruction (Ed.D.) (p. 146)
 - Curriculum and Instruction (ISC) (p. 150)
 - Elementary Education (p. 155)
 - English Education (p. 159)
 - Mathematics Education (p. 162)
 - Reading Education (p. 166)
 - Science Education (p. 170)
 - Social Studies Education (p. 174)
- Special Education, School Psychology and Early Childhood Studies (p. 177)
 - Early Childhood Education (p. 178)
 - School Psychology (p. 180)
 - Special Education (p. 182)

Faculty

Assistant Professor

- Brown, Taryn T C

Clinical Assistant Professor

- Vetere-Earley, Timothy Matthew

Clinical Associate Professor

- Vescio, Vicki Ann

Research Scientist

- Bratsch-Hines, Mary

Human Development and Organizational Studies in Education

Director: A. C. Manley

Graduate Coordinator: C. Haynes

Programs leading to the Master of Arts in Education (M.A.E.), Master of Education (M.Ed.), Education Specialist (Ed.S.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.) degrees are offered through this school with programs in Counseling and Counselor Education, Educational Leadership, Higher Education Administration, Marriage and Family Counseling, Mental Health Counseling, Research and Evaluation

Methodology, School Counseling and Guidance, and Student Personnel in Higher Education.

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

More information can be found at our website: <http://education.ufl.edu/hdose> (<http://education.ufl.edu/hdose/>).

Majors

- Anatomical Sciences Education (p. 119)
- Counseling and Counselor Education (p. 120)
- Educational Leadership (p. 122)
- Higher Education Administration (p. 126)
- Marriage and Family Counseling (p. 128)
- Mental Health Counseling (p. 131)
- Program Evaluation in Educational Environments (p. 134)
- Research and Evaluation Methodology (p. 136)
- School Counseling and Guidance (p. 139)
- Student Personnel in Higher Education (p. 142)

Faculty

Professor

- Bhattacharya, Kakali
- Good, Glenn E.
- Leite, Walter Lana
- Manley, Anne Corinne
- Miller, David

Associate Professor

- Curran, Frank C.
- Li, Wei
- Mariani, Melissa Ann
- Ortagus, Justin Charles
- Redding, Christopher Hyde
- Shannonhouse, Laura R.
- Smith, Sondra Lori
- Therriault, David James
- Ulmer, Jasmine Brooke

Assistant Professor

- Aaron, Tiffany S.
- Kent, Jennifer Kristen
- Pan, Yiqin
- Shin, Eunjin
- Smith-Onyewu, Zyrashae
- Thomas, Christopher
- Wu, Jue

Clinical Assistant Professor

- Balser, Walter F.
- Grimes, Deaetta
- Jean-Philippe, Sara
- Lynch, Lindsay Byron

- Machado, Mercedes M.
- Mawdsley, Helena Pan
- Moss-Lazarczyk, Amber Brisa
- Mousa, Bruce E.
- Robinson, Tuuli
- Salvo, James
- Seraphine, Anne Elizabeth
- Wright, Eric A.

Clinical Associate Professor

- Haynes, Clifford
- West, Rosa M.

Clinical Professor

- Puig, Ana

Courtesy Professor

- Frierson, Henry T.

Associate In

- Porter-Roberts, Julia D.

Affiliated Faculty

- Bratsch-Hines, Mary
Research Scientist
- Daniels, Philip F.
Clinical Assistant Professor
- Hernandez, Carlos Antonio
Clinical Assistant Professor
- Lenes, Emilie Ayn
Clinical Associate Professor
- Rivera, Shinlay Chu
Assistant Professor
- Sixbey, Meggen B.
Clinical Associate Professor

Anatomical Sciences Education

The Anatomical Sciences Education graduate program offers the Master of Science and the Doctor of Philosophy degrees. The faculty for this program is drawn from these disciplines:

- Anatomy
- Education

For the Ph.D. program, applicants must meet the minimum requirements for the University of Florida Graduate School: Junior/Senior GPA > 3.0 and a score on the Graduate Record Exam (GRE) a minimum score of 300 for the current scale. No GRE is required for the MA program. For both the MS and the PhD program, the student will submit a minimum of three letters of reference, a statement of purpose, and a resume, which the admissions committee will use to assess the student's qualifications for admission to the program. International students must comply with current UF standards for admission to the Graduate School, including requirements for English language competency and financial responsibility.

Contact Mark Zakshevsky at zmz30@ufl.edu

or visit the program's website at <https://anatomy.acb.med.ufl.edu/>.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN ANATOMICAL SCIENCES EDUCATION

- Doctor of Philosophy
- Master of Science

Courses

Anatomical Sciences Education Courses

Student Learning Outcomes

ANATOMICAL SCIENCES EDUCATION (Ph.D.)

SL01

Knowledge

Identify and describe the anatomical features of the human body with referent to systems, location, and planes of the body.

SL02

Skills

Develop tools to critically assess anatomical and educational research.

SL03

Professionalism

Display appropriate behavior to instructors, fellow students and individuals who have bequeathed their bodies to medical science.

Anatomical sciences education (M.S.)

SL01

Knowledge

Identify and describe the anatomical features of the human body with referent to systems, location, and planes of the body.

SL02

Skills

Develop tools to critically assess anatomical and educational research.

SL03

Professionalism

Apply ethical standards and implement excellence in all endeavors which focus on professional identity formation (i.e., development of professional values, actions and aspirations).

Counseling and Counselor Education Program Information

The doctoral program in Counseling and Counselor Education prepares students for careers in academia and advanced clinical and administrative positions. Our program aligns with the University of Florida's mission to prepare the next generation of scholars and professional leaders. Thus, our doctoral program is a good fit for individuals who want to fulfill the roles of counselor educators – research, writing, teaching, service, securing external funding to support scholarship, assuming professional leadership positions, etc. The doctoral program ideally suits individuals with previously earned master's and at least two years of clinical experience. Doctoral students complete coursework and a doctoral clinical internship, participate in teaching and supervision, and conduct research leading to the completion of a

dissertation. Students average 3 to 5 years to complete the doctorate, many balancing work and school commitments. In addition to other admission materials, GRE scores must be submitted upon application to the Counseling and Counselor Education doctoral program. Please visit <https://education.ufl.edu/counselor-education/admissions/> for further information about admission requirements to our programs.

Degrees Offered

Degrees Offered with a Major in Counseling and Counselor Education

- Doctor of Education
 - without a concentration
 - concentration in Marriage and Family Counseling
 - concentration in Mental Health Counseling
 - concentration in School Counseling and Guidance
- Doctor of Philosophy
 - without a concentration
 - concentration in Marriage and Family Counseling
 - concentration in Mental Health Counseling
 - concentration in School Counseling and Guidance

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6

EDA 6931	Special Topics	1-3	EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3
EDA 6948	Supervised Practice in School Administration	1-15	EDF 7483	Qualitative Data Collection: Approaches and Techniques	3
EDA 6971	Research for Master's Thesis	1-15	EDF 7486	Methods of Educational Research	3
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3	EDF 7491	Evaluation of Educational Products and Systems	3
EDA 7206	Organizational Leadership in Education	3	EDF 7911	Qualitative Research Writing and Representation in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3	EDF 7931	Seminar in Educational Research	3
EDA 7945	Practicum in Supervision and Administration	1-15	EDF 7932	Multivariate Analysis in Educational Research	3
EDA 7979	Advanced Research	1-12	EDF 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15	EDF 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3	EDG 6285	Evaluation in the School Program	3
EDF 5441	Assessment in General and Exceptional Student Education	3	EDH 6006	The College Student	3
EDF 6113	Educational Psychology: Human Development	3	EDH 6040	Theory of College Student Development	3
EDF 6211	Educational Psychology: General	3	EDH 6046	Diversity Issues in Higher Education	3
EDF 6215	Educational Psychology: Learning Theory	3	EDH 6051	Educational Outcomes of American Colleges and Universities	3
EDF 6400	Quantitative Foundations of Education Research Overview	3	EDH 6052	Inquiry in College and University Teaching	3
EDF 6401	Educational Statistics	3	EDH 6053	The Community Junior College in America	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3	EDH 6065	History of American Higher Education	3
EDF 6403	Quantitative Foundations of Educational Research	6	EDH 6066	American Higher Education	3
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3	EDH 6305	College and University Teaching	3
EDF 6436	Theory of Measurement	3	EDH 6306	Coaching Models for Student Success in Higher Education	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3	EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3
EDF 6464	Reading and Designing Qualitative Research	3	EDH 6364	Higher Education Environments	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3	EDH 6365	Academic and Student Affairs Collaborations	3
EDF 6471	Survey Design and Analysis in Educational Research	3	EDH 6503	Resource Development in Higher Education	3
EDF 6475	Qualitative Foundations of Educational Research	3	EDH 6632	Current Issues in Community College Leadership	3
EDF 6481	Quantitative Research Methods in Education	4	EDH 6637	Crisis Management in Higher Education	3
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3	EDH 6644	Assessment in Higher Education	3
EDF 6905	Individual Study	1-3	EDH 6662	Contemporary Issues in Higher Education Leadership	3
EDF 6910	Supervised Research	1-5	EDH 6664	Public Policy in Higher Education	3
EDF 6938	Special Topics	1-3	EDH 6665	Leadership and Supervision in Higher Education	3
EDF 6940	Supervised Teaching	1-5	EDH 6668	Change Leadership in Higher Education	3
EDF 6941	Practicum in Educational Research	2-9	EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3
EDF 6971	Research for Master's Thesis	1-15	EDH 6905	Individual Work	1-3
EDF 6973	Project in Lieu of Thesis	1-6	EDH 6931	Special Topics in Higher Education	1-3
EDF 7405	Advanced Quantitative Foundations of Educational Research	3	EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3
EDF 7412	Structural Equation Models	3	EDH 6947	Practicum in Student Personnel	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3	EDH 6973	Project in Lieu of Thesis	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3	EDH 6981	Introduction to Problems of Practice Inquiry	3
EDF 7439	Item Response Theory	3	EDH 7050	Exploration of Research Literature in Higher Education	3
EDF 7453	Natural Language Processing in Education Research	3	EDH 7225	Seminar: Curriculum in Higher Education	3
EDF 7469	AI for Evaluation in Educational Environments	3	EDH 7405	The Law and Higher Education	3
EDF 7474	Multilevel Models	3	EDH 7505	The Financing of Higher Education	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3	EDH 7631	Administration of Instruction in Higher Education	3
			EDH 7634	Student Affairs Administration in Higher Education	3
			EDH 7635	Higher Education Administration	3
			EDH 7636	Organizational Theory in Higher Education	3

EDH 7645	Data Management and Quantitative Workflow in Education Research	3
EDH 7910	Higher Education Research Fieldwork	3
EDH 7916	Contemporary Research on Higher Education	3
EDH 7934	Advanced Scholarly Writing for Publication	3
EDH 7942	Supervised Practice in Student Personnel in Higher Education	1
EDH 7948	Internship in Higher Education	3
EDH 7979	Advanced Research	1-12
EDH 7980	Research for Doctoral Dissertation	1-15
EDH 7982	Research Proposal Development in Higher Education	3
MHS 5005	Introduction to Counseling	3
MHS 6020	Counseling in Community Settings	3
MHS 6061	Spiritual Issues in Multicultural Counseling	3
MHS 6071	Diagnosis and Treatment of Mental Disorders	3
MHS 6200	Assessment in Counseling	3
MHS 6340	Career Development	3
MHS 6401	Counseling Theories and Applications	3
MHS 6421	Play Counseling and Play Process with Children	3
MHS 6428	Multicultural Counseling	3
MHS 6430	Introduction to Family Counseling	3
MHS 6440	Marriage and Couples Counseling	3
MHS 6450	Substance Abuse Counseling	3
MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
MHS 6471	Sexuality and Mental Health	3
MHS 6480	Developmental Counseling Over the Life Span	3
MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
MHS 6500	Group Counseling: Theories and Procedures	3
MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
MHS 6720	Professional Identity and Ethics in Counseling	3
MHS 6735	Applied Research in Counseling	3
MHS 6765	Mindful Living: Spirituality For Everyday Life	3
MHS 6831	Supervised Split Internship	3-6
MHS 6910	Supervised Research	1-5
MHS 6940	Supervised Teaching	0-5
MHS 6971	Research for Master's Thesis	1-15
MHS 7407	Advanced Counseling Theories	3
MHS 7431	Advanced Family Counseling	4
MHS 7600	Consultation Procedures	3
MHS 7610	Counseling Supervision Theories and Practice	3
MHS 7730	Advanced Counseling Research	3
MHS 7740	Research in Counseling	3
MHS 7803	Advanced Counseling Practicum	3
MHS 7804	Group Supervision in Mental Health Counseling	3
MHS 7805	Practicum in Mental Health Counseling	3
MHS 7806	Practicum in Marriage and Family Counseling	3
MHS 7807	Group Supervision in Marriage and Family Counseling	3
MHS 7809	Counseling Supervision Practicum	3
MHS 7830	Internship in Counseling and Development-600 Hours	6
MHS 7840	Internship 1 in Counselor Education	3
MHS 7941	Internship 2 in Counselor Education	3
MHS 7946	Internship in Agency Program Management	6

MHS 7979	Advanced Research	1-12
MHS 7980	Research for Doctoral Dissertation	1-15
PCO 6939	Seminar: Current Topics in Counseling Psychology	3
PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7949	Internship in Counseling Psychology	1
SDS 6401	Counseling Skills for Non-Counselors	3
SDS 6411	Counseling with Children	3
SDS 6436	Family-School Intervention	3
SDS 6620	Organization and Administration of School Counseling Programs	3
SDS 6831	Supervision for a Split Internship	3
SDS 6905	Individual Work	1-4
SDS 6936	Seminar in Counselor Education	3
SDS 6938	Special Topics	1-4
SDS 7800	Practicum in School Counseling	3
SDS 7820	Group Supervision in School Counseling	3
SDS 7830	Internship in Counseling and Development-600 Hours	6

Student Learning Outcomes

Counseling & Counselor Education

SLO 1 Knowledge

Candidates will apply professional knowledge in each of the eight (CACREP) common core curricular areas and at least one specialty area within the counselor education context.

SLO 2 Skills

Candidates will apply proficiency in counseling, supervision, counselor education (teaching), and research associated with counselor preparation and training.

SLO 3 Professional Behavior

Candidates will apply professional behavior in the field of counselor education and supervision by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Educational Leadership

Program Information

Programs in Educational Leadership provide opportunities for professional educators and those who would like to be professional educators to receive quality coursework, mentorship, and degrees in educational administration, policy, and leadership. The programs provided are ideal for vice principals, principals, district directors and supervisors, assistant superintendents, school business managers, teachers aspiring to acquire administrative roles within the K-12 system and educational leaders of other organizations.

Degrees Offered

Degrees Offered with a Major in Educational Leadership

- Doctor of Education
 - without a concentration
 - concentration in Educational Policy
- Doctor of Philosophy
 - without a concentration
 - concentration in Educational Policy
- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6
EDA 6931	Special Topics	1-3
EDA 6948	Supervised Practice in School Administration	1-15
EDA 6971	Research for Master's Thesis	1-15
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3
EDA 7206	Organizational Leadership in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3

EDA 7945	Practicum in Supervision and Administration	1-15
EDA 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3
EDF 5441	Assessment in General and Exceptional Student Education	3
EDF 6113	Educational Psychology: Human Development	3
EDF 6211	Educational Psychology: General	3
EDF 6215	Educational Psychology: Learning Theory	3
EDF 6400	Quantitative Foundations of Education Research Overview	3
EDF 6401	Educational Statistics	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3
EDF 6436	Theory of Measurement	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3
EDF 6464	Reading and Designing Qualitative Research	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3
EDF 6471	Survey Design and Analysis in Educational Research	3
EDF 6475	Qualitative Foundations of Educational Research	3
EDF 6481	Quantitative Research Methods in Education	4
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3
EDF 6905	Individual Study	1-3
EDF 6910	Supervised Research	1-5
EDF 6938	Special Topics	1-3
EDF 6940	Supervised Teaching	1-5
EDF 6941	Practicum in Educational Research	2-9
EDF 6971	Research for Master's Thesis	1-15
EDF 6973	Project in Lieu of Thesis	1-6
EDF 7405	Advanced Quantitative Foundations of Educational Research	3
EDF 7412	Structural Equation Models	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3
EDF 7439	Item Response Theory	3
EDF 7453	Natural Language Processing in Education Research	3
EDF 7469	AI for Evaluation in Educational Environments	3
EDF 7474	Multilevel Models	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3
EDF 7486	Methods of Educational Research	3
EDF 7491	Evaluation of Educational Products and Systems	3

EDF 7911	Qualitative Research Writing and Representation in Education	3	EDH 7948	Internship in Higher Education	3
EDF 7931	Seminar in Educational Research	3	EDH 7979	Advanced Research	1-12
EDF 7932	Multivariate Analysis in Educational Research	3	EDH 7980	Research for Doctoral Dissertation	1-15
EDF 7979	Advanced Research	1-12	EDH 7982	Research Proposal Development in Higher Education	3
EDF 7980	Research for Doctoral Dissertation	1-15	MHS 5005	Introduction to Counseling	3
EDG 6285	Evaluation in the School Program	3	MHS 6020	Counseling in Community Settings	3
EDH 6006	The College Student	3	MHS 6061	Spiritual Issues in Multicultural Counseling	3
EDH 6040	Theory of College Student Development	3	MHS 6071	Diagnosis and Treatment of Mental Disorders	3
EDH 6046	Diversity Issues in Higher Education	3	MHS 6200	Assessment in Counseling	3
EDH 6051	Educational Outcomes of American Colleges and Universities	3	MHS 6340	Career Development	3
EDH 6052	Inquiry in College and University Teaching	3	MHS 6401	Counseling Theories and Applications	3
EDH 6053	The Community Junior College in America	3	MHS 6421	Play Counseling and Play Process with Children	3
EDH 6065	History of American Higher Education	3	MHS 6428	Multicultural Counseling	3
EDH 6066	American Higher Education	3	MHS 6430	Introduction to Family Counseling	3
EDH 6305	College and University Teaching	3	MHS 6440	Marriage and Couples Counseling	3
EDH 6306	Coaching Models for Student Success in Higher Education	3	MHS 6450	Substance Abuse Counseling	3
EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3	MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
EDH 6364	Higher Education Environments	3	MHS 6471	Sexuality and Mental Health	3
EDH 6365	Academic and Student Affairs Collaborations	3	MHS 6480	Developmental Counseling Over the Life Span	3
EDH 6503	Resource Development in Higher Education	3	MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
EDH 6632	Current Issues in Community College Leadership	3	MHS 6500	Group Counseling: Theories and Procedures	3
EDH 6637	Crisis Management in Higher Education	3	MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
EDH 6644	Assessment in Higher Education	3	MHS 6720	Professional Identity and Ethics in Counseling	3
EDH 6662	Contemporary Issues in Higher Education Leadership	3	MHS 6735	Applied Research in Counseling	3
EDH 6664	Public Policy in Higher Education	3	MHS 6765	Mindful Living: Spirituality For Everyday Life	3
EDH 6665	Leadership and Supervision in Higher Education	3	MHS 6831	Supervised Split Internship	3-6
EDH 6668	Change Leadership in Higher Education	3	MHS 6910	Supervised Research	1-5
EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3	MHS 6940	Supervised Teaching	0-5
EDH 6905	Individual Work	1-3	MHS 6971	Research for Master's Thesis	1-15
EDH 6931	Special Topics in Higher Education	1-3	MHS 7407	Advanced Counseling Theories	3
EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3	MHS 7431	Advanced Family Counseling	4
EDH 6947	Practicum in Student Personnel	3	MHS 7600	Consultation Procedures	3
EDH 6973	Project in Lieu of Thesis	3	MHS 7610	Counseling Supervision Theories and Practice	3
EDH 6981	Introduction to Problems of Practice Inquiry	3	MHS 7730	Advanced Counseling Research	3
EDH 7050	Exploration of Research Literature in Higher Education	3	MHS 7740	Research in Counseling	3
EDH 7225	Seminar: Curriculum in Higher Education	3	MHS 7803	Advanced Counseling Practicum	3
EDH 7405	The Law and Higher Education	3	MHS 7804	Group Supervision in Mental Health Counseling	3
EDH 7505	The Financing of Higher Education	3	MHS 7805	Practicum in Mental Health Counseling	3
EDH 7631	Administration of Instruction in Higher Education	3	MHS 7806	Practicum in Marriage and Family Counseling	3
EDH 7634	Student Affairs Administration in Higher Education	3	MHS 7807	Group Supervision in Marriage and Family Counseling	3
EDH 7635	Higher Education Administration	3	MHS 7809	Counseling Supervision Practicum	3
EDH 7636	Organizational Theory in Higher Education	3	MHS 7830	Internship in Counseling and Development-600 Hours	6
EDH 7645	Data Management and Quantitative Workflow in Education Research	3	MHS 7840	Internship 1 in Counselor Education	3
EDH 7910	Higher Education Research Fieldwork	3	MHS 7941	Internship 2 in Counselor Education	3
EDH 7916	Contemporary Research on Higher Education	3	MHS 7946	Internship in Agency Program Management	6
EDH 7934	Advanced Scholarly Writing for Publication	3	MHS 7979	Advanced Research	1-12
EDH 7942	Supervised Practice in Student Personnel in Higher Education	1	MHS 7980	Research for Doctoral Dissertation	1-15
			PCO 6939	Seminar: Current Topics in Counseling Psychology	3
			PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
			PCO 7949	Internship in Counseling Psychology	1

SDS 6401	Counseling Skills for Non-Counselors	3
SDS 6411	Counseling with Children	3
SDS 6436	Family-School Intervention	3
SDS 6620	Organization and Administration of School Counseling Programs	3
SDS 6831	Supervision for a Split Internship	3
SDS 6905	Individual Work	1-4
SDS 6936	Seminar in Counselor Education	3
SDS 6938	Special Topics	1-4
SDS 7800	Practicum in School Counseling	3
SDS 7820	Group Supervision in School Counseling	3
SDS 7830	Internship in Counseling and Development-600 Hours	6

Student Learning Outcomes

Educational Leadership (PHD)

SLO 1 Knowledge

Students will identify and describe the core curricular areas of educational leadership including: school finance and law, human resources, technology, data-driven decision-making, diversity, organizational theory, supervision, evaluation, and research.

SLO 2 Skills

Candidates will apply clarity of written and oral expression to advanced levels of skill in the core areas of educational leadership, evaluation and dissertation research.

SLO 3 Skills

Candidates will identify and explain competencies and skills of instructional leadership, operational leadership and school leadership to promote the success of all students.

SLO 4 Professional Behavior

Candidates will participate in professional organizations and will apply ethical behavior and professional conduct.

SLO 5 Professional Behavior

Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

Educational leadership (edd)

SLO 1 Knowledge

Students will identify and describe the core curricular areas of educational leadership including: school finance and law; human resources; technology; data-driven decision-making, diversity; organizational theory, leading change, educational policy, instructional leadership, program evaluation, supervision and strategic planning.

SLO 2 Skills

Candidates will apply clarity of written and oral expression to advanced levels of skill in the core areas of educational leadership, evaluation and dissertation research.

SLO 3 Skills

Candidates will identify and explain competencies and skills of instructional leadership, operational leadership, and school leadership to promote the success of all students and the improvement of teacher quality.

SLO 4 Professional Behavior

Candidates will apply ethical behavior, professional conduct, and communication.

SLO 5 Professional Behavior

Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

Educational Leadership (eds)

SLO 1 Knowledge

Candidates will identify and describe the core curricular areas of educational leadership including: school finance and law, human resources, technology, data-driven decision-making, diversity, organizational theory, supervision and strategic planning.

SLO 2 Skills

Candidates will apply and defend advanced levels of skill in the core areas of educational leadership.

SLO 3 Skills

Candidates will identify and explain competencies and skills of instructional leadership, operational leadership and school leadership to promote the success of all students.

SLO 4 Professional Behavior

Candidates will apply ethical behavior, professional conduct and communication.

SLO 5 Professional Behavior

Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

Educational Leadership (MAE)

SLO 1 Knowledge

Candidates will identify and describe the core curricular areas of educational leadership including school finance, law, human resources, technology, data-driven decision-making, diversity, organizational theory, supervision & strategic planning.

SLO 2 Skills

Candidates will apply competencies and skills of instructional leadership, operational leadership and school leadership to promote the success of all students.

SLO 3 Professional Behavior

Candidates will apply ethical behavior, professional conduct, and communication.

SLO 4 Professional Behavior

Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

Educational Leadership (MEd)

SLO 1 Knowledge

Candidates will identify and describe the core curricular areas of educational leadership including school finance, law, human resources, technology, data-driven decision-making, diversity, organizational theory, supervision & strategic planning.

SLO 2 Skills

Candidates will apply competencies and skills of instructional leadership, operational leadership and school leadership to promote the success of all students.

SLO 3 Professional Behavior

Candidates will apply ethical behavior, professional conduct, and communication.

SLO 4 Professional Behavior

Candidates will promote the success of all students by understanding the larger political, social, economic, legal and cultural issues.

Higher Education Administration

Program Information

The Higher Education Administration program is one of the nation's premier graduate programs for higher education administration and policy evaluation. Our emphasis remains on the role of research in evaluating policies, informing institutional effectiveness, and creating scholarship that connects both scholars and practitioners through a multidisciplinary approach. Focusing on both the two-year and four-year sectors, our nationally respected Higher Education Administration programs offer a Ph.D. and Ed.D. focused on rigorous scholarship and preparing future higher education faculty members, institutional leaders, policymakers, and researchers. Aided by our innovative and nationally respected faculty, the Higher Education Administration program provides students with the opportunity to work on cutting-edge research projects and publish work in top journals within higher education, public policy, and postsecondary administration.

Degrees Offered

Degrees Offered with a Major in Higher Education Administration

- Doctor of Education
 - without a concentration
 - concentration in Educational Policy
- Doctor of Philosophy
 - without a concentration
 - concentration in Educational Policy

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3

EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6
EDA 6931	Special Topics	1-3
EDA 6948	Supervised Practice in School Administration	1-15
EDA 6971	Research for Master's Thesis	1-15
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3
EDA 7206	Organizational Leadership in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3
EDA 7945	Practicum in Supervision and Administration	1-15
EDA 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3
EDF 5441	Assessment in General and Exceptional Student Education	3
EDF 6113	Educational Psychology: Human Development	3
EDF 6211	Educational Psychology: General	3
EDF 6215	Educational Psychology: Learning Theory	3
EDF 6400	Quantitative Foundations of Education Research Overview	3
EDF 6401	Educational Statistics	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3
EDF 6436	Theory of Measurement	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3
EDF 6464	Reading and Designing Qualitative Research	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3
EDF 6471	Survey Design and Analysis in Educational Research	3
EDF 6475	Qualitative Foundations of Educational Research	3
EDF 6481	Quantitative Research Methods in Education	4
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3
EDF 6905	Individual Study	1-3
EDF 6910	Supervised Research	1-5
EDF 6938	Special Topics	1-3
EDF 6940	Supervised Teaching	1-5
EDF 6941	Practicum in Educational Research	2-9
EDF 6971	Research for Master's Thesis	1-15

EDF 6973	Project in Lieu of Thesis	1-6	EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3
EDF 7405	Advanced Quantitative Foundations of Educational Research	3	EDH 6947	Practicum in Student Personnel	3
EDF 7412	Structural Equation Models	3	EDH 6973	Project in Lieu of Thesis	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3	EDH 6981	Introduction to Problems of Practice Inquiry	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3	EDH 7050	Exploration of Research Literature in Higher Education	3
EDF 7439	Item Response Theory	3	EDH 7225	Seminar: Curriculum in Higher Education	3
EDF 7453	Natural Language Processing in Education Research	3	EDH 7405	The Law and Higher Education	3
EDF 7469	AI for Evaluation in Educational Environments	3	EDH 7505	The Financing of Higher Education	3
EDF 7474	Multilevel Models	3	EDH 7631	Administration of Instruction in Higher Education	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3	EDH 7634	Student Affairs Administration in Higher Education	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3	EDH 7635	Higher Education Administration	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3	EDH 7636	Organizational Theory in Higher Education	3
EDF 7486	Methods of Educational Research	3	EDH 7645	Data Management and Quantitative Workflow in Education Research	3
EDF 7491	Evaluation of Educational Products and Systems	3	EDH 7910	Higher Education Research Fieldwork	3
EDF 7911	Qualitative Research Writing and Representation in Education	3	EDH 7916	Contemporary Research on Higher Education	3
EDF 7931	Seminar in Educational Research	3	EDH 7934	Advanced Scholarly Writing for Publication	3
EDF 7932	Multivariate Analysis in Educational Research	3	EDH 7942	Supervised Practice in Student Personnel in Higher Education	1
EDF 7979	Advanced Research	1-12	EDH 7948	Internship in Higher Education	3
EDF 7980	Research for Doctoral Dissertation	1-15	EDH 7979	Advanced Research	1-12
EDG 6285	Evaluation in the School Program	3	EDH 7980	Research for Doctoral Dissertation	1-15
EDH 6006	The College Student	3	EDH 7982	Research Proposal Development in Higher Education	3
EDH 6040	Theory of College Student Development	3	MHS 5005	Introduction to Counseling	3
EDH 6046	Diversity Issues in Higher Education	3	MHS 6020	Counseling in Community Settings	3
EDH 6051	Educational Outcomes of American Colleges and Universities	3	MHS 6061	Spiritual Issues in Multicultural Counseling	3
EDH 6052	Inquiry in College and University Teaching	3	MHS 6071	Diagnosis and Treatment of Mental Disorders	3
EDH 6053	The Community Junior College in America	3	MHS 6200	Assessment in Counseling	3
EDH 6065	History of American Higher Education	3	MHS 6340	Career Development	3
EDH 6066	American Higher Education	3	MHS 6401	Counseling Theories and Applications	3
EDH 6305	College and University Teaching	3	MHS 6421	Play Counseling and Play Process with Children	3
EDH 6306	Coaching Models for Student Success in Higher Education	3	MHS 6428	Multicultural Counseling	3
EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3	MHS 6430	Introduction to Family Counseling	3
EDH 6364	Higher Education Environments	3	MHS 6440	Marriage and Couples Counseling	3
EDH 6365	Academic and Student Affairs Collaborations	3	MHS 6450	Substance Abuse Counseling	3
EDH 6503	Resource Development in Higher Education	3	MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
EDH 6632	Current Issues in Community College Leadership	3	MHS 6471	Sexuality and Mental Health	3
EDH 6637	Crisis Management in Higher Education	3	MHS 6480	Developmental Counseling Over the Life Span	3
EDH 6644	Assessment in Higher Education	3	MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
EDH 6662	Contemporary Issues in Higher Education Leadership	3	MHS 6500	Group Counseling: Theories and Procedures	3
EDH 6664	Public Policy in Higher Education	3	MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
EDH 6665	Leadership and Supervision in Higher Education	3	MHS 6720	Professional Identity and Ethics in Counseling	3
EDH 6668	Change Leadership in Higher Education	3	MHS 6735	Applied Research in Counseling	3
EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3	MHS 6765	Mindful Living: Spirituality For Everyday Life	3
EDH 6905	Individual Work	1-3	MHS 6831	Supervised Split Internship	3-6
EDH 6931	Special Topics in Higher Education	1-3	MHS 6910	Supervised Research	1-5
			MHS 6940	Supervised Teaching	0-5
			MHS 6971	Research for Master's Thesis	1-15
			MHS 7407	Advanced Counseling Theories	3
			MHS 7431	Advanced Family Counseling	4
			MHS 7600	Consultation Procedures	3

MHS 7610	Counseling Supervision Theories and Practice	3
MHS 7730	Advanced Counseling Research	3
MHS 7740	Research in Counseling	3
MHS 7803	Advanced Counseling Practicum	3
MHS 7804	Group Supervision in Mental Health Counseling	3
MHS 7805	Practicum in Mental Health Counseling	3
MHS 7806	Practicum in Marriage and Family Counseling	3
MHS 7807	Group Supervision in Marriage and Family Counseling	3
MHS 7809	Counseling Supervision Practicum	3
MHS 7830	Internship in Counseling and Development-600 Hours	6
MHS 7840	Internship 1 in Counselor Education	3
MHS 7941	Internship 2 in Counselor Education	3
MHS 7946	Internship in Agency Program Management	6
MHS 7979	Advanced Research	1-12
MHS 7980	Research for Doctoral Dissertation	1-15
PCO 6939	Seminar: Current Topics in Counseling Psychology	3
PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7949	Internship in Counseling Psychology	1
SDS 6401	Counseling Skills for Non-Counselors	3
SDS 6411	Counseling with Children	3
SDS 6436	Family-School Intervention	3
SDS 6620	Organization and Administration of School Counseling Programs	3
SDS 6831	Supervision for a Split Internship	3
SDS 6905	Individual Work	1-4
SDS 6936	Seminar in Counselor Education	3
SDS 6938	Special Topics	1-4
SDS 7800	Practicum in School Counseling	3
SDS 7820	Group Supervision in School Counseling	3
SDS 7830	Internship in Counseling and Development-600 Hours	6

Student Learning Outcomes

Higher education administration (PHd)

SLO 1 Knowledge

* Identifies, describes, and explains the substantive body of literature related higher education and the national, state, regional, and institutional contexts in higher education * Describes and explains the institutional functioning of higher education institutions including issues related to leadership and governance, funding, the role of the government as well as issues pertaining to students, faculty, and administrators * Identifies and describes major global and national trends affecting higher education
* Identifies and describes the most conventional types of qualitative and quantitative research methodologies applied to the study of higher education

SLO 2 Skills

* Relate and apply major concepts and theories in the literature to specific higher education issues, cases, and settings * To develop skills of analysis, synthesis, research, and communication (verbal and written) concerning issues and topics related to higher education * To write academically according to APA style and to other audiences effectively

SLO 3 Professional Behavior

* Displays ethical behaviors consistent with professional standards related to research and publishing and practice demonstrated through cultural sensitivity, awareness, and empathy * Abides to expectations and norms of the discipline and profession

Higher education administration (Edd)

SLO 1 Knowledge

* Identifies, describes, and explains the substantive body of literature related to higher education and the national, state, regional, and institutional contexts in higher education * Describes and explains the institutional functioning of higher education institutions including issues related to leadership and governance, funding, the role of the government as well as issues pertaining to students, faculty, and administrators
* Identifies and describes the major global and national trends affecting higher education * Identifies and describes the most conventional types of qualitative and quantitative research methodologies applied to the study of higher education

SLO 2 Skills

* Relate and apply major concepts and theories in the literature to specific higher education issues, cases, and settings * To develop skills of analysis, synthesis, research, and communication (verbal and written) concerning issues and topics related to higher education * To write academically according to APA style and to other audiences effectively

SLO 3 Professional Behavior

* Displays ethical behaviors consistent with professional standards related to research and publishing and practice demonstrated through cultural sensitivity, awareness, and empathy Abides to expectations and norms of the discipline and profession

Marriage and Family Counseling

Program Information

The Marriage & Family Counseling/Therapy program is designed to equip students with the pre-professional competencies required for Registered Intern status and, after a minimum number of years of post-degree supervised clinical experience, for licensure in the State of Florida as Marriage and Family Counselors. The program emphasizes an eco-systemic approach to understanding human problems and generating solution opportunities to mutual concerns and problems.

Degrees Offered

Degrees Offered with a Major in Marriage and Family Counseling

- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6
EDA 6931	Special Topics	1-3
EDA 6948	Supervised Practice in School Administration	1-15
EDA 6971	Research for Master's Thesis	1-15
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3
EDA 7206	Organizational Leadership in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3
EDA 7945	Practicum in Supervision and Administration	1-15
EDA 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3
EDF 5441	Assessment in General and Exceptional Student Education	3
EDF 6113	Educational Psychology: Human Development	3
EDF 6211	Educational Psychology: General	3
EDF 6215	Educational Psychology: Learning Theory	3
EDF 6400	Quantitative Foundations of Education Research Overview	3
EDF 6401	Educational Statistics	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3
EDF 6436	Theory of Measurement	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3
EDF 6464	Reading and Designing Qualitative Research	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3
EDF 6471	Survey Design and Analysis in Educational Research	3
EDF 6475	Qualitative Foundations of Educational Research	3
EDF 6481	Quantitative Research Methods in Education	4
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3
EDF 6905	Individual Study	1-3
EDF 6910	Supervised Research	1-5
EDF 6938	Special Topics	1-3
EDF 6940	Supervised Teaching	1-5
EDF 6941	Practicum in Educational Research	2-9
EDF 6971	Research for Master's Thesis	1-15
EDF 6973	Project in Lieu of Thesis	1-6
EDF 7405	Advanced Quantitative Foundations of Educational Research	3
EDF 7412	Structural Equation Models	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3
EDF 7439	Item Response Theory	3
EDF 7453	Natural Language Processing in Education Research	3
EDF 7469	AI for Evaluation in Educational Environments	3
EDF 7474	Multilevel Models	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3
EDF 7486	Methods of Educational Research	3
EDF 7491	Evaluation of Educational Products and Systems	3
EDF 7911	Qualitative Research Writing and Representation in Education	3
EDF 7931	Seminar in Educational Research	3
EDF 7932	Multivariate Analysis in Educational Research	3
EDF 7979	Advanced Research	1-12
EDF 7980	Research for Doctoral Dissertation	1-15
EDG 6285	Evaluation in the School Program	3
EDH 6006	The College Student	3
EDH 6040	Theory of College Student Development	3
EDH 6046	Diversity Issues in Higher Education	3
EDH 6051	Educational Outcomes of American Colleges and Universities	3
EDH 6052	Inquiry in College and University Teaching	3
EDH 6053	The Community Junior College in America	3
EDH 6065	History of American Higher Education	3
EDH 6066	American Higher Education	3
EDH 6305	College and University Teaching	3

EDH 6306	Coaching Models for Student Success in Higher Education	3	MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3	MHS 6471	Sexuality and Mental Health	3
EDH 6364	Higher Education Environments	3	MHS 6480	Developmental Counseling Over the Life Span	3
EDH 6365	Academic and Student Affairs Collaborations	3	MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
EDH 6503	Resource Development in Higher Education	3	MHS 6500	Group Counseling: Theories and Procedures	3
EDH 6632	Current Issues in Community College Leadership	3	MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
EDH 6637	Crisis Management in Higher Education	3	MHS 6720	Professional Identity and Ethics in Counseling	3
EDH 6644	Assessment in Higher Education	3	MHS 6735	Applied Research in Counseling	3
EDH 6662	Contemporary Issues in Higher Education Leadership	3	MHS 6765	Mindful Living: Spirituality For Everyday Life	3
EDH 6664	Public Policy in Higher Education	3	MHS 6831	Supervised Split Internship	3-6
EDH 6665	Leadership and Supervision in Higher Education	3	MHS 6910	Supervised Research	1-5
EDH 6668	Change Leadership in Higher Education	3	MHS 6940	Supervised Teaching	0-5
EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3	MHS 6971	Research for Master's Thesis	1-15
EDH 6905	Individual Work	1-3	MHS 7407	Advanced Counseling Theories	3
EDH 6931	Special Topics in Higher Education	1-3	MHS 7431	Advanced Family Counseling	4
EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3	MHS 7600	Consultation Procedures	3
EDH 6947	Practicum in Student Personnel	3	MHS 7610	Counseling Supervision Theories and Practice	3
EDH 6973	Project in Lieu of Thesis	3	MHS 7730	Advanced Counseling Research	3
EDH 6981	Introduction to Problems of Practice Inquiry	3	MHS 7740	Research in Counseling	3
EDH 7050	Exploration of Research Literature in Higher Education	3	MHS 7803	Advanced Counseling Practicum	3
EDH 7225	Seminar: Curriculum in Higher Education	3	MHS 7804	Group Supervision in Mental Health Counseling	3
EDH 7405	The Law and Higher Education	3	MHS 7805	Practicum in Mental Health Counseling	3
EDH 7505	The Financing of Higher Education	3	MHS 7806	Practicum in Marriage and Family Counseling	3
EDH 7631	Administration of Instruction in Higher Education	3	MHS 7807	Group Supervision in Marriage and Family Counseling	3
EDH 7634	Student Affairs Administration in Higher Education	3	MHS 7809	Counseling Supervision Practicum	3
EDH 7635	Higher Education Administration	3	MHS 7830	Internship in Counseling and Development-600 Hours	6
EDH 7636	Organizational Theory in Higher Education	3	MHS 7840	Internship 1 in Counselor Education	3
EDH 7645	Data Management and Quantitative Workflow in Education Research	3	MHS 7941	Internship 2 in Counselor Education	3
EDH 7910	Higher Education Research Fieldwork	3	MHS 7946	Internship in Agency Program Management	6
EDH 7916	Contemporary Research on Higher Education	3	MHS 7979	Advanced Research	1-12
EDH 7934	Advanced Scholarly Writing for Publication	3	MHS 7980	Research for Doctoral Dissertation	1-15
EDH 7942	Supervised Practice in Student Personnel in Higher Education	1	PCO 6939	Seminar: Current Topics in Counseling Psychology	3
EDH 7948	Internship in Higher Education	3	PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
EDH 7979	Advanced Research	1-12	PCO 7949	Internship in Counseling Psychology	1
EDH 7980	Research for Doctoral Dissertation	1-15	SDS 6401	Counseling Skills for Non-Counselors	3
EDH 7982	Research Proposal Development in Higher Education	3	SDS 6411	Counseling with Children	3
MHS 5005	Introduction to Counseling	3	SDS 6436	Family-School Intervention	3
MHS 6020	Counseling in Community Settings	3	SDS 6620	Organization and Administration of School Counseling Programs	3
MHS 6061	Spiritual Issues in Multicultural Counseling	3	SDS 6831	Supervision for a Split Internship	3
MHS 6071	Diagnosis and Treatment of Mental Disorders	3	SDS 6905	Individual Work	1-4
MHS 6200	Assessment in Counseling	3	SDS 6936	Seminar in Counselor Education	3
MHS 6340	Career Development	3	SDS 6938	Special Topics	1-4
MHS 6401	Counseling Theories and Applications	3	SDS 7800	Practicum in School Counseling	3
MHS 6421	Play Counseling and Play Process with Children	3	SDS 7820	Group Supervision in School Counseling	3
MHS 6428	Multicultural Counseling	3	SDS 7830	Internship in Counseling and Development-600 Hours	6
MHS 6430	Introduction to Family Counseling	3	Student Learning Outcomes marriage & family therapy (eds)		
MHS 6440	Marriage and Couples Counseling	3			
MHS 6450	Substance Abuse Counseling	3	SLO 1	Knowledge	

Candidates will apply professional knowledge to address a wide variety of issues in the context of relationships and families.

SLO 2 Skills

Candidates will apply ethical and legal standards in marriage, couple, and family counseling and select models or techniques appropriate to couples' or families' presenting problems in a practical setting.

SLO 3 Professional Behavior

Candidates will demonstrate professional behavior in marriage and family counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Marriage & Family Therapy (MAE)

SLO 1 Knowledge

Candidates will apply professional knowledge to address a wide variety of issues in the context of relationships and families.

SLO 2 Skills

Candidates will engage in marriage and family counseling skills by applying ethical and legal standards in marriage, couple, and family counseling and to select models or techniques appropriate to couples' or families' presenting problems.

SLO 3 Professional Behavior

Candidates will engage in professional behavior in marriage and family counseling by: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Marriage & Family Therapy (MEd)

SLO 1 Knowledge

Candidates will apply professional knowledge to address a wide variety of issues in the context of relationships and families.

SLO 2 Skills

Candidates will engage in marriage and family counseling skills by applying ethical and legal standards in marriage, couple, and family counseling and to select models or techniques appropriate to couples' or families' presenting problems.

SLO 3 Professional Behavior

Candidates will engage in professional behavior in marriage and family counseling by: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Mental Health Counseling

Program Information

The M.Ed./Ed.S. and M.AE./Ed.S. program in Mental Health Counseling is designed to equip students with the pre-professional competencies required for Registered Intern status and, after a minimum number of years of post-degree supervised clinical experience,

1. licensure in the State of Florida as Mental Health Counselors and
2. clinical membership in NBCC's Academy of Certified Clinical Mental Health Counselors.

Additionally, some students elect the thesis option (M.A.E.) to complete their studies.

Degrees Offered

Degrees Offered with a Major in Mental Health Counseling

- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3

EDA 6905	Individual Work	1-6	EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3
EDA 6931	Special Topics	1-3	EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3
EDA 6948	Supervised Practice in School Administration	1-15	EDF 7483	Qualitative Data Collection: Approaches and Techniques	3
EDA 6971	Research for Master's Thesis	1-15	EDF 7486	Methods of Educational Research	3
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3	EDF 7491	Evaluation of Educational Products and Systems	3
EDA 7206	Organizational Leadership in Education	3	EDF 7911	Qualitative Research Writing and Representation in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3	EDF 7931	Seminar in Educational Research	3
EDA 7945	Practicum in Supervision and Administration	1-15	EDF 7932	Multivariate Analysis in Educational Research	3
EDA 7979	Advanced Research	1-12	EDF 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15	EDF 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3	EDG 6285	Evaluation in the School Program	3
EDF 5441	Assessment in General and Exceptional Student Education	3	EDH 6006	The College Student	3
EDF 6113	Educational Psychology: Human Development	3	EDH 6040	Theory of College Student Development	3
EDF 6211	Educational Psychology: General	3	EDH 6046	Diversity Issues in Higher Education	3
EDF 6215	Educational Psychology: Learning Theory	3	EDH 6051	Educational Outcomes of American Colleges and Universities	3
EDF 6400	Quantitative Foundations of Education Research Overview	3	EDH 6052	Inquiry in College and University Teaching	3
EDF 6401	Educational Statistics	3	EDH 6053	The Community Junior College in America	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3	EDH 6065	History of American Higher Education	3
EDF 6403	Quantitative Foundations of Educational Research	6	EDH 6066	American Higher Education	3
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3	EDH 6305	College and University Teaching	3
EDF 6436	Theory of Measurement	3	EDH 6306	Coaching Models for Student Success in Higher Education	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3	EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3
EDF 6464	Reading and Designing Qualitative Research	3	EDH 6364	Higher Education Environments	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3	EDH 6365	Academic and Student Affairs Collaborations	3
EDF 6471	Survey Design and Analysis in Educational Research	3	EDH 6503	Resource Development in Higher Education	3
EDF 6475	Qualitative Foundations of Educational Research	3	EDH 6632	Current Issues in Community College Leadership	3
EDF 6481	Quantitative Research Methods in Education	4	EDH 6637	Crisis Management in Higher Education	3
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3	EDH 6644	Assessment in Higher Education	3
EDF 6905	Individual Study	1-3	EDH 6662	Contemporary Issues in Higher Education Leadership	3
EDF 6910	Supervised Research	1-5	EDH 6664	Public Policy in Higher Education	3
EDF 6938	Special Topics	1-3	EDH 6665	Leadership and Supervision in Higher Education	3
EDF 6940	Supervised Teaching	1-5	EDH 6668	Change Leadership in Higher Education	3
EDF 6941	Practicum in Educational Research	2-9	EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3
EDF 6971	Research for Master's Thesis	1-15	EDH 6905	Individual Work	1-3
EDF 6973	Project in Lieu of Thesis	1-6	EDH 6931	Special Topics in Higher Education	1-3
EDF 7405	Advanced Quantitative Foundations of Educational Research	3	EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3
EDF 7412	Structural Equation Models	3	EDH 6947	Practicum in Student Personnel	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3	EDH 6973	Project in Lieu of Thesis	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3	EDH 6981	Introduction to Problems of Practice Inquiry	3
EDF 7439	Item Response Theory	3	EDH 7050	Exploration of Research Literature in Higher Education	3
EDF 7453	Natural Language Processing in Education Research	3	EDH 7225	Seminar: Curriculum in Higher Education	3
EDF 7469	AI for Evaluation in Educational Environments	3	EDH 7405	The Law and Higher Education	3
EDF 7474	Multilevel Models	3	EDH 7505	The Financing of Higher Education	3
			EDH 7631	Administration of Instruction in Higher Education	3
			EDH 7634	Student Affairs Administration in Higher Education	3

EDH 7635	Higher Education Administration	3	MHS 7941	Internship 2 in Counselor Education	3
EDH 7636	Organizational Theory in Higher Education	3	MHS 7946	Internship in Agency Program Management	6
EDH 7645	Data Management and Quantitative Workflow in Education Research	3	MHS 7979	Advanced Research	1-12
EDH 7910	Higher Education Research Fieldwork	3	MHS 7980	Research for Doctoral Dissertation	1-15
EDH 7916	Contemporary Research on Higher Education	3	PCO 6939	Seminar: Current Topics in Counseling Psychology	3
EDH 7934	Advanced Scholarly Writing for Publication	3	PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
EDH 7942	Supervised Practice in Student Personnel in Higher Education	1	PCO 7949	Internship in Counseling Psychology	1
EDH 7948	Internship in Higher Education	3	SDS 6401	Counseling Skills for Non-Counselors	3
EDH 7979	Advanced Research	1-12	SDS 6411	Counseling with Children	3
EDH 7980	Research for Doctoral Dissertation	1-15	SDS 6436	Family-School Intervention	3
EDH 7982	Research Proposal Development in Higher Education	3	SDS 6620	Organization and Administration of School Counseling Programs	3
MHS 5005	Introduction to Counseling	3	SDS 6831	Supervision for a Split Internship	3
MHS 6020	Counseling in Community Settings	3	SDS 6905	Individual Work	1-4
MHS 6061	Spiritual Issues in Multicultural Counseling	3	SDS 6936	Seminar in Counselor Education	3
MHS 6071	Diagnosis and Treatment of Mental Disorders	3	SDS 6938	Special Topics	1-4
MHS 6200	Assessment in Counseling	3	SDS 7800	Practicum in School Counseling	3
MHS 6340	Career Development	3	SDS 7820	Group Supervision in School Counseling	3
MHS 6401	Counseling Theories and Applications	3	SDS 7830	Internship in Counseling and Development-600 Hours	6
MHS 6421	Play Counseling and Play Process with Children	3			
MHS 6428	Multicultural Counseling	3			
MHS 6430	Introduction to Family Counseling	3			
MHS 6440	Marriage and Couples Counseling	3			
MHS 6450	Substance Abuse Counseling	3			
MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3			
MHS 6471	Sexuality and Mental Health	3			
MHS 6480	Developmental Counseling Over the Life Span	3			
MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3			
MHS 6500	Group Counseling: Theories and Procedures	3			
MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3			
MHS 6720	Professional Identity and Ethics in Counseling	3			
MHS 6735	Applied Research in Counseling	3			
MHS 6765	Mindful Living: Spirituality For Everyday Life	3			
MHS 6831	Supervised Split Internship	3-6			
MHS 6910	Supervised Research	1-5			
MHS 6940	Supervised Teaching	0-5			
MHS 6971	Research for Master's Thesis	1-15			
MHS 7407	Advanced Counseling Theories	3			
MHS 7431	Advanced Family Counseling	4			
MHS 7600	Consultation Procedures	3			
MHS 7610	Counseling Supervision Theories and Practice	3			
MHS 7730	Advanced Counseling Research	3			
MHS 7740	Research in Counseling	3			
MHS 7803	Advanced Counseling Practicum	3			
MHS 7804	Group Supervision in Mental Health Counseling	3			
MHS 7805	Practicum in Mental Health Counseling	3			
MHS 7806	Practicum in Marriage and Family Counseling	3			
MHS 7807	Group Supervision in Marriage and Family Counseling	3			
MHS 7809	Counseling Supervision Practicum	3			
MHS 7830	Internship in Counseling and Development-600 Hours	6			
MHS 7840	Internship 1 in Counselor Education	3			

Student Learning Outcomes

mental health counseling (eds)

SLO 1 Knowledge

Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the clinical mental health counseling context.

SLO 2 Skills

Candidates demonstrate proficiency in counseling skills by applying principles and practices of diagnosis, treatment, referral, and prevention of mental and emotional disorders to initiate, maintain, and terminate counseling. Candidates also apply multicultural competencies to clinical mental health counseling involving case conceptualization, diagnosis, treatment, referral, and prevention of mental and emotional disorders.

SLO 3 Professional Behavior

Candidates will demonstrate professional behavior in mental health counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling

Mental Health Counseling (MAE)

SLO 1 Knowledge

Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the clinical mental health counseling context.

SLO 2 Skills

Candidates demonstrate proficiency in counseling skills by applying principles and practices of diagnosis, treatment, referral, and prevention of mental and emotional disorders to initiate, maintain, and terminate counseling. Candidates also apply multicultural competencies to clinical

mental health counseling involving case conceptualization, diagnosis, treatment, referral, and prevention of mental and emotional disorders.

SLO 3 Professional Behavior Candidates will demonstrate professional behavior in mental health counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Mental Health Counseling (MEd)

SLO 1 Knowledge

Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the clinical mental health counseling context.

SLO 2 Skills

Candidates demonstrate proficiency in counseling skills by applying principles and practices of diagnosis, treatment, referral, and prevention of mental and emotional disorders to initiate, maintain, and terminate counseling. Candidates also apply multicultural competencies to clinical mental health counseling involving case conceptualization, diagnosis, treatment, referral, and prevention of mental and emotional disorders.

SLO 3 Professional Behavior

Candidates will demonstrate professional behavior in mental health counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Program Evaluation in Educational Environments

Program Information

The goal of the Program Evaluation in Educational Environments is to prepare exemplary educational evaluators, who are able to apply state-of-the-art evaluation theory and tools to develop, improve, and assess programs, organizations, and policies. The coursework and learning experiences offered by this major are designed to train and empower evaluators to provide evaluation support for organizations and institutions, as they seek solutions to critical problems at local, national, and global levels. Because evaluation activity crosses disciplines, the evaluator is able to provide a unique and informed perspective to guide social change and innovations. The actions and recommendations of a program evaluator often trigger and foster positive reform in policies and programs in government, schools, business, health, and social agencies both locally, nationally, and internationally.

- Learn to evaluate educational and other social science programs, interpret educational data, develop evaluation assessment instruments, and use research methodologies and evaluation theory to plan, conduct, and complete a program evaluation.
- Find jobs in federal and state agencies, institutions of higher education, school districts, and for-profit and non-profit organizations.

A number of program evaluators also choose to work as private consultants for school districts, government agencies, and private organizations.

- Complete a master's degree (M.A.E.) in two years with classes focusing on program evaluation theory and tools, research methodology, and statistics and psychometrics as applied to educational program evaluation.
- Our students come from a variety of backgrounds, including psychology; education; sociology; political science; anthropology; agricultural, family, youth, and community sciences; and health education and performance.

Degrees Offered

Degrees Offered with a Major in Program Evaluation in Educational Environments

- Master of Arts in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6
EDA 6931	Special Topics	1-3
EDA 6948	Supervised Practice in School Administration	1-15
EDA 6971	Research for Master's Thesis	1-15
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3

EDA 7206	Organizational Leadership in Education	3	EDF 7491	Evaluation of Educational Products and Systems	3
EDA 7236	Advanced School Law for Educational Leaders	3	EDF 7911	Qualitative Research Writing and Representation in Education	3
EDA 7945	Practicum in Supervision and Administration	1-15	EDF 7931	Seminar in Educational Research	3
EDA 7979	Advanced Research	1-12	EDF 7932	Multivariate Analysis in Educational Research	3
EDA 7980	Research for Doctoral Dissertation	1-15	EDF 7979	Advanced Research	1-12
EDA 7985	Research Design in Educational Administration	3	EDF 7980	Research for Doctoral Dissertation	1-15
EDF 5441	Assessment in General and Exceptional Student Education	3	EDG 6285	Evaluation in the School Program	3
EDF 6113	Educational Psychology: Human Development	3	EDH 6006	The College Student	3
EDF 6211	Educational Psychology: General	3	EDH 6040	Theory of College Student Development	3
EDF 6215	Educational Psychology: Learning Theory	3	EDH 6046	Diversity Issues in Higher Education	3
EDF 6400	Quantitative Foundations of Education Research Overview	3	EDH 6051	Educational Outcomes of American Colleges and Universities	3
EDF 6401	Educational Statistics	3	EDH 6052	Inquiry in College and University Teaching	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3	EDH 6053	The Community Junior College in America	3
EDF 6403	Quantitative Foundations of Educational Research	6	EDH 6065	History of American Higher Education	3
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3	EDH 6066	American Higher Education	3
EDF 6436	Theory of Measurement	3	EDH 6305	College and University Teaching	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3	EDH 6306	Coaching Models for Student Success in Higher Education	3
EDF 6464	Reading and Designing Qualitative Research	3	EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3	EDH 6364	Higher Education Environments	3
EDF 6471	Survey Design and Analysis in Educational Research	3	EDH 6365	Academic and Student Affairs Collaborations	3
EDF 6475	Qualitative Foundations of Educational Research	3	EDH 6503	Resource Development in Higher Education	3
EDF 6481	Quantitative Research Methods in Education	4	EDH 6632	Current Issues in Community College Leadership	3
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3	EDH 6637	Crisis Management in Higher Education	3
EDF 6905	Individual Study	1-3	EDH 6644	Assessment in Higher Education	3
EDF 6910	Supervised Research	1-5	EDH 6662	Contemporary Issues in Higher Education Leadership	3
EDF 6938	Special Topics	1-3	EDH 6664	Public Policy in Higher Education	3
EDF 6940	Supervised Teaching	1-5	EDH 6665	Leadership and Supervision in Higher Education	3
EDF 6941	Practicum in Educational Research	2-9	EDH 6668	Change Leadership in Higher Education	3
EDF 6971	Research for Master's Thesis	1-15	EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3
EDF 6973	Project in Lieu of Thesis	1-6	EDH 6905	Individual Work	1-3
EDF 7405	Advanced Quantitative Foundations of Educational Research	3	EDH 6931	Special Topics in Higher Education	1-3
EDF 7412	Structural Equation Models	3	EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3	EDH 6947	Practicum in Student Personnel	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3	EDH 6973	Project in Lieu of Thesis	3
EDF 7439	Item Response Theory	3	EDH 6981	Introduction to Problems of Practice Inquiry	3
EDF 7453	Natural Language Processing in Education Research	3	EDH 7050	Exploration of Research Literature in Higher Education	3
EDF 7469	AI for Evaluation in Educational Environments	3	EDH 7225	Seminar: Curriculum in Higher Education	3
EDF 7474	Multilevel Models	3	EDH 7405	The Law and Higher Education	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3	EDH 7505	The Financing of Higher Education	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3	EDH 7631	Administration of Instruction in Higher Education	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3	EDH 7634	Student Affairs Administration in Higher Education	3
EDF 7486	Methods of Educational Research	3	EDH 7635	Higher Education Administration	3
			EDH 7636	Organizational Theory in Higher Education	3
			EDH 7645	Data Management and Quantitative Workflow in Education Research	3
			EDH 7910	Higher Education Research Fieldwork	3
			EDH 7916	Contemporary Research on Higher Education	3
			EDH 7934	Advanced Scholarly Writing for Publication	3

EDH 7942	Supervised Practice in Student Personnel in Higher Education	1
EDH 7948	Internship in Higher Education	3
EDH 7979	Advanced Research	1-12
EDH 7980	Research for Doctoral Dissertation	1-15
EDH 7982	Research Proposal Development in Higher Education	3
MHS 5005	Introduction to Counseling	3
MHS 6020	Counseling in Community Settings	3
MHS 6061	Spiritual Issues in Multicultural Counseling	3
MHS 6071	Diagnosis and Treatment of Mental Disorders	3
MHS 6200	Assessment in Counseling	3
MHS 6340	Career Development	3
MHS 6401	Counseling Theories and Applications	3
MHS 6421	Play Counseling and Play Process with Children	3
MHS 6428	Multicultural Counseling	3
MHS 6430	Introduction to Family Counseling	3
MHS 6440	Marriage and Couples Counseling	3
MHS 6450	Substance Abuse Counseling	3
MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
MHS 6471	Sexuality and Mental Health	3
MHS 6480	Developmental Counseling Over the Life Span	3
MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
MHS 6500	Group Counseling: Theories and Procedures	3
MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
MHS 6720	Professional Identity and Ethics in Counseling	3
MHS 6735	Applied Research in Counseling	3
MHS 6765	Mindful Living: Spirituality For Everyday Life	3
MHS 6831	Supervised Split Internship	3-6
MHS 6910	Supervised Research	1-5
MHS 6940	Supervised Teaching	0-5
MHS 6971	Research for Master's Thesis	1-15
MHS 7407	Advanced Counseling Theories	3
MHS 7431	Advanced Family Counseling	4
MHS 7600	Consultation Procedures	3
MHS 7610	Counseling Supervision Theories and Practice	3
MHS 7730	Advanced Counseling Research	3
MHS 7740	Research in Counseling	3
MHS 7803	Advanced Counseling Practicum	3
MHS 7804	Group Supervision in Mental Health Counseling	3
MHS 7805	Practicum in Mental Health Counseling	3
MHS 7806	Practicum in Marriage and Family Counseling	3
MHS 7807	Group Supervision in Marriage and Family Counseling	3
MHS 7809	Counseling Supervision Practicum	3
MHS 7830	Internship in Counseling and Development-600 Hours	6
MHS 7840	Internship 1 in Counselor Education	3
MHS 7941	Internship 2 in Counselor Education	3
MHS 7946	Internship in Agency Program Management	6
MHS 7979	Advanced Research	1-12
MHS 7980	Research for Doctoral Dissertation	1-15
PCO 6939	Seminar: Current Topics in Counseling Psychology	3

PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7949	Internship in Counseling Psychology	1
SDS 6401	Counseling Skills for Non-Counselors	3
SDS 6411	Counseling with Children	3
SDS 6436	Family-School Intervention	3
SDS 6620	Organization and Administration of School Counseling Programs	3
SDS 6831	Supervision for a Split Internship	3
SDS 6905	Individual Work	1-4
SDS 6936	Seminar in Counselor Education	3
SDS 6938	Special Topics	1-4
SDS 7800	Practicum in School Counseling	3
SDS 7820	Group Supervision in School Counseling	3
SDS 7830	Internship in Counseling and Development-600 Hours	6

Research and Evaluation Methodology Program Information

The mission of the Research and Evaluation Methodology program is to generate, evaluate, apply and disseminate knowledge about educational research methodology, to prepare exemplary educational research methodologists, and to collaborate with others to provide methodology for the advancement of educational research. This mission aligns with College of Education's and University of Florida's missions because it results in research strategies for knowledge discovery to solve critical educational and human problems in a diverse global community.

- Learn to evaluate educational programs, analyze educational data, develop assessment instruments, and conduct research about the efficacy of research methodologies.
- Work as an educational researcher, an educational data analyst, or a psychometrician (an expert in testing and assessment).
- Find jobs in testing companies; research and evaluation companies; research centers; and assessment centers at universities, school districts, and state and federal agencies.
- Complete a master's degree (M.A.E. or M.Ed.) in two years or a Ph.D. in four years with classes focusing on research methodology, statistics applied to education, program evaluation, and psychometrics.
- We admit students with some undergraduate research experience. Our students come from a variety of backgrounds, including psychology, sociology, statistics, mathematics, mathematics education, political science, marketing, economics, and engineering.

Degrees Offered

Degrees Offered with a Major in Research and Evaluation Methodology

- Doctor of Education
- Doctor of Philosophy
- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Research and Evaluation Methodology Courses

Code	Title	Credits
EDF 5441	Assessment in General and Exceptional Student Education	3
EDF 6113	Educational Psychology: Human Development	3
EDF 6211	Educational Psychology: General	3
EDF 6215	Educational Psychology: Learning Theory	3
EDF 6400	Quantitative Foundations of Education Research Overview	3
EDF 6401	Educational Statistics	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6436	Theory of Measurement	3
EDF 6471	Survey Design and Analysis in Educational Research	3
EDF 6475	Qualitative Foundations of Educational Research	3
EDF 6481	Quantitative Research Methods in Education	4
EDF 6905	Individual Study	1-3
EDF 6910	Supervised Research	1-5
EDF 6938	Special Topics	1-3
EDF 6940	Supervised Teaching	1-5
EDF 6941	Practicum in Educational Research	2-9
EDF 6971	Research for Master's Thesis	1-15
EDF 7412	Structural Equation Models	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3
EDF 7439	Item Response Theory	3
EDF 7474	Multilevel Models	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3
EDF 7486	Methods of Educational Research	3
EDF 7491	Evaluation of Educational Products and Systems	3
EDF 7931	Seminar in Educational Research	3
EDF 7932	Multivariate Analysis in Educational Research	3
EDF 7979	Advanced Research	1-12
EDF 7980	Research for Doctoral Dissertation	1-15

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3

EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6
EDA 6931	Special Topics	1-3
EDA 6948	Supervised Practice in School Administration	1-15
EDA 6971	Research for Master's Thesis	1-15
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3
EDA 7206	Organizational Leadership in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3
EDA 7945	Practicum in Supervision and Administration	1-15
EDA 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3
EDF 5441	Assessment in General and Exceptional Student Education	3
EDF 6113	Educational Psychology: Human Development	3
EDF 6211	Educational Psychology: General	3
EDF 6215	Educational Psychology: Learning Theory	3
EDF 6400	Quantitative Foundations of Education Research Overview	3
EDF 6401	Educational Statistics	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3
EDF 6436	Theory of Measurement	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3
EDF 6464	Reading and Designing Qualitative Research	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3
EDF 6471	Survey Design and Analysis in Educational Research	3

EDF 6475	Qualitative Foundations of Educational Research	3	EDH 6662	Contemporary Issues in Higher Education Leadership	3
EDF 6481	Quantitative Research Methods in Education	4	EDH 6664	Public Policy in Higher Education	3
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3	EDH 6665	Leadership and Supervision in Higher Education	3
EDF 6905	Individual Study	1-3	EDH 6668	Change Leadership in Higher Education	3
EDF 6910	Supervised Research	1-5	EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3
EDF 6938	Special Topics	1-3	EDH 6905	Individual Work	1-3
EDF 6940	Supervised Teaching	1-5	EDH 6931	Special Topics in Higher Education	1-3
EDF 6941	Practicum in Educational Research	2-9	EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3
EDF 6971	Research for Master's Thesis	1-15	EDH 6947	Practicum in Student Personnel	3
EDF 6973	Project in Lieu of Thesis	1-6	EDH 6973	Project in Lieu of Thesis	3
EDF 7405	Advanced Quantitative Foundations of Educational Research	3	EDH 6981	Introduction to Problems of Practice Inquiry	3
EDF 7412	Structural Equation Models	3	EDH 7050	Exploration of Research Literature in Higher Education	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3	EDH 7225	Seminar: Curriculum in Higher Education	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3	EDH 7405	The Law and Higher Education	3
EDF 7439	Item Response Theory	3	EDH 7505	The Financing of Higher Education	3
EDF 7453	Natural Language Processing in Education Research	3	EDH 7631	Administration of Instruction in Higher Education	3
EDF 7469	AI for Evaluation in Educational Environments	3	EDH 7634	Student Affairs Administration in Higher Education	3
EDF 7474	Multilevel Models	3	EDH 7635	Higher Education Administration	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3	EDH 7636	Organizational Theory in Higher Education	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3	EDH 7645	Data Management and Quantitative Workflow in Education Research	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3	EDH 7910	Higher Education Research Fieldwork	3
EDF 7486	Methods of Educational Research	3	EDH 7916	Contemporary Research on Higher Education	3
EDF 7491	Evaluation of Educational Products and Systems	3	EDH 7934	Advanced Scholarly Writing for Publication	3
EDF 7911	Qualitative Research Writing and Representation in Education	3	EDH 7942	Supervised Practice in Student Personnel in Higher Education	1
EDF 7931	Seminar in Educational Research	3	EDH 7948	Internship in Higher Education	3
EDF 7932	Multivariate Analysis in Educational Research	3	EDH 7979	Advanced Research	1-12
EDF 7979	Advanced Research	1-12	EDH 7980	Research for Doctoral Dissertation	1-15
EDF 7980	Research for Doctoral Dissertation	1-15	EDH 7982	Research Proposal Development in Higher Education	3
EDG 6285	Evaluation in the School Program	3	MHS 5005	Introduction to Counseling	3
EDH 6006	The College Student	3	MHS 6020	Counseling in Community Settings	3
EDH 6040	Theory of College Student Development	3	MHS 6061	Spiritual Issues in Multicultural Counseling	3
EDH 6046	Diversity Issues in Higher Education	3	MHS 6071	Diagnosis and Treatment of Mental Disorders	3
EDH 6051	Educational Outcomes of American Colleges and Universities	3	MHS 6200	Assessment in Counseling	3
EDH 6052	Inquiry in College and University Teaching	3	MHS 6340	Career Development	3
EDH 6053	The Community Junior College in America	3	MHS 6401	Counseling Theories and Applications	3
EDH 6065	History of American Higher Education	3	MHS 6421	Play Counseling and Play Process with Children	3
EDH 6066	American Higher Education	3	MHS 6428	Multicultural Counseling	3
EDH 6305	College and University Teaching	3	MHS 6430	Introduction to Family Counseling	3
EDH 6306	Coaching Models for Student Success in Higher Education	3	MHS 6440	Marriage and Couples Counseling	3
EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3	MHS 6450	Substance Abuse Counseling	3
EDH 6364	Higher Education Environments	3	MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
EDH 6365	Academic and Student Affairs Collaborations	3	MHS 6471	Sexuality and Mental Health	3
EDH 6503	Resource Development in Higher Education	3	MHS 6480	Developmental Counseling Over the Life Span	3
EDH 6632	Current Issues in Community College Leadership	3	MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
EDH 6637	Crisis Management in Higher Education	3	MHS 6500	Group Counseling: Theories and Procedures	3
EDH 6644	Assessment in Higher Education	3	MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
			MHS 6720	Professional Identity and Ethics in Counseling	3

MHS 6735	Applied Research in Counseling	3
MHS 6765	Mindful Living: Spirituality For Everyday Life	3
MHS 6831	Supervised Split Internship	3-6
MHS 6910	Supervised Research	1-5
MHS 6940	Supervised Teaching	0-5
MHS 6971	Research for Master's Thesis	1-15
MHS 7407	Advanced Counseling Theories	3
MHS 7431	Advanced Family Counseling	4
MHS 7600	Consultation Procedures	3
MHS 7610	Counseling Supervision Theories and Practice	3
MHS 7730	Advanced Counseling Research	3
MHS 7740	Research in Counseling	3
MHS 7803	Advanced Counseling Practicum	3
MHS 7804	Group Supervision in Mental Health Counseling	3
MHS 7805	Practicum in Mental Health Counseling	3
MHS 7806	Practicum in Marriage and Family Counseling	3
MHS 7807	Group Supervision in Marriage and Family Counseling	3
MHS 7809	Counseling Supervision Practicum	3
MHS 7830	Internship in Counseling and Development-600 Hours	6
MHS 7840	Internship 1 in Counselor Education	3
MHS 7941	Internship 2 in Counselor Education	3
MHS 7946	Internship in Agency Program Management	6
MHS 7979	Advanced Research	1-12
MHS 7980	Research for Doctoral Dissertation	1-15
PCO 6939	Seminar: Current Topics in Counseling Psychology	3
PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7949	Internship in Counseling Psychology	1
SDS 6401	Counseling Skills for Non-Counselors	3
SDS 6411	Counseling with Children	3
SDS 6436	Family-School Intervention	3
SDS 6620	Organization and Administration of School Counseling Programs	3
SDS 6831	Supervision for a Split Internship	3
SDS 6905	Individual Work	1-4
SDS 6936	Seminar in Counselor Education	3
SDS 6938	Special Topics	1-4
SDS 7800	Practicum in School Counseling	3
SDS 7820	Group Supervision in School Counseling	3
SDS 7830	Internship in Counseling and Development-600 Hours	6

Majors will participate in professional organizations, research presentations, or scholarly publications.

research & evaluation methodology (edd)

SLO 1 Knowledge

Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2 Skills

Majors will formulate hypotheses, plan and design educational research studies, plan and design methodological research studies, analyze data, and report results at an advanced level.

SLO 3 Professional Behavior

Majors will participate in professional organizations, research presentations, or scholarly publications.

Research & Evaluation Methodology (MAE)

SLO 1 Knowledge

Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2 Skills

Majors will formulate hypotheses, planning and designing educational research studies, planning and designing methodological research studies, analyzing data, and reporting results.

SLO 3 Professional Behavior

Majors will present concepts in research methodology both orally and in writing.

Research & Evaluation Methodology (MEd)

SLO 1 Knowledge

Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2 Skills

Majors will formulate hypotheses, planning and designing educational research studies, analyzing data, and reporting results.

SLO 3 Professional Behavior

Majors will present concepts in research methodology both orally and in writing.

School Counseling and Guidance Program Information

The M.Ed./Ed.S. and M.AE./Ed.S. program in School Counseling is designed to equip students with the pre-professional competencies required for Florida Department of Education Certification in School Counseling. The 72-credit hour program provides students with the specialized knowledge and skills required for placements as school counselors in public or private elementary, middle, or secondary schools.

Student Learning Outcomes

Research & evaluation methodology (Phd)

SLO 1 Knowledge

Majors will identify, define, explain, and describe the concepts, methods and issues in educational measurement and assessment, evaluation, and research methodology.

SLO 2 Skills

Majors will formulate hypotheses, plan and design educational research studies, plan and design methodological research studies, analyze data, and report results at an advanced level.

SLO 3 Professional Behavior

Students enrolled in the School Counseling program, a state-approved and CAEP (Council for the Accreditation of Educator Preparation) and CACREP (Council for the Accreditation of Counseling and Related Educational Programs) accredited school counselor preparation program, must provide passing scores for all pertinent sections of the Florida Teacher Certification Examination (FTCE) including the General Knowledge test (math, English language skills, reading comprehension, and essay), the Professional Education examination, and the Subject Area Examination in Guidance and Counseling K-12 prior to graduation from the program. Questions about this requirement or any other certification related questions may be addressed to the College of Education Office of Student Services.

Degrees Offered

Degrees Offered with a Major in School Counseling and Guidance

- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6
EDA 6931	Special Topics	1-3
EDA 6948	Supervised Practice in School Administration	1-15

EDA 6971	Research for Master's Thesis	1-15
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3
EDA 7206	Organizational Leadership in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3
EDA 7945	Practicum in Supervision and Administration	1-15
EDA 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3
EDF 5441	Assessment in General and Exceptional Student Education	3
EDF 6113	Educational Psychology: Human Development	3
EDF 6211	Educational Psychology: General	3
EDF 6215	Educational Psychology: Learning Theory	3
EDF 6400	Quantitative Foundations of Education Research Overview	3
EDF 6401	Educational Statistics	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3
EDF 6436	Theory of Measurement	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3
EDF 6464	Reading and Designing Qualitative Research	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3
EDF 6471	Survey Design and Analysis in Educational Research	3
EDF 6475	Qualitative Foundations of Educational Research	3
EDF 6481	Quantitative Research Methods in Education	4
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3
EDF 6905	Individual Study	1-3
EDF 6910	Supervised Research	1-5
EDF 6938	Special Topics	1-3
EDF 6940	Supervised Teaching	1-5
EDF 6941	Practicum in Educational Research	2-9
EDF 6971	Research for Master's Thesis	1-15
EDF 6973	Project in Lieu of Thesis	1-6
EDF 7405	Advanced Quantitative Foundations of Educational Research	3
EDF 7412	Structural Equation Models	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3
EDF 7439	Item Response Theory	3
EDF 7453	Natural Language Processing in Education Research	3
EDF 7469	AI for Evaluation in Educational Environments	3
EDF 7474	Multilevel Models	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3

EDF 7483	Qualitative Data Collection: Approaches and Techniques	3	EDH 7910	Higher Education Research Fieldwork	3
EDF 7486	Methods of Educational Research	3	EDH 7916	Contemporary Research on Higher Education	3
EDF 7491	Evaluation of Educational Products and Systems	3	EDH 7934	Advanced Scholarly Writing for Publication	3
EDF 7911	Qualitative Research Writing and Representation in Education	3	EDH 7942	Supervised Practice in Student Personnel in Higher Education	1
EDF 7931	Seminar in Educational Research	3	EDH 7948	Internship in Higher Education	3
EDF 7932	Multivariate Analysis in Educational Research	3	EDH 7979	Advanced Research	1-12
EDF 7979	Advanced Research	1-12	EDH 7980	Research for Doctoral Dissertation	1-15
EDF 7980	Research for Doctoral Dissertation	1-15	EDH 7982	Research Proposal Development in Higher Education	3
EDG 6285	Evaluation in the School Program	3	MHS 5005	Introduction to Counseling	3
EDH 6006	The College Student	3	MHS 6020	Counseling in Community Settings	3
EDH 6040	Theory of College Student Development	3	MHS 6061	Spiritual Issues in Multicultural Counseling	3
EDH 6046	Diversity Issues in Higher Education	3	MHS 6071	Diagnosis and Treatment of Mental Disorders	3
EDH 6051	Educational Outcomes of American Colleges and Universities	3	MHS 6200	Assessment in Counseling	3
EDH 6052	Inquiry in College and University Teaching	3	MHS 6340	Career Development	3
EDH 6053	The Community Junior College in America	3	MHS 6401	Counseling Theories and Applications	3
EDH 6065	History of American Higher Education	3	MHS 6421	Play Counseling and Play Process with Children	3
EDH 6066	American Higher Education	3	MHS 6428	Multicultural Counseling	3
EDH 6305	College and University Teaching	3	MHS 6430	Introduction to Family Counseling	3
EDH 6306	Coaching Models for Student Success in Higher Education	3	MHS 6440	Marriage and Couples Counseling	3
EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3	MHS 6450	Substance Abuse Counseling	3
EDH 6364	Higher Education Environments	3	MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
EDH 6365	Academic and Student Affairs Collaborations	3	MHS 6471	Sexuality and Mental Health	3
EDH 6503	Resource Development in Higher Education	3	MHS 6480	Developmental Counseling Over the Life Span	3
EDH 6632	Current Issues in Community College Leadership	3	MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
EDH 6637	Crisis Management in Higher Education	3	MHS 6500	Group Counseling: Theories and Procedures	3
EDH 6644	Assessment in Higher Education	3	MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
EDH 6662	Contemporary Issues in Higher Education Leadership	3	MHS 6720	Professional Identity and Ethics in Counseling	3
EDH 6664	Public Policy in Higher Education	3	MHS 6735	Applied Research in Counseling	3
EDH 6665	Leadership and Supervision in Higher Education	3	MHS 6765	Mindful Living: Spirituality For Everyday Life	3
EDH 6668	Change Leadership in Higher Education	3	MHS 6831	Supervised Split Internship	3-6
EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3	MHS 6910	Supervised Research	1-5
EDH 6905	Individual Work	1-3	MHS 6940	Supervised Teaching	0-5
EDH 6931	Special Topics in Higher Education	1-3	MHS 6971	Research for Master's Thesis	1-15
EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3	MHS 7407	Advanced Counseling Theories	3
EDH 6947	Practicum in Student Personnel	3	MHS 7431	Advanced Family Counseling	4
EDH 6973	Project in Lieu of Thesis	3	MHS 7600	Consultation Procedures	3
EDH 6981	Introduction to Problems of Practice Inquiry	3	MHS 7610	Counseling Supervision Theories and Practice	3
EDH 7050	Exploration of Research Literature in Higher Education	3	MHS 7730	Advanced Counseling Research	3
EDH 7225	Seminar: Curriculum in Higher Education	3	MHS 7740	Research in Counseling	3
EDH 7405	The Law and Higher Education	3	MHS 7803	Advanced Counseling Practicum	3
EDH 7505	The Financing of Higher Education	3	MHS 7804	Group Supervision in Mental Health Counseling	3
EDH 7631	Administration of Instruction in Higher Education	3	MHS 7805	Practicum in Mental Health Counseling	3
EDH 7634	Student Affairs Administration in Higher Education	3	MHS 7806	Practicum in Marriage and Family Counseling	3
EDH 7635	Higher Education Administration	3	MHS 7807	Group Supervision in Marriage and Family Counseling	3
EDH 7636	Organizational Theory in Higher Education	3	MHS 7809	Counseling Supervision Practicum	3
EDH 7645	Data Management and Quantitative Workflow in Education Research	3	MHS 7830	Internship in Counseling and Development-600 Hours	6
			MHS 7840	Internship 1 in Counselor Education	3
			MHS 7941	Internship 2 in Counselor Education	3
			MHS 7946	Internship in Agency Program Management	6
			MHS 7979	Advanced Research	1-12
			MHS 7980	Research for Doctoral Dissertation	1-15

PCO 6939	Seminar: Current Topics in Counseling Psychology	3
PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7949	Internship in Counseling Psychology	1
SDS 6401	Counseling Skills for Non-Counselors	3
SDS 6411	Counseling with Children	3
SDS 6436	Family-School Intervention	3
SDS 6620	Organization and Administration of School Counseling Programs	3
SDS 6831	Supervision for a Split Internship	3
SDS 6905	Individual Work	1-4
SDS 6936	Seminar in Counselor Education	3
SDS 6938	Special Topics	1-4
SDS 7800	Practicum in School Counseling	3
SDS 7820	Group Supervision in School Counseling	3
SDS 7830	Internship in Counseling and Development-600 Hours	6

Student Learning Outcomes

School counseling & guidance

SLO 1 Knowledge

Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2 Skills

Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

SLO 3 Professional Behavior

Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

School Counseling & Guidance (EdS)

SLO 1 Knowledge

Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2 Skills

Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

SLO 3 Professional Behavior

Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and

credentialing bodies, and applications of ethical and legal considerations in professional counseling.

School Counseling & Guidance (MAE)

SLO 1 Knowledge

Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2 Skills

Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

SLO 3 Professional Behavior

Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

School Counseling & Guidance (MEd)

SLO 1 Knowledge

Candidates will identify, explain, and defend professional knowledge to address a wide variety of circumstances within the school counseling field.

SLO 2 Skills

Candidates demonstrate proficiency in school counseling skills by demonstrating the ability to apply and adhere to ethical and legal standards in school counseling and the ability to articulate, model, and advocate for an appropriate school counselor identity and program.

SLO 3 Professional Behavior

Candidates will demonstrate professional behavior in school counseling by engaging in: (a) professional organizations, including membership benefits, activities, services to members, and current issues; (b) professional credentialing, including certification, licensure, and accreditation practices and standards, and the effects of public policy on these issues; (c) ethical standards of professional organizations and credentialing bodies, and applications of ethical and legal considerations in professional counseling.

Student Personnel in Higher Education

Program Information

The University of Florida Student Personnel in Higher Education program is a master's program designed to prepare students to enter Student Affairs leadership positions in two- and four-year institutions of higher education. The program integrates academic coursework with practitioner-based experience. The SPHE master's degree consists of 36 credit hours of core classes and 10 credit hours of supervised practicum and internship experiences (total = 46 credit hours). Students enter the graduate program in the fall semester as members of a cohort group. The group provides support and builds a sense of community for the

students. All students are assigned a faculty advisor at the time of admission.

The student affairs profession is increasingly diverse and is engaged in a variety of activities and programs. The emphasis in UF's master's degree program in SPHE is upon the promotion, design, and assessment of student learning in a variety of campus and community settings.

Degrees Offered

Degrees Offered with a Major in Student Personnel in Higher Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Human Development and Organizational Studies in Education Departmental Courses

Code	Title	Credits
EDA 6061	Educational Organization and Administration	3
EDA 6067	Education Policy in a Democratic Society	3
EDA 6069	Educational Policy Analysis	3
EDA 6107	Leading Change in Educational Organizations	3
EDA 6192	Educational Leadership: The Individual	3
EDA 6193	Educational Leadership: Instruction	3
EDA 6195	Educational Policy Development	3
EDA 6197	Contemporary Issues in Educational Leadership	3
EDA 6198	Communicating through Scholarly Writing in Educational Leadership	3
EDA 6215	Communications in Educational Leadership	3
EDA 6222	Administration of School Personnel	3
EDA 6232	Public School Law	3
EDA 6242	Public School Finance	3
EDA 6271	Technology Leadership for Educational Administrators	3
EDA 6326	Turnaround Schools	3
EDA 6370	Mentoring for Career Development	3
EDA 6423	Data-Driven Decision Making in Educational Organizations	3
EDA 6427	Applied Education Policy Research	3
EDA 6428	Legal Methods and Research in Education	3
EDA 6429	Literature Review in Educational Leadership and Policy	3
EDA 6503	The Principalship	3
EDA 6509	The Superintendent	3
EDA 6905	Individual Work	1-6
EDA 6931	Special Topics	1-3
EDA 6948	Supervised Practice in School Administration	1-15
EDA 6971	Research for Master's Thesis	1-15
EDA 6981	Research Proposal Development in Educational Leadership and Policy	3
EDA 7206	Organizational Leadership in Education	3
EDA 7236	Advanced School Law for Educational Leaders	3

EDA 7945	Practicum in Supervision and Administration	1-15
EDA 7979	Advanced Research	1-12
EDA 7980	Research for Doctoral Dissertation	1-15
EDA 7985	Research Design in Educational Administration	3
EDF 5441	Assessment in General and Exceptional Student Education	3
EDF 6113	Educational Psychology: Human Development	3
EDF 6211	Educational Psychology: General	3
EDF 6215	Educational Psychology: Learning Theory	3
EDF 6400	Quantitative Foundations of Education Research Overview	3
EDF 6401	Educational Statistics	3
EDF 6402	Quantitative Foundations in Educational Research: Inferential Statistics	3
EDF 6403	Quantitative Foundations of Educational Research	6
EDF 6416	Quantitative Methods for Evaluation in Educational Environments	3
EDF 6436	Theory of Measurement	3
EDF 6463	Culturally Responsive Evaluation in Educational Environments	3
EDF 6464	Reading and Designing Qualitative Research	3
EDF 6468	Evaluation Management for Grants in Educational Environments	3
EDF 6471	Survey Design and Analysis in Educational Research	3
EDF 6475	Qualitative Foundations of Educational Research	3
EDF 6481	Quantitative Research Methods in Education	4
EDF 6492	Evaluation Communication and Ethics in the Educational Environment	3
EDF 6905	Individual Study	1-3
EDF 6910	Supervised Research	1-5
EDF 6938	Special Topics	1-3
EDF 6940	Supervised Teaching	1-5
EDF 6941	Practicum in Educational Research	2-9
EDF 6971	Research for Master's Thesis	1-15
EDF 6973	Project in Lieu of Thesis	1-6
EDF 7405	Advanced Quantitative Foundations of Educational Research	3
EDF 7412	Structural Equation Models	3
EDF 7413	Advanced Topics in Structural Equation Modeling	3
EDF 7435	Rating Scale Design and Analysis in Educational Research	3
EDF 7439	Item Response Theory	3
EDF 7453	Natural Language Processing in Education Research	3
EDF 7469	AI for Evaluation in Educational Environments	3
EDF 7474	Multilevel Models	3
EDF 7479	Qualitative Data Analysis: Approaches and Techniques	3
EDF 7482	Quasi-experimental Design and Analysis in Educational Research	3
EDF 7483	Qualitative Data Collection: Approaches and Techniques	3
EDF 7486	Methods of Educational Research	3
EDF 7491	Evaluation of Educational Products and Systems	3

EDF 7911	Qualitative Research Writing and Representation in Education	3	EDH 7948	Internship in Higher Education	3
EDF 7931	Seminar in Educational Research	3	EDH 7979	Advanced Research	1-12
EDF 7932	Multivariate Analysis in Educational Research	3	EDH 7980	Research for Doctoral Dissertation	1-15
EDF 7979	Advanced Research	1-12	EDH 7982	Research Proposal Development in Higher Education	3
EDF 7980	Research for Doctoral Dissertation	1-15	MHS 5005	Introduction to Counseling	3
EDG 6285	Evaluation in the School Program	3	MHS 6020	Counseling in Community Settings	3
EDH 6006	The College Student	3	MHS 6061	Spiritual Issues in Multicultural Counseling	3
EDH 6040	Theory of College Student Development	3	MHS 6071	Diagnosis and Treatment of Mental Disorders	3
EDH 6046	Diversity Issues in Higher Education	3	MHS 6200	Assessment in Counseling	3
EDH 6051	Educational Outcomes of American Colleges and Universities	3	MHS 6340	Career Development	3
EDH 6052	Inquiry in College and University Teaching	3	MHS 6401	Counseling Theories and Applications	3
EDH 6053	The Community Junior College in America	3	MHS 6421	Play Counseling and Play Process with Children	3
EDH 6065	History of American Higher Education	3	MHS 6428	Multicultural Counseling	3
EDH 6066	American Higher Education	3	MHS 6430	Introduction to Family Counseling	3
EDH 6305	College and University Teaching	3	MHS 6440	Marriage and Couples Counseling	3
EDH 6306	Coaching Models for Student Success in Higher Education	3	MHS 6450	Substance Abuse Counseling	3
EDH 6360	Foundations and Functions of Higher Education and Student Affairs	3	MHS 6466	Trauma and Crisis Intervention: Theory and Practice	3
EDH 6364	Higher Education Environments	3	MHS 6471	Sexuality and Mental Health	3
EDH 6365	Academic and Student Affairs Collaborations	3	MHS 6480	Developmental Counseling Over the Life Span	3
EDH 6503	Resource Development in Higher Education	3	MHS 6495	Counseling Lesbian, Gay, Bisexual, and Transgender Clients	3
EDH 6632	Current Issues in Community College Leadership	3	MHS 6500	Group Counseling: Theories and Procedures	3
EDH 6637	Crisis Management in Higher Education	3	MHS 6705	Professional, Ethical, and Legal Issues in Marriage and Family Counseling	3
EDH 6644	Assessment in Higher Education	3	MHS 6720	Professional Identity and Ethics in Counseling	3
EDH 6662	Contemporary Issues in Higher Education Leadership	3	MHS 6735	Applied Research in Counseling	3
EDH 6664	Public Policy in Higher Education	3	MHS 6765	Mindful Living: Spirituality For Everyday Life	3
EDH 6665	Leadership and Supervision in Higher Education	3	MHS 6831	Supervised Split Internship	3-6
EDH 6668	Change Leadership in Higher Education	3	MHS 6910	Supervised Research	1-5
EDH 6669	The College Experience: Higher Education in Media and Pop Culture	3	MHS 6940	Supervised Teaching	0-5
EDH 6905	Individual Work	1-3	MHS 6971	Research for Master's Thesis	1-15
EDH 6931	Special Topics in Higher Education	1-3	MHS 7407	Advanced Counseling Theories	3
EDH 6935	Capstone Seminar in Student Personnel in Higher Education	3	MHS 7431	Advanced Family Counseling	4
EDH 6947	Practicum in Student Personnel	3	MHS 7600	Consultation Procedures	3
EDH 6973	Project in Lieu of Thesis	3	MHS 7610	Counseling Supervision Theories and Practice	3
EDH 6981	Introduction to Problems of Practice Inquiry	3	MHS 7730	Advanced Counseling Research	3
EDH 7050	Exploration of Research Literature in Higher Education	3	MHS 7740	Research in Counseling	3
EDH 7225	Seminar: Curriculum in Higher Education	3	MHS 7803	Advanced Counseling Practicum	3
EDH 7405	The Law and Higher Education	3	MHS 7804	Group Supervision in Mental Health Counseling	3
EDH 7505	The Financing of Higher Education	3	MHS 7805	Practicum in Mental Health Counseling	3
EDH 7631	Administration of Instruction in Higher Education	3	MHS 7806	Practicum in Marriage and Family Counseling	3
EDH 7634	Student Affairs Administration in Higher Education	3	MHS 7807	Group Supervision in Marriage and Family Counseling	3
EDH 7635	Higher Education Administration	3	MHS 7809	Counseling Supervision Practicum	3
EDH 7636	Organizational Theory in Higher Education	3	MHS 7830	Internship in Counseling and Development-600 Hours	6
EDH 7645	Data Management and Quantitative Workflow in Education Research	3	MHS 7840	Internship 1 in Counselor Education	3
EDH 7910	Higher Education Research Fieldwork	3	MHS 7941	Internship 2 in Counselor Education	3
EDH 7916	Contemporary Research on Higher Education	3	MHS 7946	Internship in Agency Program Management	6
EDH 7934	Advanced Scholarly Writing for Publication	3	MHS 7979	Advanced Research	1-12
EDH 7942	Supervised Practice in Student Personnel in Higher Education	1	MHS 7980	Research for Doctoral Dissertation	1-15
			PCO 6939	Seminar: Current Topics in Counseling Psychology	3
			PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
			PCO 7949	Internship in Counseling Psychology	1

SDS 6401	Counseling Skills for Non-Counselors	3
SDS 6411	Counseling with Children	3
SDS 6436	Family-School Intervention	3
SDS 6620	Organization and Administration of School Counseling Programs	3
SDS 6831	Supervision for a Split Internship	3
SDS 6905	Individual Work	1-4
SDS 6936	Seminar in Counselor Education	3
SDS 6938	Special Topics	1-4
SDS 7800	Practicum in School Counseling	3
SDS 7820	Group Supervision in School Counseling	3
SDS 7830	Internship in Counseling and Development-600 Hours	6

Student Learning Outcomes

SLO1 Knowledge

Students will apply student affairs functioning constructs which include, but are not limited to, issues related to leadership and governance, technology, curricular and co-curricular partnerships, as well as issues pertaining to students, faculty, and administrators.

SLO2 Skills

Students will exhibit professional skills and competencies expected of student affairs professionals to be competitive for employment in student affairs positions.

SLO3 Professional Behavior

Students will develop presentation skills to effectively communicate and articulate student affairs related concepts and ideas.

School of Teaching and Learning

Director: A. Adams

Graduate Coordinator: K. Dawson

The School of Teaching and Learning (<http://education.ufl.edu/school-teaching-learning/>) offers face-to-face and online programs leading to the Master of Education (M.Ed., non-thesis), Master of Arts in Education (M.A.E., thesis or project in lieu of thesis), Specialist in Education (Ed.S.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.) degrees. Descriptions of the programs are linked below, and official requirements for these degrees are provided in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

Students pursuing the Ph.D. degree in Curriculum & Instruction gain research and teaching experience in one of eight areas of specialization:

- Educational Technology
- English Education
- ESOL/Bilingual Education
- Language Arts, Reading, & Children's Literature (LARC)
- Mathematics Education
- Science Education
- Social Studies Education
- Teachers, Schools, and Society (TSS)

Various forms of financial support are available to Ph.D. students through fellowships, scholarships, research assistantships, and teaching assistantships.

The Ed.D. degree is a professional practice doctorate with three specialization areas for students to pursue online: Teachers, Schools, and Society (TSS), Computer Science Education, and Educational Technology.

The School of Teaching and Learning also offers graduate programs and specializations at the M.Ed., M.A.E, and Ed.S. degrees for students seeking to deepen their knowledge and advance within their professions. These include Educational Technology, English Education, ESOL/ bilingual Education, Language Arts, Reading & Children's Literature (LARC), Literacy & the Arts, Mathematics Education, Media Literacy Education, Reading Education, Science Education, Social Foundations of Education, Social Studies Education and Teacher Leadership for School Improvement (TLSI).

Majors

- Anatomical Sciences Education (p. 146)
- Curriculum and Instruction (Ed.D.) (p. 146)
- Curriculum and Instruction (ISC) (p. 150)
- Elementary Education (p. 155)
- English Education (p. 159)
- Mathematics Education (p. 162)
- Reading Education (p. 166)
- Science Education (p. 170)
- Social Studies Education (p. 174)

Faculty

Professor

- Adams, Thomasenia L.
- Antonenko, Pavlo
- Crippen, Kent J.
- Dana, Nancy L.
- Dana, Thomas M.
- Dawson, Kara Mariehopkins
- Fang, Zhihui
- Ritzhaupt, Albert D.
- Terzian, Sevan G.
- Washington, Elizabeth Anne

Associate Professor

- Brown, Julie Catherine
- Coleman King, Chonika Ceptember
- Israel, Maya
- Kohnen, Angela Marie
- Smith, Sara Ashley
- Xing, Wanli

Assistant Professor

- Botelho, Anthony
- Closser, Avery Harrison
- Dever, Daryn
- Moore, Robert Lamont
- Nash, Brady Lee
- Newbutt, Nigel Arthur

- Pacheco, Mark B.
- Rahimi, Seyedahmad

Clinical Assistant Professor

- Beckett, Blake Mickle
- Bivens, Briana M.
- Huang, Rui
- Lazarevic, Bojan
- Olesova, Larisa A.

Clinical Associate Professor

- Hambacher, Elyse Lee
- Soto, Melissa Marie

Clinical Professor

- Adams, Alyson Joyce
- Kumar, Swapna

Affiliated Faculty

- Black, Erik Wade
Master Lecturer
- Brown, Taryn T C
Assistant Professor
- Vescio, Vicki Ann
Clinical Associate Professor
- Vetere-Earley, Timothy Matthew
Clinical Assistant Professor

Anatomical Sciences Education

The Anatomical Sciences Education graduate program offers the Master of Science and the Doctor of Philosophy degrees. The faculty for this program is drawn from these disciplines:

- Anatomy
- Education

For the Ph.D. program, applicants must meet the minimum requirements for the University of Florida Graduate School: Junior/Senior GPA > 3.0 and a score on the Graduate Record Exam (GRE) a minimum score of 300 for the current scale. No GRE is required for the MA program. For both the MS and the PhD program, the student will submit a minimum of three letters of reference, a statement of purpose, and a resume, which the admissions committee will use to assess the student's qualifications for admission to the program. International students must comply with current UF standards for admission to the Graduate School, including requirements for English language competency and financial responsibility.

Contact Mark Zakshevsky at zmz30@ufl.edu or visit the program's website at <https://anatomy.acb.med.ufl.edu/>.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN ANATOMICAL SCIENCES EDUCATION

- Doctor of Philosophy
- Master of Science

Courses

Anatomical Sciences Education Courses

Student Learning Outcomes

ANATOMICAL SCIENCES EDUCATION (PH.D.)

SL01

Knowledge

Identify and describe the anatomical features of the human body with referent to systems, location, and planes of the body.

SL02

Skills

Develop tools to critically assess anatomical and educational research.

SL03

Professionalism

Display appropriate behavior to instructors, fellow students and individuals who have bequeathed their bodies to medical science.

ANATOMICAL SCIENCES EDUCATION (M.S.)

SL01

Knowledge

Identify and describe the anatomical features of the human body with referent to systems, location, and planes of the body.

SL02

Skills

Develop tools to critically assess anatomical and educational research.

SL03

Professionalism

Apply ethical standards and implement excellence in all endeavors which focus on professional identity formation (i.e., development of professional values, actions and aspirations).

Curriculum and Instruction (Ed.D.)

Program Information

The School of Teaching & Learning's doctoral program in Curriculum & Instruction cultivates proficient scholars, teachers, and other educational professionals through an academically rigorous curriculum that balances theoretical and applied knowledge.

The Ed.D. is viewed as a professional practice doctorate wherein graduate students acquire and produce expert knowledge of how theoretical and empirical academic research can be applied in ways that foster school improvement in various contexts. The Ed.D. degree prepares students to advance within their professions and is not designed to prepare for faculty careers in higher education. Ed.D. students

pursue specializations in one of three areas: Teachers, Schools, and Society (<https://education.ufl.edu/curriculum-teaching/>), Computer Science Education (<https://education.ufl.edu/computer-science-education/>), and Educational Technology (<https://education.ufl.edu/educational-technology/>). All specializations are offered to students online.

All doctoral students are required to complete successfully a minimum of 90 credits. Coursework includes research methodology and methods, educational curriculum and foundations, independent research, specialization seminars, and at least 12 credit hours of dissertation work. To earn their doctoral degree, all students must complete their coursework satisfactorily, pass written and oral qualifying examinations, and successfully complete and defend a dissertation.

Degrees Offered

Degrees Offered with a Major in Curriculum and Instruction

- Doctor of Education
 - without a concentration
 - concentration in Educational Technology
 - concentration in Languages and Literacies in Education
 - concentration in Critical Study of Race, Ethnicity and Culture In Education
 - concentration in Teachers, Schools, & Society

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	1-12
EDE 7047	Issues in Teacher Education	3
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6636	Theorizing Race and Racism in Educational Research	3
EDF 6639	Anti-Black Racism in Education	3
EDF 6812	Comparative Education	3
EDF 6866	Education in Latin America	3
EDF 6939	Critical Race Theory in Educational Research	3
EDF 7934	Seminar in Educational Foundations	3
EDG 5666	Knowing and Learning in Secondary Schools	3
EDG 6017	Writing for Academic Purposes	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6228	Qualitative Research for Practitioner Scholars	3

EDG 6229	Qualitative Research in Curriculum and Instruction	3
EDG 6305	Multiple Perspectives on Teaching and Learning	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6378	Learning Science with Technology	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3
EDG 6648	Research Design in Curriculum and Instruction	3
EDG 6664	Survey of Research on STEM Education	3
EDG 6668	Teaching Adults	3
EDG 6805C	K-12 Computer Programming Foundations I	3
EDG 6806C	K-12 Computer Programming Foundations II	3
EDG 6807	Issues and Trends in K-12 Computer Science Education	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6930	Schooling & the Marginalization of Students	3
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6953	TLSI Online Portfolio Preparation	1-3
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7359	Professional Development and Teacher Learning	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EDG 7982	Practitioner Research: Theory & Practice	3
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6059	Blended Learning Environments	3
EME 6065	Human-Computer Interaction and the Learner	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6067	Emerging Learning Technologies	3
EME 6074	Mobile Technologies in Education	3
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3
EME 6458	Distance Teaching and Learning	3
EME 6480	Quantitative Methods in Educational Technology Research	3

EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3

Curriculum, Teaching, and Teacher Education Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	3-12
EDE 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3
LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3
LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4

ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

curriculum and instruction (PHD)

SLO 1 Knowledge

The student will master scholarly breadth of research about teaching and learning and neighboring academic fields.

SLO 2 Knowledge

The student will apply expertise of an original and significant question and issue in education.

SLO 3 Skills

The student will apply clarity of written and oral expression in the qualifying examination and the dissertation.

SLO 4 Professional Behavior

The student will address professional audiences through membership in professional organizations, research presentations, and/or scholarly publications.

curriculum and instruction (edd)

SLO 1 Knowledge

The student will explain and evaluate their conceptual and practical competence and critical stances in theory, pedagogy, and research.

SLO 2 Skills

The student will present results of research about resolving context-based problems of practice in written and oral format.

SLO 3 Professional Behavior

The student will disseminate and/or demonstrate professional knowledge in formal and informal settings about best curricular and pedagogical practices.

curriculum and instruction (eds)

SLO 1 Knowledge

The student will explain and evaluate their breadth of knowledge of content, methods, and contexts of schooling and education.

SLO 2 Skills

The student will utilize expertise developed in an area of specialization to pursue an original and significant inquiry or research question.

SLO 3 Professional Behavior

The student will demonstrate their implementation of an inquiry stance to improving teaching and on-going professional learning that can be shared with other professionals.

Curriculum & Instruction (MAE)

SLO 1 Knowledge

The student will explain and evaluate research-based knowledge of curriculum, teaching, and learning.

SLO 2 Skills

The student will apply knowledge to investigate a problem or question related to curriculum, teaching, and learning.

SLO 3 Professional Behavior

The student will present a written and an oral examination of a topic of investigation within the field of study.

Curriculum & Instruction (MEd)

SLO 1 Knowledge

The student will explain and evaluate their masterful use of research-based knowledge of general and specific subject area best practices in teaching and learning.

SLO 2 Skills

The student will use knowledge of teaching and learning to organize content for instruction, develop appropriate differentiated teaching practices, and evaluate the impact of instruction on student learning.

SLO 3 Professional Behavior

The student will collaborate with other professionals, reflect upon their own practice, and demonstrate a sense of efficacy and ethical practice.

Curriculum and Instruction (ISC)

Program Information

The School of Teaching & Learning's graduate programs in Curriculum & Instruction cultivate proficient scholars, teachers, and other educational professionals through an academically rigorous curriculum that balances theoretical and applied knowledge.

The Ph.D. prepares graduate students to assume roles as faculty and other leaders in higher education. It is carefully designed to balance coursework, research projects, and teaching experiences for students to acquire the knowledge, dispositions, skills and abilities to become highly effective faculty and leaders in higher education. Program area faculty adhere to a comprehensive framework reflecting broad and multi-faceted conceptions of scholarship: Application, Discovery, Integration and Teaching. Students engage in research, teaching, professional

service, and professional practice projects that further their familiarity with these domains. An array of subject area specializations (<https://education.ufl.edu/school-teaching-learning/admissions/doctordal-degrees-phd-edd/>) for all Ph.D. students in Curriculum & Instruction fosters their intellectual and professional growth in greater depth. These include: Educational Technology (<http://education.ufl.edu/educational-technology/on-campus-ph-d/>); English Education (<http://education.ufl.edu/english-education/degrees/>); ESOL/Bilingual Education (<https://education.ufl.edu/esol/degrees/#doctorate>); Reading and Literacy Education (<https://education.ufl.edu/reading-education/doctorate/>); Mathematics Education (<https://education.ufl.edu/math-education/doctorate/>); Science Education (<https://education.ufl.edu/science-education/doctor-of-philosophy/>); Social Studies Education (<https://education.ufl.edu/social-studies-education/degrees/doctorate/>); and Teachers, Schools, and Society (<https://education.ufl.edu/curriculum-teaching/>) (TSS) (<https://education.ufl.edu/curriculum-teaching/>). All doctoral students are required to complete successfully a minimum of 90 credits. Coursework includes research methodology and methods, educational curriculum and foundations, independent research, specialization seminars, and at least 12 credit hours of dissertation work. To earn their doctoral degree, all students must complete their coursework satisfactorily, pass written and oral qualifying examinations, and successfully complete and defend a dissertation.

The Master of Arts in Education (M.A.E.) in Curriculum & Instruction is designed to provide exposure to research and increase the practical knowledge of those interested in various aspects of Curriculum & Instruction. Specialization areas include: Educational Technology (<http://education.ufl.edu/educational-technology/>); ESOL/Bilingual Education (<https://education.ufl.edu/esol/>); Reading and Literacy Education (<https://education.ufl.edu/reading-education/>); Literacy & the Arts (<https://education.ufl.edu/english-education/>); Media Literacy Education (<http://education.ufl.edu/english-education/specializations/media-literacy/>); and Teachers, Schools, and Society (<https://education.ufl.edu/curriculum-teaching/>) (TSS) (<https://education.ufl.edu/curriculum-teaching/>). A thesis or final project in lieu of a thesis is required of all students. The LARC specialization is available both on-campus and online.

The Master of Education (M.Ed.) in Curriculum & Instruction is a professional degree designed to meet the needs of practicing and aspiring professionals to serve various functions in established and emerging educational activities. Specialization areas include: Educational Technology (<http://education.ufl.edu/educational-technology/>); ESOL/Bilingual Education (<https://education.ufl.edu/esol/>); and Teacher Leadership for School Improvement (TLSI) (<https://education.ufl.edu/tlsi/>). The Educational Technology and TLSI specializations are both available online.

The Specialist in Education (Ed.S.) in Curriculum & Instruction is a degree designed to meet the needs of practicing and aspiring professionals, who already hold a master's degree in an appropriate field, to serve various functions in established and emerging educational activities. Specialization areas include: Educational Technology (<http://education.ufl.edu/educational-technology/>); ESOL/Bilingual Education (<https://education.ufl.edu/esol/degrees/>); Reading and Literacy Education (<https://education.ufl.edu/reading-education/>); Literacy & the Arts (<https://education.ufl.edu/english-education/degrees/>); Media Literacy Education (<http://education.ufl.edu/english-education/specializations/media-literacy/>); and Teacher Leadership for School Improvement (TLSI) (<https://education.ufl.edu/tlsi/>). The Educational Technology and TLSI specializations are both available online.

For more information, please see our website: <http://education.ufl.edu/school-teaching-learning> (<http://education.ufl.edu/school-teaching-learning/>).

Degrees Offered

Degrees Offered with a Major in Curriculum and Instruction

- Doctor of Education
 - with a concentration in Computer Science Education
- Doctor of Philosophy
 - without a concentration
 - concentration in Critical Study of Race, Ethnicity and Culture In Education
 - concentration in Educational Technology
 - *optional second concentration in Critical Study of Race, Ethnicity and Culture In Education*
 - concentration in Languages and Literacies in Education
 - *optional second concentration in Critical Study of Race, Ethnicity and Culture In Education*
 - concentration in Science Education
 - *optional second concentration in Critical Study of Race, Ethnicity and Culture In Education*
 - concentration in Teachers, Schools, & Society
 - *optional second concentration in Critical Study of Race, Ethnicity and Culture In Education*
- Master of Arts in Education
 - without a concentration
 - concentration in Computer Science Education
 - concentration in Educational Technology
 - *optional second concentration in Media and Digital Literacy Education*
 - concentration in Media and Digital Literacy Education
 - Teaching English as an Additional Language (K-12)
- Master of Education
 - without a concentration
 - concentration in Educational Technology
 - concentration in Teaching English as an Additional Language (K-12)
 - concentration in Teacher Leadership for School Improvement
- Specialist in Education
 - without a concentration
 - concentration in Educational Technology
 - concentration in Teacher Leadership for School Improvement

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3

EDE 6905	Individual Work	1-5	EDG 7982	Practitioner Research: Theory & Practice	3
EDE 6948	Internship in Elementary Schools	1-12	EME 5054	Foundations of Educational Technology	3
EDE 7047	Issues in Teacher Education	3	EME 5207	Designing Technology-Rich Curricula	3
EDF 5552	Role of School in Democratic Society	3	EME 5404	Instructional Computing II	3
EDF 6520	History of Education	3	EME 5405	Internet in K-12 Instruction	3
EDF 6544	Philosophical Foundations of Education	3	EME 6059	Blended Learning Environments	3
EDF 6616	Education and American Culture	3	EME 6065	Human-Computer Interaction and the Learner	3
EDF 6636	Theorizing Race and Racism in Educational Research	3	EME 6066	Issues and Trends in Educational Technology Research	3
EDF 6639	Anti-Black Racism in Education	3	EME 6067	Emerging Learning Technologies	3
EDF 6812	Comparative Education	3	EME 6074	Mobile Technologies in Education	3
EDF 6866	Education in Latin America	3	EME 6156	Games and Simulations for Teaching and Learning	3
EDF 6939	Critical Race Theory in Educational Research	3	EME 6208	Designing Integrated Media Environments I	3
EDF 7934	Seminar in Educational Foundations	3	EME 6209	Designing Integrated Media Environments II	3
EDG 5666	Knowing and Learning in Secondary Schools	3	EME 6235	Managing Educational Projects	3
EDG 6017	Writing for Academic Purposes	3	EME 6236	Distance Education Leadership and Management	3
EDG 6047	Teacher Leadership for Educational Change	3	EME 6458	Distance Teaching and Learning	3
EDG 6207	Transforming the Curriculum	3	EME 6480	Quantitative Methods in Educational Technology Research	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3	EME 6606	Advanced Instructional Design	3
EDG 6228	Qualitative Research for Practitioner Scholars	3	EME 6609	Instructional Design	3
EDG 6229	Qualitative Research in Curriculum and Instruction	3	EME 6637	Managing and Analyzing Multimodal Educational Data	3
EDG 6305	Multiple Perspectives on Teaching and Learning	3	EME 6638	Theory, Design, and Development of Stealth Assessment for Learning	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3	EME 6645	Neurotechnologies in Education	3
EDG 6356	Teaching, Learning and Assessment	3	EME 6651	Learning Analytics Concepts and Techniques	3
EDG 6378	Learning Science with Technology	3	EME 6935	Seminar: Distance Education Issues and Applications	1
EDG 6415	Culturally Responsive Classroom Management	3	EME 6945	Practicum in Educational Media and Instructional Design	3-8
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3	EME 7345	Implementing Educational Technology Innovations (ETIs)	3
EDG 6648	Research Design in Curriculum and Instruction	3	EME 7938	Seminar in Educational Media and Instructional Design	3
EDG 6664	Survey of Research on STEM Education	3	ESE 5426	Data-Driven Decision Making for Secondary Teachers	3
EDG 6668	Teaching Adults	3	ESE 6345	Effective Teaching and Classroom Management	3
EDG 6805C	K-12 Computer Programming Foundations I	3	ESE 6905	Individual Work	1-4
EDG 6806C	K-12 Computer Programming Foundations II	3	ESE 6939	Special Topics	3
EDG 6807	Issues and Trends in K-12 Computer Science Education	3	ESE 6945	Student Teaching in Secondary School	2-9
EDG 6905	Individual Work	1-6	ETE 6141	K-12 Computer Sc Pedagogy I	3
EDG 6910	Supervised Research	1-5	ETE 6142	K-12 Computer Sc Pedagogy II	3
EDG 6930	Schooling & the Marginalization of Students	3	FLE 6165	Bilingual-Bicultural Education	3
EDG 6931	Special Topics	1-4	FLE 6167	Cross-Cultural Communication for Teachers	3
EDG 6940	Supervised Teaching	1-5	LAE 5341	Language Arts: Teaching Nonfiction Writing	3
EDG 6953	TLSI Online Portfolio Preparation	1-3	LAE 6298	Literacy & Language Instruction	3
EDG 6971	Research for Master's Thesis	1-15	LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
EDG 6973	Project in Lieu of Thesis	1-9	LAE 6348	Teaching Multiliteracies	3
EDG 7224	Critical Pedagogy	3	LAE 6407	Early Childhood Children's Literature	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3	LAE 6446	Multicultural Literature for Children and Adolescents	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3	LAE 6865	Teaching Media Literacy with the Internet	3
EDG 7359	Professional Development and Teacher Learning	3	LAE 6869	Teaching Digital Storytelling	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3	LAE 6939	Literacy, Family, and Culture	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4	LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
EDG 7979	Advanced Research	1-12	LAE 6946	Children's Literature in Educational Settings	3
EDG 7980	Research for Doctoral Dissertation	1-15			

LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3
LAE 7938	Lit, Cult and Politics	3
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6177	Mathematics Teaching and Learning in Higher Education	3
MAE 6313	Problem Solving in School Mathematics	3
MAE 6349	Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding	3
MAE 6916	Inquiry in Mathematics Teaching	3
MAE 7899	Mathematics Education Seminar	3
MUE 7938	Music Education Seminar	3
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6448	Diagnosing and Remediating Reading Difficulties	3
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6843	Reading Practicum	1
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6930	Seminar in Science Education	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3
SMT 6066	Data Wrangling and Visualization in Educational Research	3
SMT 6106	Informal STEM Practice	3
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 5335	ESOL and Reading for Secondary Teachers	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6385	Technology for Language and Reading Education	3
TSL 6440	Testing and Evaluation of ESOL	3

TSL 6670	Multilingualism from a Global Perspective	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

General Courses

Code	Title	Credits
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3

Curriculum, Teaching, and Teacher Education Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	3-12
EDE 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3

EME 6609	Instructional Design	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3
LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3
LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3

RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4
ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

curriculum and instruction (edd)

SLO 1 Knowledge
The student will explain and evaluate their conceptual and practical competence and critical stances in theory, pedagogy, and research.

SLO 2 Skills

The student will present results of research about resolving context-based problems of practice in written and oral format.

SLO 3 Professional Behavior

The student will disseminate and/or demonstrate professional knowledge in formal and informal settings about best curricular and pedagogical practices.

curriculum and instruction (eds)

SLO 1 Knowledge

The student will explain and evaluate their breadth of knowledge of content, methods, and contexts of schooling and education.

SLO 2 Skills

The student will utilize expertise developed in an area of specialization to pursue an original and significant inquiry or research question.

SLO 3 Professional Behavior

The student will demonstrate their implementation of an inquiry stance to improving teaching and on-going professional learning that can be shared with other professionals.

curriculum and instruction (PHD)

SLO 1 Knowledge

The student will master scholarly breadth of research about teaching and learning and neighboring academic fields.

SLO 2 Knowledge

The student will apply expertise of an original and significant question and issue in education.

SLO 3 Skills

The student will apply clarity of written and oral expression in the qualifying examination and the dissertation.

SLO 4 Professional Behavior

The student will address professional audiences through membership in professional organizations, research presentations, and/or scholarly publications.

Elementary Education

Program Information

The School of Teaching & Learning offers the Master of Education (M.Ed.) and Master of Arts in Education (M.A.E.) degrees in Elementary Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 778) section of this catalog.

For those interested in elementary (K-6) teacher certification, the Alternative Certification in Elementary Education (SITE) Program is an M.A.E. degree that prepares and certifies elementary school teachers.

Alternative Certification in Elementary Education (SITE) Program

The Site-based Implementation of Teacher Education (SITE) program at the University of Florida is a state-designated Educator Preparation Institute (EPI) created to attract talented college graduates and career path changers with non-education majors to the elementary classroom. The yearlong program is available online and provides an alternative, accelerated pathway to teaching experience and certification for prospective teachers who possess an undergraduate degree outside of education. The clinical internship combines supervised classroom

teaching and formal study, with successful completion leading to a master's (M.A.E.) degree in Elementary Education. The SITE program leads to eligibility for the Professional Certificate in Elementary Education K-6 and the Reading Endorsement in Florida.

Many students come to the program with degrees or professional experience in fields such as accounting, business, English, family studies, history, journalism, nursing and psychology. Selection for entry into this full-time internship requires a 3.0 or higher undergraduate GPA; a stellar essay/statement of purpose; three professional letters of recommendation; and a Statement of Status of Eligibility from the Florida Department of Education.

Interns complete 30 credit hours of study and classroom teaching over three semesters, all under the supervision of a school-based mentor and a university coach. The mentor teacher and intern teach side-by-side throughout the entire school year, while the UF coach supports the intern to problem-solve and reflect on teaching skills. Along with their planning, teaching and coursework responsibilities, the interns become familiar with the school improvement goals and new programs initiated at their host schools. SITE coursework is taught by UF education professors and teachers who all have proven expertise in K-12 teaching.

SITE is intended to culminate in certification to teach in Florida. Graduates wishing to teach in states other than Florida should contact the Department of Education in their state of choice for certification requirements there.

For additional information about the program please visit: <http://education.ufl.edu/site> (<http://education.ufl.edu/site/>).

Degrees Offered

Degrees Offered with a Major in Elementary Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	1-12
EDE 7047	Issues in Teacher Education	3
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6636	Theorizing Race and Racism in Educational Research	3
EDF 6639	Anti-Black Racism in Education	3
EDF 6812	Comparative Education	3
EDF 6866	Education in Latin America	3

EDF 6939	Critical Race Theory in Educational Research	3	EME 6156	Games and Simulations for Teaching and Learning	3
EDF 7934	Seminar in Educational Foundations	3	EME 6208	Designing Integrated Media Environments I	3
EDG 5666	Knowing and Learning in Secondary Schools	3	EME 6209	Designing Integrated Media Environments II	3
EDG 6017	Writing for Academic Purposes	3	EME 6235	Managing Educational Projects	3
EDG 6047	Teacher Leadership for Educational Change	3	EME 6236	Distance Education Leadership and Management	3
EDG 6207	Transforming the Curriculum	3	EME 6458	Distance Teaching and Learning	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3	EME 6480	Quantitative Methods in Educational Technology Research	3
EDG 6228	Qualitative Research for Practitioner Scholars	3	EME 6606	Advanced Instructional Design	3
EDG 6229	Qualitative Research in Curriculum and Instruction	3	EME 6609	Instructional Design	3
EDG 6305	Multiple Perspectives on Teaching and Learning	3	EME 6637	Managing and Analyzing Multimodal Educational Data	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3	EME 6638	Theory, Design, and Development of Stealth Assessment for Learning	3
EDG 6356	Teaching, Learning and Assessment	3	EME 6645	Neurotechnologies in Education	3
EDG 6378	Learning Science with Technology	3	EME 6651	Learning Analytics Concepts and Techniques	3
EDG 6415	Culturally Responsive Classroom Management	3	EME 6935	Seminar: Distance Education Issues and Applications	1
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3	EME 6945	Practicum in Educational Media and Instructional Design	3-8
EDG 6648	Research Design in Curriculum and Instruction	3	EME 7345	Implementing Educational Technology Innovations (ETIs)	3
EDG 6664	Survey of Research on STEM Education	3	EME 7938	Seminar in Educational Media and Instructional Design	3
EDG 6668	Teaching Adults	3	ESE 5426	Data-Driven Decision Making for Secondary Teachers	3
EDG 6805C	K-12 Computer Programming Foundations I	3	ESE 6345	Effective Teaching and Classroom Management	3
EDG 6806C	K-12 Computer Programming Foundations II	3	ESE 6905	Individual Work	1-4
EDG 6807	Issues and Trends in K-12 Computer Science Education	3	ESE 6939	Special Topics	3
EDG 6905	Individual Work	1-6	ESE 6945	Student Teaching in Secondary School	2-9
EDG 6910	Supervised Research	1-5	ETE 6141	K-12 Computer Sc Pedagogy I	3
EDG 6930	Schooling & the Marginalization of Students	3	ETE 6142	K-12 Computer Sc Pedagogy II	3
EDG 6931	Special Topics	1-4	FLE 6165	Bilingual-Bicultural Education	3
EDG 6940	Supervised Teaching	1-5	FLE 6167	Cross-Cultural Communication for Teachers	3
EDG 6953	TLSI Online Portfolio Preparation	1-3	LAE 5341	Language Arts: Teaching Nonfiction Writing	3
EDG 6971	Research for Master's Thesis	1-15	LAE 6298	Literacy & Language Instruction	3
EDG 6973	Project in Lieu of Thesis	1-9	LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
EDG 7224	Critical Pedagogy	3	LAE 6348	Teaching Multiliteracies	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3	LAE 6407	Early Childhood Children's Literature	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3	LAE 6446	Multicultural Literature for Children and Adolescents	3
EDG 7359	Professional Development and Teacher Learning	3	LAE 6865	Teaching Media Literacy with the Internet	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3	LAE 6869	Teaching Digital Storytelling	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4	LAE 6939	Literacy, Family, and Culture	3
EDG 7979	Advanced Research	1-12	LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
EDG 7980	Research for Doctoral Dissertation	1-15	LAE 6946	Children's Literature in Educational Settings	3
EDG 7982	Practitioner Research: Theory & Practice	3	LAE 7934	Seminar in Composition Theory and Practice	3
EME 5054	Foundations of Educational Technology	3	LAE 7936	Seminar in English Language Arts	3
EME 5207	Designing Technology-Rich Curricula	3	LAE 7938	Lit, Cult and Politics	3
EME 5404	Instructional Computing II	3	MAE 5332	Secondary School Mathematics Methods and Assessment	3
EME 5405	Internet in K-12 Instruction	3	MAE 5347	Teaching K-8 Mathematics for Understanding	3
EME 6059	Blended Learning Environments	3	MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
EME 6065	Human-Computer Interaction and the Learner	3	MAE 5945	Secondary School Mathematics Practicum	3-6
EME 6066	Issues and Trends in Educational Technology Research	3	MAE 6177	Mathematics Teaching and Learning in Higher Education	3
EME 6067	Emerging Learning Technologies	3			
EME 6074	Mobile Technologies in Education	3			

MAE 6313	Problem Solving in School Mathematics	3
MAE 6349	Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding	3
MAE 6916	Inquiry in Mathematics Teaching	3
MAE 7899	Mathematics Education Seminar	3
MUE 7938	Music Education Seminar	3
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6448	Diagnosing and Remediating Reading Difficulties	3
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6843	Reading Practicum	1
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6930	Seminar in Science Education	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3
SMT 6066	Data Wrangling and Visualization in Educational Research	3
SMT 6106	Informal STEM Practice	3
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 5335	ESOL and Reading for Secondary Teachers	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6385	Technology for Language and Reading Education	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6670	Multilingualism from a Global Perspective	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

General Courses

Code	Title	Credits
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6356	Teaching, Learning and Assessment	3

EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3

Curriculum, Teaching, and Teacher Education Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6905	Individual Work	1-5
EDG 6948	Internship in Elementary Schools	3-12
EDG 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3
LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3
LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3

SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4
ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

Elementary Education (MAE)

SLO 1 Knowledge

The student will master research-based knowledge of teaching and learning in elementary education.

SLO 2 Knowledge

The student will critique teaching practices based on knowledge of the developmental and socio-cultural context of the learner.

SLO 3 Skills

The student will investigate a problem or question within the field of elementary education.

SLO 4 Professional Behavior The student will present a written and oral presentation and defense of a topic of investigation in elementary education that demonstrates critical thinking and effective

communication skills.

Elementary Education (MEd)

SLO 1 Knowledge

The student will master research-based knowledge of best practices of teaching and learning in elementary education.

SLO 2 Skills

The student will use knowledge of teaching and learning to organize instruction, develop and apply appropriate inclusive teaching practices for elementary education, evaluate the impact of instruction on student learning, and create a positive learning environment.

SLO 3 Professional Behavior

The student will collaborate with other professionals, reflect upon and research their own practice, and demonstrate a sense of efficacy and ethical practice.

English Education Program Information

The School of Teaching & Learning offers the Master of Arts in Education (M.A.E.) degrees in English Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 778) section of this catalog.

Students interested in second language learning and teaching, bilingualism, and multiculturalism might consider applying to the Advanced Studies in in ESOL Education/ Bilingual Education program (<https://education.ufl.edu/esol/degrees/>).

The **Master of Arts in Education (M.A.E.) in English Education** program is focused on teaching the skills of literacy and the subject of English (literature, writing, and the study of texts). The program offers flexible options to ensure that it can support a range of academic and professional goals. Students can choose from one of the following programs of study:

1. A **30-credit** degree option with studies focused on important issues in English education.
2. A combined **30-credit** degree option with our Educator Preparation Institute (EPI), which offers aspiring teachers an 18-credit EPI licensure program plus the additional 12 credits needed for the MAE. Students interested in this option must also apply to the EPI program by April 15th and plan to start during the summer term.

For more information, please visit the English Language Arts K-12 website (<https://education.ufl.edu/english-education/>).

Degrees Offered

Degrees Offered with a Major in English Education

- Master of Arts in Education
 - no concentration
 - concentration in Media and Digital Literacy Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	1-12
EDE 7047	Issues in Teacher Education	3
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6636	Theorizing Race and Racism in Educational Research	3
EDF 6639	Anti-Black Racism in Education	3
EDF 6812	Comparative Education	3
EDF 6866	Education in Latin America	3
EDF 6939	Critical Race Theory in Educational Research	3
EDF 7934	Seminar in Educational Foundations	3
EDG 5666	Knowing and Learning in Secondary Schools	3
EDG 6017	Writing for Academic Purposes	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6228	Qualitative Research for Practitioner Scholars	3
EDG 6229	Qualitative Research in Curriculum and Instruction	3
EDG 6305	Multiple Perspectives on Teaching and Learning	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6378	Learning Science with Technology	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3
EDG 6648	Research Design in Curriculum and Instruction	3
EDG 6664	Survey of Research on STEM Education	3
EDG 6668	Teaching Adults	3
EDG 6805C	K-12 Computer Programming Foundations I	3
EDG 6806C	K-12 Computer Programming Foundations II	3
EDG 6807	Issues and Trends in K-12 Computer Science Education	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6930	Schooling & the Marginalization of Students	3
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6953	TLSI Online Portfolio Preparation	1-3
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3

EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3	LAE 6348	Teaching Multiliteracies	3
EDG 7359	Professional Development and Teacher Learning	3	LAE 6407	Early Childhood Children's Literature	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3	LAE 6446	Multicultural Literature for Children and Adolescents	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4	LAE 6865	Teaching Media Literacy with the Internet	3
EDG 7979	Advanced Research	1-12	LAE 6869	Teaching Digital Storytelling	3
EDG 7980	Research for Doctoral Dissertation	1-15	LAE 6939	Literacy, Family, and Culture	3
EDG 7982	Practitioner Research: Theory & Practice	3	LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
EME 5054	Foundations of Educational Technology	3	LAE 6946	Children's Literature in Educational Settings	3
EME 5207	Designing Technology-Rich Curricula	3	LAE 7934	Seminar in Composition Theory and Practice	3
EME 5404	Instructional Computing II	3	LAE 7936	Seminar in English Language Arts	3
EME 5405	Internet in K-12 Instruction	3	LAE 7938	Lit, Cult and Politics	3
EME 6059	Blended Learning Environments	3	MAE 5332	Secondary School Mathematics Methods and Assessment	3
EME 6065	Human-Computer Interaction and the Learner	3	MAE 5347	Teaching K-8 Mathematics for Understanding	3
EME 6066	Issues and Trends in Educational Technology Research	3	MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
EME 6067	Emerging Learning Technologies	3	MAE 5945	Secondary School Mathematics Practicum	3-6
EME 6074	Mobile Technologies in Education	3	MAE 6177	Mathematics Teaching and Learning in Higher Education	3
EME 6156	Games and Simulations for Teaching and Learning	3	MAE 6313	Problem Solving in School Mathematics	3
EME 6208	Designing Integrated Media Environments I	3	MAE 6349	Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding	3
EME 6209	Designing Integrated Media Environments II	3	MAE 6916	Inquiry in Mathematics Teaching	3
EME 6235	Managing Educational Projects	3	MAE 7899	Mathematics Education Seminar	3
EME 6236	Distance Education Leadership and Management	3	MUE 7938	Music Education Seminar	3
EME 6458	Distance Teaching and Learning	3	RED 5337	Reading in the Secondary School	3
EME 6480	Quantitative Methods in Educational Technology Research	3	RED 5355	Reading Instruction in the Elementary School	3
EME 6606	Advanced Instructional Design	3	RED 5399	Practices in Beginning Reading Instruction	3
EME 6609	Instructional Design	3	RED 6346	Seminar in Reading	3-6
EME 6637	Managing and Analyzing Multimodal Educational Data	3	RED 6448	Diagnosing and Remediating Reading Difficulties	3
EME 6638	Theory, Design, and Development of Stealth Assessment for Learning	3	RED 6520	Classroom Literacy Assessment and Instruction	3
EME 6645	Neurotechnologies in Education	3	RED 6546C	Diagnosis of Reading Difficulties	3
EME 6651	Learning Analytics Concepts and Techniques	3	RED 6548C	Remediation of Reading Difficulties	3
EME 6935	Seminar: Distance Education Issues and Applications	1	RED 6647	Trends in Reading	3
EME 6945	Practicum in Educational Media and Instructional Design	3-8	RED 6843	Reading Practicum	1
EME 7345	Implementing Educational Technology Innovations (ETIs)	3	RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
EME 7938	Seminar in Educational Media and Instructional Design	3	RED 7019	Foundations of Literacy	3
ESE 5426	Data-Driven Decision Making for Secondary Teachers	3	SCE 5140	Science Curriculum Development	3
ESE 6345	Effective Teaching and Classroom Management	3	SCE 5316	Inquiry-Based Science Teaching	3
ESE 6905	Individual Work	1-4	SCE 5695	Diversity and Equity in Science Teaching	3
ESE 6939	Special Topics	3	SCE 5765	Data-Driven Science Instruction	3
ESE 6945	Student Teaching in Secondary School	2-9	SCE 6117	Science Education in the Elementary School	3
ETE 6141	K-12 Computer Sc Pedagogy I	3	SCE 6337	Secondary Science Methods and Assessment	3
ETE 6142	K-12 Computer Sc Pedagogy II	3	SCE 6930	Seminar in Science Education	3
FLE 6165	Bilingual-Bicultural Education	3	SCE 6947	Practicum in Secondary Science Teaching and Assessment	3
FLE 6167	Cross-Cultural Communication for Teachers	3	SMT 6066	Data Wrangling and Visualization in Educational Research	3
LAE 5341	Language Arts: Teaching Nonfiction Writing	3	SMT 6106	Informal STEM Practice	3
LAE 6298	Literacy & Language Instruction	3	SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3	SSE 6117	Social Studies Education—Elementary School	3
			SSE 6133	Secondary School Social Studies Methods and Assessment	3

SSE 6478	Global Studies Methods for Social Studies	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 5335	ESOL and Reading for Secondary Teachers	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6385	Technology for Language and Reading Education	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6670	Multilingualism from a Global Perspective	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

General Courses

Code	Title	Credits
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3

Curriculum, Teaching, and Teacher Education Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	3-12
EDE 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3
LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3
LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6

MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4
ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3

EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

English Education (MAE)

SLO 1 Knowledge

The student will master research-based knowledge of English Education best practices of teaching and learning

SLO 2 Skills

The student will apply knowledge to investigate a significant problem or original question within the field of English Education

SLO 3 Professional Behavior

The student will complete a written thesis or project and an oral presentation of a topic of investigation within English Education

English Education (MEd)

SLO 1 Knowledge

The student will master research-based knowledge of general and specific subject area best practices of teaching and learning

SLO 2 Skills

The student will use knowledge of teaching and learning to organize content for instruction, develop and apply appropriate inclusive teaching practices, evaluate the impact of instruction on student learning, and create a positive learning environment

SLO 3 Professional Behavior

The student will collaborate with other professionals, reflect upon their own practice, and demonstrate a sense of efficacy and ethical practice

Mathematics Education

Program Information

The School of Teaching & Learning offers the Master of Arts in Education (M.A.E.) degree in Mathematics Education. More information about the requirements for this degree can be found in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

The Master of Arts in Education (M.A.E.) in Mathematics Education

program is designed for individuals interested in gaining expertise in mathematics education and strengthening their background in mathematics. The program offers flexible options to ensure that it can support a range of academic and professional goals. Students can choose from one of the following programs of study:

1. A **30-credit** degree option with studies focused on important issues in mathematics education.
2. A combined **30-credit** degree option with our Educator Preparation Institute (EPI), which offers aspiring teachers an 18-credit EPI licensure program plus the additional 12 credits needed for the MAE. Students interested in this option must also apply to the EPI program by April 15th and plan to start during the summer term.
3. A **36-credit** degree option that includes 18 graduate credits in mathematics. Although this is a higher-credit option, it is a

popular choice for anyone interested in teaching mathematics in a community college.

All three options require 18 credits of course offerings within the School of Teaching and Learning, including a thesis or project-in-lieu of thesis.

What kind of students typically are enrolled in the M.A.E. in mathematics education program?

- Practicing or aspiring teachers who want to strengthen their abilities to teach mathematics in a variety of instructional settings.
- Experienced teachers who have the eventual goal of earning a doctorate in mathematics education enabling them to work in a teacher education/mathematics education program at an institution of higher education.
- Individuals who plan to teach at the community college level. Requirements to teach at the community college level vary depending on the individual campus. Typically, individuals must have a minimum of 18 credits in graduate mathematics. Candidates are encouraged to consult the community college where they desire employment for the exact employment requirements.

Admission Requirements:

B.A. or B.S. in mathematics, mathematics education, or related field; 2.7 overall GPA and 3.0 upper division GPA; and completing all other general admission requirements

Graduation Requirements:

3.0 GPA (overall and in major); completion of course requirements; thesis or project-in-lieu of thesis

What might a program of study look like in the M.A.E. in mathematics education?

The program of study form is customized to address the unique needs of each student and is developed in consultation with a mathematics education advisor. While there are different requirements for each of the above options, all options require a thesis or project-in-lieu of thesis to be completed in the graduating semester.

Please visit this website for additional information about the M.A.E. degree program in Mathematics Education: <https://education.ufl.edu/math-education/masters/>.

Degrees Offered

Degrees Offered with a Major in Mathematics Education

- Master of Arts in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5

EDE 6948	Internship in Elementary Schools	1-12
EDE 7047	Issues in Teacher Education	3
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6636	Theorizing Race and Racism in Educational Research	3
EDF 6639	Anti-Black Racism in Education	3
EDF 6812	Comparative Education	3
EDF 6866	Education in Latin America	3
EDF 6939	Critical Race Theory in Educational Research	3
EDF 7934	Seminar in Educational Foundations	3
EDG 5666	Knowing and Learning in Secondary Schools	3
EDG 6017	Writing for Academic Purposes	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6228	Qualitative Research for Practitioner Scholars	3
EDG 6229	Qualitative Research in Curriculum and Instruction	3
EDG 6305	Multiple Perspectives on Teaching and Learning	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6378	Learning Science with Technology	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3
EDG 6648	Research Design in Curriculum and Instruction	3
EDG 6664	Survey of Research on STEM Education	3
EDG 6668	Teaching Adults	3
EDG 6805C	K-12 Computer Programming Foundations I	3
EDG 6806C	K-12 Computer Programming Foundations II	3
EDG 6807	Issues and Trends in K-12 Computer Science Education	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6930	Schooling & the Marginalization of Students	3
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6953	TLSI Online Portfolio Preparation	1-3
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7359	Professional Development and Teacher Learning	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EDG 7982	Practitioner Research: Theory & Practice	3

EME 5054	Foundations of Educational Technology	3	LAE 7936	Seminar in English Language Arts	3
EME 5207	Designing Technology-Rich Curricula	3	LAE 7938	Lit, Cult and Politics	3
EME 5404	Instructional Computing II	3	MAE 5332	Secondary School Mathematics Methods and Assessment	3
EME 5405	Internet in K-12 Instruction	3	MAE 5347	Teaching K-8 Mathematics for Understanding	3
EME 6059	Blended Learning Environments	3	MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
EME 6065	Human-Computer Interaction and the Learner	3	MAE 5945	Secondary School Mathematics Practicum	3-6
EME 6066	Issues and Trends in Educational Technology Research	3	MAE 6177	Mathematics Teaching and Learning in Higher Education	3
EME 6067	Emerging Learning Technologies	3	MAE 6313	Problem Solving in School Mathematics	3
EME 6074	Mobile Technologies in Education	3	MAE 6349	Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding	3
EME 6156	Games and Simulations for Teaching and Learning	3	MAE 6916	Inquiry in Mathematics Teaching	3
EME 6208	Designing Integrated Media Environments I	3	MAE 7899	Mathematics Education Seminar	3
EME 6209	Designing Integrated Media Environments II	3	MUE 7938	Music Education Seminar	3
EME 6235	Managing Educational Projects	3	RED 5337	Reading in the Secondary School	3
EME 6236	Distance Education Leadership and Management	3	RED 5355	Reading Instruction in the Elementary School	3
EME 6458	Distance Teaching and Learning	3	RED 5399	Practices in Beginning Reading Instruction	3
EME 6480	Quantitative Methods in Educational Technology Research	3	RED 6346	Seminar in Reading	3-6
EME 6606	Advanced Instructional Design	3	RED 6448	Diagnosing and Remediating Reading Difficulties	3
EME 6609	Instructional Design	3	RED 6520	Classroom Literacy Assessment and Instruction	3
EME 6637	Managing and Analyzing Multimodal Educational Data	3	RED 6546C	Diagnosis of Reading Difficulties	3
EME 6638	Theory, Design, and Development of Stealth Assessment for Learning	3	RED 6548C	Remediation of Reading Difficulties	3
EME 6645	Neurotechnologies in Education	3	RED 6647	Trends in Reading	3
EME 6651	Learning Analytics Concepts and Techniques	3	RED 6843	Reading Practicum	1
EME 6935	Seminar: Distance Education Issues and Applications	1	RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
EME 6945	Practicum in Educational Media and Instructional Design	3-8	RED 7019	Foundations of Literacy	3
EME 7345	Implementing Educational Technology Innovations (ETIs)	3	SCE 5140	Science Curriculum Development	3
EME 7938	Seminar in Educational Media and Instructional Design	3	SCE 5316	Inquiry-Based Science Teaching	3
ESE 5426	Data-Driven Decision Making for Secondary Teachers	3	SCE 5695	Diversity and Equity in Science Teaching	3
ESE 6345	Effective Teaching and Classroom Management	3	SCE 5765	Data-Driven Science Instruction	3
ESE 6905	Individual Work	1-4	SCE 6117	Science Education in the Elementary School	3
ESE 6939	Special Topics	3	SCE 6337	Secondary Science Methods and Assessment	3
ESE 6945	Student Teaching in Secondary School	2-9	SCE 6930	Seminar in Science Education	3
ETE 6141	K-12 Computer Sc Pedagogy I	3	SCE 6947	Practicum in Secondary Science Teaching and Assessment	3
ETE 6142	K-12 Computer Sc Pedagogy II	3	SMT 6066	Data Wrangling and Visualization in Educational Research	3
FLE 6165	Bilingual-Bicultural Education	3	SMT 6106	Informal STEM Practice	3
FLE 6167	Cross-Cultural Communication for Teachers	3	SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
LAE 5341	Language Arts: Teaching Nonfiction Writing	3	SSE 6117	Social Studies Education--Elementary School	3
LAE 6298	Literacy & Language Instruction	3	SSE 6133	Secondary School Social Studies Methods and Assessment	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3	SSE 6478	Global Studies Methods for Social Studies	3
LAE 6348	Teaching Multiliteracies	3	TSL 5142	ESOL Curriculum, Methods, and Assessment	3
LAE 6407	Early Childhood Children's Literature	3	TSL 5335	ESOL and Reading for Secondary Teachers	3
LAE 6446	Multicultural Literature for Children and Adolescents	3	TSL 6145	Curriculum and Materials Development for ESOL K-12	3
LAE 6865	Teaching Media Literacy with the Internet	3	TSL 6245	Language Principles for ESOL Teachers	3
LAE 6869	Teaching Digital Storytelling	3	TSL 6373	Methods of Teaching ESOL K-12	3
LAE 6939	Literacy, Family, and Culture	3	TSL 6385	Technology for Language and Reading Education	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3	TSL 6440	Testing and Evaluation of ESOL	3
LAE 6946	Children's Literature in Educational Settings	3	TSL 6670	Multilingualism from a Global Perspective	3
LAE 7934	Seminar in Composition Theory and Practice	3			

TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

General Courses

Code	Title	Credits
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3

Curriculum, Teaching, and Teacher Education Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	3-12
EDE 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3

EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3
LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3
LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3

RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4
ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education—Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

Mathematics Education (MAE)

SLO 1 Knowledge

The student will identify, describe, and explain current research on teaching and learning of mathematics

SLO 2 Skills

The student will investigate a significant problem or original question within the field of study.

SLO 3 Professional Behavior

The students will critically evaluate their own effectiveness to plan future lessons and improve the teaching of all students over time.

Mathematics Education (MEd)

SLO 1 Knowledge

The student will identify, describe, and explain research on teaching and learning of mathematics.

SLO 2 Skills

The student will create, select and implement: (1) specific learning goals, (2) appropriate teaching methods and instructional materials, and (3) evaluation strategies aligned with goals, using knowledge of subject matter, learners and classroom management.

SLO 3 Professional Behavior

The student will collaborate with other professionals, such as peers and mentor teachers, to reflect upon their mathematics teaching. Students will communicate high expectations for all PK-12 students.

Reading Education

Program Information

The School of Teaching & Learning offers the Master of Education (M.Ed.) and Master of Arts in Education (M.A.E.) degrees in Reading Education. More information about the requirements for these degrees can be found in the Graduate Degrees (p. 778) section of this catalog.

The Master of Education (M.Ed.) in Reading Education is for prospective teachers eligible for teacher certification and practicing teachers who desire to update themselves on the latest research and practice in reading/literacy instruction and to obtain K-12 reading certification. This is a non-thesis degree requiring completion of a minimum of 36 credit hours of coursework. Students learn evidence-based classroom practices and develop knowledge, skills, and strategies for supporting the literacy growth of PreK-12 students. The program is accredited by the Council for the Accreditation of Educator Preparation (CAEP). The curriculum is focused on the knowledge and methods teachers need to effectively promote literacy learning and academic achievement for all PreK-12 students. Teachers will not only gain expertise in addressing reading/writing difficulties but also learn how to support students' growth as learners who can decode, use, and create many different kinds of texts, such as textbooks, primary source documents, literature and media. Students can pursue the reading MEd degree **fully online, fully on campus, or partly online and partly on campus**.

The Master of Arts (MAE) in Reading Education is for students who want to deepen understanding about reading/literacy process and develop expertise in reading/literacy pedagogy, but for whom state certification is not a main goal. Students seeking the MAE have the option of completing 30 credits of coursework + 6 credits of thesis (or project in lieu of thesis), or 36 credits of coursework. Students can pursue the reading MAE fully online or partly online and partly on campus.

Students interested in obtaining a Florida K-12 reading certification should:

- Submit transcripts to the Florida Department of Education for course count content analysis.
- Take and receive passing scores on the Florida Teacher Certification Exam (FTCE) for Reading K-12. You can find information about the exam from the Florida Department of Education at <http://www.fldoe.org>.

Graduates of the program may be eligible for reading certification in other states and are advised to investigate that possibility if they do not plan to teach in the state of Florida.

Please visit this program area website to learn more about the M.Ed. degree in Reading Education: <https://education.ufl.edu/reading-education/masters/>.

Degrees Offered

Degrees Offered with a Major in Reading Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	1-12
EDE 7047	Issues in Teacher Education	3
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6636	Theorizing Race and Racism in Educational Research	3
EDF 6639	Anti-Black Racism in Education	3
EDF 6812	Comparative Education	3
EDF 6866	Education in Latin America	3
EDF 6939	Critical Race Theory in Educational Research	3
EDF 7934	Seminar in Educational Foundations	3
EDG 5666	Knowing and Learning in Secondary Schools	3
EDG 6017	Writing for Academic Purposes	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6228	Qualitative Research for Practitioner Scholars	3
EDG 6229	Qualitative Research in Curriculum and Instruction	3

EDG 6305	Multiple Perspectives on Teaching and Learning	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6378	Learning Science with Technology	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3
EDG 6648	Research Design in Curriculum and Instruction	3
EDG 6664	Survey of Research on STEM Education	3
EDG 6668	Teaching Adults	3
EDG 6805C	K-12 Computer Programming Foundations I	3
EDG 6806C	K-12 Computer Programming Foundations II	3
EDG 6807	Issues and Trends in K-12 Computer Science Education	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6930	Schooling & the Marginalization of Students	3
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6953	TLSI Online Portfolio Preparation	1-3
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7359	Professional Development and Teacher Learning	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EDG 7982	Practitioner Research: Theory & Practice	3
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6059	Blended Learning Environments	3
EME 6065	Human-Computer Interaction and the Learner	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6067	Emerging Learning Technologies	3
EME 6074	Mobile Technologies in Education	3
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3
EME 6458	Distance Teaching and Learning	3
EME 6480	Quantitative Methods in Educational Technology Research	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3

EME 6637	Managing and Analyzing Multimodal Educational Data	3	RED 6448	Diagnosing and Remediating Reading Difficulties	3
EME 6638	Theory, Design, and Development of Stealth Assessment for Learning	3	RED 6520	Classroom Literacy Assessment and Instruction	3
EME 6645	Neurotechnologies in Education	3	RED 6546C	Diagnosis of Reading Difficulties	3
EME 6651	Learning Analytics Concepts and Techniques	3	RED 6548C	Remediation of Reading Difficulties	3
EME 6935	Seminar: Distance Education Issues and Applications	1	RED 6647	Trends in Reading	3
EME 6945	Practicum in Educational Media and Instructional Design	3-8	RED 6843	Reading Practicum	1
EME 7345	Implementing Educational Technology Innovations (ETIs)	3	RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
EME 7938	Seminar in Educational Media and Instructional Design	3	RED 7019	Foundations of Literacy	3
ESE 5426	Data-Driven Decision Making for Secondary Teachers	3	SCE 5140	Science Curriculum Development	3
ESE 6345	Effective Teaching and Classroom Management	3	SCE 5316	Inquiry-Based Science Teaching	3
ESE 6905	Individual Work	1-4	SCE 5695	Diversity and Equity in Science Teaching	3
ESE 6939	Special Topics	3	SCE 5765	Data-Driven Science Instruction	3
ESE 6945	Student Teaching in Secondary School	2-9	SCE 6117	Science Education in the Elementary School	3
ETE 6141	K-12 Computer Sc Pedagogy I	3	SCE 6337	Secondary Science Methods and Assessment	3
ETE 6142	K-12 Computer Sc Pedagogy II	3	SCE 6930	Seminar in Science Education	3
FLE 6165	Bilingual-Bicultural Education	3	SCE 6947	Practicum in Secondary Science Teaching and Assessment	3
FLE 6167	Cross-Cultural Communication for Teachers	3	SMT 6066	Data Wrangling and Visualization in Educational Research	3
LAE 5341	Language Arts: Teaching Nonfiction Writing	3	SMT 6106	Informal STEM Practice	3
LAE 6298	Literacy & Language Instruction	3	SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3	SSE 6117	Social Studies Education--Elementary School	3
LAE 6348	Teaching Multiliteracies	3	SSE 6133	Secondary School Social Studies Methods and Assessment	3
LAE 6407	Early Childhood Children's Literature	3	SSE 6478	Global Studies Methods for Social Studies	3
LAE 6446	Multicultural Literature for Children and Adolescents	3	TSL 5142	ESOL Curriculum, Methods, and Assessment	3
LAE 6865	Teaching Media Literacy with the Internet	3	TSL 5335	ESOL and Reading for Secondary Teachers	3
LAE 6869	Teaching Digital Storytelling	3	TSL 6145	Curriculum and Materials Development for ESOL K-12	3
LAE 6939	Literacy, Family, and Culture	3	TSL 6245	Language Principles for ESOL Teachers	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3	TSL 6373	Methods of Teaching ESOL K-12	3
LAE 6946	Children's Literature in Educational Settings	3	TSL 6385	Technology for Language and Reading Education	3
LAE 7934	Seminar in Composition Theory and Practice	3	TSL 6440	Testing and Evaluation of ESOL	3
LAE 7936	Seminar in English Language Arts	3	TSL 6670	Multilingualism from a Global Perspective	3
LAE 7938	Lit, Cult and Politics	3	TSL 6700	Issues in ESOL for School Counselors and Psychologists	3
MAE 5332	Secondary School Mathematics Methods and Assessment	3	General Courses		
MAE 5347	Teaching K-8 Mathematics for Understanding	3	Code	Title	Credits
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3	EDG 6047	Teacher Leadership for Educational Change	3
MAE 5945	Secondary School Mathematics Practicum	3-6	EDG 6207	Transforming the Curriculum	3
MAE 6177	Mathematics Teaching and Learning in Higher Education	3	EDG 6226	Foundations of Research in Curriculum & Instruction	3
MAE 6313	Problem Solving in School Mathematics	3	EDG 6356	Teaching, Learning and Assessment	3
MAE 6349	Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding	3	EDG 6905	Individual Work	1-6
MAE 6916	Inquiry in Mathematics Teaching	3	EDG 6910	Supervised Research	1-5
MAE 7899	Mathematics Education Seminar	3	EDG 6931	Special Topics	1-4
MUE 7938	Music Education Seminar	3	EDG 6940	Supervised Teaching	1-5
RED 5337	Reading in the Secondary School	3	EDG 6971	Research for Master's Thesis	1-15
RED 5355	Reading Instruction in the Elementary School	3	EDG 6973	Project in Lieu of Thesis	1-9
RED 5399	Practices in Beginning Reading Instruction	3	EDG 7224	Critical Pedagogy	3
RED 6346	Seminar in Reading	3-6	EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
			EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3

EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3

Curriculum, Teaching, and Teacher Education Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	3-12
EDE 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3
LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3
LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4

ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

Reading Education (MAE)

SLO 1 Knowledge

The student identifies, describes, and explains general and subject-specific best practices in Reading Education.

SLO 2 Skills

The student investigates a significant problem or an original question within the field of Reading Education.

SLO 3 Professional Behavior

The student describes and defends a thorough and valid understanding of the formal body of knowledge and area of inquiry within the field of Reading Education.

Reading Education (MEd)

SLO 1 Knowledge

The student identifies, describes, and explains best practices in Reading Education.

SLO 2 Skills

The student organizes instruction, develops and applies appropriate reading instructional practices, and evaluates the impact of instruction on student learning.

SLO 3 Professional Behavior

The student will collaborate with other professionals, reflect upon their own practice, and apply ethical practices.

Science Education Program Information

The Science Education master's degree program focus on theory and research-based best practices in formal and informal science teaching and learning at all age levels (preK-adult). The School of Teaching and Learning offers one master's degree in Science Education: a Master of Arts in Education (M.A.E. degree). More information about the requirements for these degrees can be found in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

Certificate Program

The School of Teaching and Learning also offers an online Educator Preparation Institute (EPI) program that leads to Florida Teacher Professional Certification (middle and high school) at the post-baccalaureate level. This certificate program is an approved Florida Department of Education Educator Preparation Institute (EPI). Our program is:

- Interdisciplinary
- Completed in 2 semesters
- Strong subject-area preparation with 1 semester of supervised student teaching
- Is completed entirely online, allowing you to complete your student teaching in your local area
- Can transfer directly and become the first half of an online Master's degree, an M.A.E. in Science Education

This 18-credit certification program is fully approved by the Florida Department of Education and leads to eligibility for Professional Educator certification in Florida. Students from out of state are welcome to apply. Be sure you understand the implications for your own state's teaching certification requirements.

Master of Arts in Education

The M.A.E. in science education offers two options: thesis or project-in-lieu of thesis. Upon admission, M.A.E. students work closely with a faculty advisor to design a program of study tailored to their professional needs and goals. Students who have completed the EPI Certificate Program may use all 18 of those credits towards the M. A. E. Students can complete science education M.A.E. programs as either part-time or full-time students. This program is also appropriate for individuals who are interested in adding to their science content background with graduate level coursework while preparing to teach at the community college level. <https://education.ufl.edu/science-education/master-of-arts/>.

Thesis Option

The thesis option is designed for experienced preK-adult formal or informal science educators interested in pursuing advanced degrees with a strong research focus. Most students completing the M.A.E. thesis option continue on to pursue doctoral degrees in science education. Thirty credits of graduate level coursework and six credits of supervised research culminating in a thesis are required.

Non-Thesis Option

The non-thesis option is primarily designed for experienced preK-adult formal or informal science educators interested in improving their own professional practice while also earning a graduate degree. A minimum of 36 total graduate credits is required for the non-thesis M.A.E. degree along with a project that is usually job-embedded.

For more detailed information about the Science programs and faculty, as well as various certificate programs please visit our website: <http://education.ufl.edu/science-education> (<http://education.ufl.edu/science-education/>).

Degrees Offered

Degrees Offered with a Major in Science Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	1-12
EDE 7047	Issues in Teacher Education	3
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6636	Theorizing Race and Racism in Educational Research	3
EDF 6639	Anti-Black Racism in Education	3
EDF 6812	Comparative Education	3
EDF 6866	Education in Latin America	3
EDF 6939	Critical Race Theory in Educational Research	3
EDF 7934	Seminar in Educational Foundations	3
EDG 5666	Knowing and Learning in Secondary Schools	3
EDG 6017	Writing for Academic Purposes	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6228	Qualitative Research for Practitioner Scholars	3
EDG 6229	Qualitative Research in Curriculum and Instruction	3
EDG 6305	Multiple Perspectives on Teaching and Learning	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6378	Learning Science with Technology	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3
EDG 6648	Research Design in Curriculum and Instruction	3
EDG 6664	Survey of Research on STEM Education	3
EDG 6668	Teaching Adults	3

EDG 6805C	K-12 Computer Programming Foundations I	3
EDG 6806C	K-12 Computer Programming Foundations II	3
EDG 6807	Issues and Trends in K-12 Computer Science Education	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6930	Schooling & the Marginalization of Students	3
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6953	TLSI Online Portfolio Preparation	1-3
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7359	Professional Development and Teacher Learning	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EDG 7982	Practitioner Research: Theory & Practice	3
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6059	Blended Learning Environments	3
EME 6065	Human-Computer Interaction and the Learner	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6067	Emerging Learning Technologies	3
EME 6074	Mobile Technologies in Education	3
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6235	Managing Educational Projects	3
EME 6236	Distance Education Leadership and Management	3
EME 6458	Distance Teaching and Learning	3
EME 6480	Quantitative Methods in Educational Technology Research	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3
EME 6637	Managing and Analyzing Multimodal Educational Data	3
EME 6638	Theory, Design, and Development of Stealth Assessment for Learning	3
EME 6645	Neurotechnologies in Education	3
EME 6651	Learning Analytics Concepts and Techniques	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7345	Implementing Educational Technology Innovations (ETIs)	3
EME 7938	Seminar in Educational Media and Instructional Design	3

ESE 5426	Data-Driven Decision Making for Secondary Teachers	3	SCE 6117	Science Education in the Elementary School	3
ESE 6345	Effective Teaching and Classroom Management	3	SCE 6337	Secondary Science Methods and Assessment	3
ESE 6905	Individual Work	1-4	SCE 6930	Seminar in Science Education	3
ESE 6939	Special Topics	3	SCE 6947	Practicum in Secondary Science Teaching and Assessment	3
ESE 6945	Student Teaching in Secondary School	2-9	SMT 6066	Data Wrangling and Visualization in Educational Research	3
ETE 6141	K-12 Computer Sc Pedagogy I	3	SMT 6106	Informal STEM Practice	3
ETE 6142	K-12 Computer Sc Pedagogy II	3	SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
FLE 6165	Bilingual-Bicultural Education	3	SSE 6117	Social Studies Education--Elementary School	3
FLE 6167	Cross-Cultural Communication for Teachers	3	SSE 6133	Secondary School Social Studies Methods and Assessment	3
LAE 5341	Language Arts: Teaching Nonfiction Writing	3	SSE 6478	Global Studies Methods for Social Studies	3
LAE 6298	Literacy & Language Instruction	3	TSL 5142	ESOL Curriculum, Methods, and Assessment	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3	TSL 5335	ESOL and Reading for Secondary Teachers	3
LAE 6348	Teaching Multiliteracies	3	TSL 6145	Curriculum and Materials Development for ESOL K-12	3
LAE 6407	Early Childhood Children's Literature	3	TSL 6245	Language Principles for ESOL Teachers	3
LAE 6446	Multicultural Literature for Children and Adolescents	3	TSL 6373	Methods of Teaching ESOL K-12	3
LAE 6865	Teaching Media Literacy with the Internet	3	TSL 6385	Technology for Language and Reading Education	3
LAE 6869	Teaching Digital Storytelling	3	TSL 6440	Testing and Evaluation of ESOL	3
LAE 6939	Literacy, Family, and Culture	3	TSL 6670	Multilingualism from a Global Perspective	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3	TSL 6700	Issues in ESOL for School Counselors and Psychologists	3
LAE 6946	Children's Literature in Educational Settings	3	General Courses		
LAE 7934	Seminar in Composition Theory and Practice	3	Code	Title	Credits
LAE 7936	Seminar in English Language Arts	3	EDG 6047	Teacher Leadership for Educational Change	3
LAE 7938	Lit, Cult and Politics	3	EDG 6207	Transforming the Curriculum	3
MAE 5332	Secondary School Mathematics Methods and Assessment	3	EDG 6226	Foundations of Research in Curriculum & Instruction	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3	EDG 6356	Teaching, Learning and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3	EDG 6905	Individual Work	1-6
MAE 5945	Secondary School Mathematics Practicum	3-6	EDG 6910	Supervised Research	1-5
MAE 6177	Mathematics Teaching and Learning in Higher Education	3	EDG 6931	Special Topics	1-4
MAE 6313	Problem Solving in School Mathematics	3	EDG 6940	Supervised Teaching	1-5
MAE 6349	Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding	3	EDG 6971	Research for Master's Thesis	1-15
MAE 6916	Inquiry in Mathematics Teaching	3	EDG 6973	Project in Lieu of Thesis	1-9
MAE 7899	Mathematics Education Seminar	3	EDG 7224	Critical Pedagogy	3
MUE 7938	Music Education Seminar	3	EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
RED 5337	Reading in the Secondary School	3	EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
RED 5355	Reading Instruction in the Elementary School	3	EDG 7941	Field Experience in Curriculum and Instruction	1-4
RED 5399	Practices in Beginning Reading Instruction	3	EDG 7979	Advanced Research	1-12
RED 6346	Seminar in Reading	3-6	EDG 7980	Research for Doctoral Dissertation	1-15
RED 6448	Diagnosing and Remediating Reading Difficulties	3	EME 6156	Games and Simulations for Teaching and Learning	3
RED 6520	Classroom Literacy Assessment and Instruction	3	EME 6235	Managing Educational Projects	3
RED 6546C	Diagnosis of Reading Difficulties	3	EME 6236	Distance Education Leadership and Management	3
RED 6548C	Remediation of Reading Difficulties	3	Curriculum, Teaching, and Teacher Education Courses		
RED 6647	Trends in Reading	3	Code	Title	Credits
RED 6843	Reading Practicum	1	EDE 5940	Integrated Teaching and Learning	3
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3	EDE 6266	Teaching and Learning in Elementary Classrooms	3
RED 7019	Foundations of Literacy	3			
SCE 5140	Science Curriculum Development	3			
SCE 5316	Inquiry-Based Science Teaching	3			
SCE 5695	Diversity and Equity in Science Teaching	3			
SCE 5765	Data-Driven Science Instruction	3			

EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	3-12
EDE 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3
LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3

LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4
ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

Science Education (MAE)

SLO 1 Knowledge

The student will identify and describe general and subject-area specific area best practices in teaching and learning in Science Education.

SLO 2 Skills

The student will investigate a significant problem or original question within their specific field of Science Education.

SLO 3 Professional Behavior

The student will apply knowledge of science content and pedagogy to complete a written thesis or project and an oral presentation of research that focuses on a significant problem or original question in Science Education.

Science Education (MEd)

SLO 1 Knowledge

The student will investigate, identify, describe, and explain best practices in science teaching and learning.

SLO 2 Skills

The student will organize content for instruction, develop and implement appropriate inclusive teaching practices, evaluate the impact of instruction on student learning, and create a positive learning environment.

SLO 3 Professional Behavior

The student will collaborate with other professionals, reflect upon their own professional practice, and demonstrate a sense of efficacy and ethical practice.

Social Studies Education

Program Information

The School of Teaching & Learning offers the Master of Arts in Education (M.A.E.) degree in Social Studies Education. More information about the requirements for this degree can be found in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

The M.A.E. degree in Social Studies Education is fully online. The degree does not confer certification; it is geared for practicing teachers who want to advance their Social Studies expertise. The thirty credits of coursework include the requirement that students complete a project in lieu of a thesis. Please visit this website for more information about this M.A.E. program: <https://education.ufl.edu/social-studies-education/degrees/mae-online/>.

For more information, please see our website: <http://education.ufl.edu/social-studies-education/> (<http://education.ufl.edu/social-studies-education/>).

Degrees Offered

Degrees Offered with a Major in Social Studies Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Teaching and Learning Departmental Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	1-12
EDE 7047	Issues in Teacher Education	3
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3
EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6636	Theorizing Race and Racism in Educational Research	3
EDF 6639	Anti-Black Racism in Education	3
EDF 6812	Comparative Education	3
EDF 6866	Education in Latin America	3
EDF 6939	Critical Race Theory in Educational Research	3
EDF 7934	Seminar in Educational Foundations	3
EDG 5666	Knowing and Learning in Secondary Schools	3
EDG 6017	Writing for Academic Purposes	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6228	Qualitative Research for Practitioner Scholars	3
EDG 6229	Qualitative Research in Curriculum and Instruction	3
EDG 6305	Multiple Perspectives on Teaching and Learning	3
EDG 6348	Instructional Coaching for Enhanced Student Learning	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6378	Learning Science with Technology	3

EDG 6415	Culturally Responsive Classroom Management	3	EME 6935	Seminar: Distance Education Issues and Applications	1
EDG 6445	Meeting the Educational Needs of Students Living in Poverty	3	EME 6945	Practicum in Educational Media and Instructional Design	3-8
EDG 6648	Research Design in Curriculum and Instruction	3	EME 7345	Implementing Educational Technology Innovations (ETIs)	3
EDG 6664	Survey of Research on STEM Education	3	EME 7938	Seminar in Educational Media and Instructional Design	3
EDG 6668	Teaching Adults	3	ESE 5426	Data-Driven Decision Making for Secondary Teachers	3
EDG 6805C	K-12 Computer Programming Foundations I	3	ESE 6345	Effective Teaching and Classroom Management	3
EDG 6806C	K-12 Computer Programming Foundations II	3	ESE 6905	Individual Work	1-4
EDG 6807	Issues and Trends in K-12 Computer Science Education	3	ESE 6939	Special Topics	3
EDG 6905	Individual Work	1-6	ESE 6945	Student Teaching in Secondary School	2-9
EDG 6910	Supervised Research	1-5	ETE 6141	K-12 Computer Sc Pedagogy I	3
EDG 6930	Schooling & the Marginalization of Students	3	ETE 6142	K-12 Computer Sc Pedagogy II	3
EDG 6931	Special Topics	1-4	FLE 6165	Bilingual-Bicultural Education	3
EDG 6940	Supervised Teaching	1-5	FLE 6167	Cross-Cultural Communication for Teachers	3
EDG 6953	TLSI Online Portfolio Preparation	1-3	LAE 5341	Language Arts: Teaching Nonfiction Writing	3
EDG 6971	Research for Master's Thesis	1-15	LAE 6298	Literacy & Language Instruction	3
EDG 6973	Project in Lieu of Thesis	1-9	LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
EDG 7224	Critical Pedagogy	3	LAE 6348	Teaching Multiliteracies	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3	LAE 6407	Early Childhood Children's Literature	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3	LAE 6446	Multicultural Literature for Children and Adolescents	3
EDG 7359	Professional Development and Teacher Learning	3	LAE 6865	Teaching Media Literacy with the Internet	3
EDG 7365	Practitioner Research: Data Collection and Analysis	3	LAE 6869	Teaching Digital Storytelling	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4	LAE 6939	Literacy, Family, and Culture	3
EDG 7979	Advanced Research	1-12	LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
EDG 7980	Research for Doctoral Dissertation	1-15	LAE 6946	Children's Literature in Educational Settings	3
EDG 7982	Practitioner Research: Theory & Practice	3	LAE 7934	Seminar in Composition Theory and Practice	3
EME 5054	Foundations of Educational Technology	3	LAE 7936	Seminar in English Language Arts	3
EME 5207	Designing Technology-Rich Curricula	3	LAE 7938	Lit, Cult and Politics	3
EME 5404	Instructional Computing II	3	MAE 5332	Secondary School Mathematics Methods and Assessment	3
EME 5405	Internet in K-12 Instruction	3	MAE 5347	Teaching K-8 Mathematics for Understanding	3
EME 6059	Blended Learning Environments	3	MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
EME 6065	Human-Computer Interaction and the Learner	3	MAE 5945	Secondary School Mathematics Practicum	3-6
EME 6066	Issues and Trends in Educational Technology Research	3	MAE 6177	Mathematics Teaching and Learning in Higher Education	3
EME 6067	Emerging Learning Technologies	3	MAE 6313	Problem Solving in School Mathematics	3
EME 6074	Mobile Technologies in Education	3	MAE 6349	Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding	3
EME 6156	Games and Simulations for Teaching and Learning	3	MAE 6916	Inquiry in Mathematics Teaching	3
EME 6208	Designing Integrated Media Environments I	3	MAE 7899	Mathematics Education Seminar	3
EME 6209	Designing Integrated Media Environments II	3	MUE 7938	Music Education Seminar	3
EME 6235	Managing Educational Projects	3	RED 5337	Reading in the Secondary School	3
EME 6236	Distance Education Leadership and Management	3	RED 5355	Reading Instruction in the Elementary School	3
EME 6458	Distance Teaching and Learning	3	RED 5399	Practices in Beginning Reading Instruction	3
EME 6480	Quantitative Methods in Educational Technology Research	3	RED 6346	Seminar in Reading	3-6
EME 6606	Advanced Instructional Design	3	RED 6448	Diagnosing and Remediating Reading Difficulties	3
EME 6609	Instructional Design	3	RED 6520	Classroom Literacy Assessment and Instruction	3
EME 6637	Managing and Analyzing Multimodal Educational Data	3	RED 6546C	Diagnosis of Reading Difficulties	3
EME 6638	Theory, Design, and Development of Stealth Assessment for Learning	3	RED 6548C	Remediation of Reading Difficulties	3
EME 6645	Neurotechnologies in Education	3	RED 6647	Trends in Reading	3
EME 6651	Learning Analytics Concepts and Techniques	3			

RED 6843	Reading Practicum	1
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6930	Seminar in Science Education	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3
SMT 6066	Data Wrangling and Visualization in Educational Research	3
SMT 6106	Informal STEM Practice	3
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education—Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 5335	ESOL and Reading for Secondary Teachers	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6385	Technology for Language and Reading Education	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6670	Multilingualism from a Global Perspective	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

General Courses

Code	Title	Credits
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6226	Foundations of Research in Curriculum & Instruction	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 6905	Individual Work	1-6
EDG 6910	Supervised Research	1-5
EDG 6931	Special Topics	1-4
EDG 6940	Supervised Teaching	1-5
EDG 6971	Research for Master's Thesis	1-15
EDG 6973	Project in Lieu of Thesis	1-9
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7941	Field Experience in Curriculum and Instruction	1-4
EDG 7979	Advanced Research	1-12
EDG 7980	Research for Doctoral Dissertation	1-15
EME 6156	Games and Simulations for Teaching and Learning	3
EME 6235	Managing Educational Projects	3

EME 6236	Distance Education Leadership and Management	3

Curriculum, Teaching, and Teacher Education Courses

Code	Title	Credits
EDE 5940	Integrated Teaching and Learning	3
EDE 6266	Teaching and Learning in Elementary Classrooms	3
EDE 6325	Teacher Inquiry/Action Research	3
EDE 6905	Individual Work	1-5
EDE 6948	Internship in Elementary Schools	3-12
EDE 7047	Issues in Teacher Education	3
EDG 6356	Teaching, Learning and Assessment	3
EDG 7224	Critical Pedagogy	3
EDG 7252	Perspectives in Curriculum, Teaching, and Teacher Education	3
EDG 7303	Teacher Learning and Socialization in High Poverty Schools	3
EDG 7982	Practitioner Research: Theory & Practice	3

Educational Technology Courses

Code	Title	Credits
EME 5054	Foundations of Educational Technology	3
EME 5207	Designing Technology-Rich Curricula	3
EME 5404	Instructional Computing II	3
EME 5405	Internet in K-12 Instruction	3
EME 6066	Issues and Trends in Educational Technology Research	3
EME 6208	Designing Integrated Media Environments I	3
EME 6209	Designing Integrated Media Environments II	3
EME 6458	Distance Teaching and Learning	3
EME 6606	Advanced Instructional Design	3
EME 6609	Instructional Design	3
EME 6935	Seminar: Distance Education Issues and Applications	1
EME 6945	Practicum in Educational Media and Instructional Design	3-8
EME 7938	Seminar in Educational Media and Instructional Design	3

ESOL/Bilingual Education Courses

Code	Title	Credits
FLE 6165	Bilingual-Bicultural Education	3
FLE 6167	Cross-Cultural Communication for Teachers	3
TSL 5142	ESOL Curriculum, Methods, and Assessment	3
TSL 6145	Curriculum and Materials Development for ESOL K-12	3
TSL 6245	Language Principles for ESOL Teachers	3
TSL 6373	Methods of Teaching ESOL K-12	3
TSL 6440	Testing and Evaluation of ESOL	3
TSL 6700	Issues in ESOL for School Counselors and Psychologists	3

Language and Literacy Education Courses

Code	Title	Credits
LAE 6298	Literacy & Language Instruction	3
LAE 6339	Curriculum, Methods, and Assessment in Secondary English Language Arts	3
LAE 6348	Teaching Multiliteracies	3
LAE 6407	Early Childhood Children's Literature	3

LAE 6446	Multicultural Literature for Children and Adolescents	3
LAE 6865	Teaching Media Literacy with the Internet	3
LAE 6869	Teaching Digital Storytelling	3
LAE 6939	Literacy, Family, and Culture	3
LAE 6945	Practicum and Assessment for Teachers of Secondary School English	3
LAE 6946	Children's Literature in Educational Settings	3
LAE 7934	Seminar in Composition Theory and Practice	3
LAE 7936	Seminar in English Language Arts	3

Mathematics Education Courses

Code	Title	Credits
MAE 5332	Secondary School Mathematics Methods and Assessment	3
MAE 5396	Using Formative Assessment to Improve Mathematical Learning	3
MAE 5347	Teaching K-8 Mathematics for Understanding	3
MAE 5945	Secondary School Mathematics Practicum	3-6
MAE 6313	Problem Solving in School Mathematics	3
MAE 7899	Mathematics Education Seminar	3

Reading Education Courses

Code	Title	Credits
RED 5337	Reading in the Secondary School	3
RED 5355	Reading Instruction in the Elementary School	3
RED 5399	Practices in Beginning Reading Instruction	3
RED 6346	Seminar in Reading	3-6
RED 6520	Classroom Literacy Assessment and Instruction	3
RED 6546C	Diagnosis of Reading Difficulties	3
RED 6548C	Remediation of Reading Difficulties	3
RED 6647	Trends in Reading	3
RED 6941	Practicum in Diagnosis and Remediation of Reading Difficulties	3
RED 7019	Foundations of Literacy	3

Science Education Courses

Code	Title	Credits
SCE 5140	Science Curriculum Development	3
SCE 5316	Inquiry-Based Science Teaching	3
SCE 5695	Diversity and Equity in Science Teaching	3
SCE 5765	Data-Driven Science Instruction	3
SCE 6117	Science Education in the Elementary School	3
SCE 6337	Secondary Science Methods and Assessment	3
SCE 6947	Practicum in Secondary Science Teaching and Assessment	3

Secondary Education Courses

Code	Title	Credits
ESE 6345	Effective Teaching and Classroom Management	3
ESE 6905	Individual Work	1-4
ESE 6939	Special Topics	3
ESE 6945	Student Teaching in Secondary School	3-9

Social Foundations of Education Courses

Code	Title	Credits
EDF 5552	Role of School in Democratic Society	3
EDF 6520	History of Education	3

EDF 6544	Philosophical Foundations of Education	3
EDF 6616	Education and American Culture	3
EDF 6812	Comparative Education	3
EDF 7934	Seminar in Educational Foundations	3

Social Studies Education Courses

Code	Title	Credits
SSE 5945C	Practicum in Secondary Social Studies Teaching and Assessment	3
SSE 6117	Social Studies Education--Elementary School	3
SSE 6133	Secondary School Social Studies Methods and Assessment	3
SSE 6478	Global Studies Methods for Social Studies	3

Teacher Leadership for School Improvement Courses

Code	Title	Credits
EDE 6325	Teacher Inquiry/Action Research	3
EDG 6047	Teacher Leadership for Educational Change	3
EDG 6207	Transforming the Curriculum	3
EDG 6415	Culturally Responsive Classroom Management	3
EDG 6953	TLSI Online Portfolio Preparation	1-3

Student Learning Outcomes

Social Studies Education (MAE)

SLO 1 Knowledge

The student identifies, describes, and explains general and subject-specific best practices in social studies teaching and learning

SLO 2 Skills

The student investigates a significant problem or original question within the field of Social Studies Education

SLO 3 Professional Behavior

The student applies knowledge of social science content and pedagogy and uses critical mindedness and professionalism to investigate a topic within the field of Social Studies Education

Social Studies Education (MEd)

SLO 1 Knowledge

The student will investigate, identify, describe, and explain best practices in social studies teaching and learning

SLO 2 Skills

The student will organize content for instruction, develop and apply appropriate inclusive teaching practices, evaluate the impact of instruction on student learning, and create a positive learning environment

SLO 3 Professional Behavior

The student will collaborate with other professionals, reflect upon their own practice, and demonstrate a sense of efficacy and ethical practice

Special Education, School Psychology and Early Childhood Studies Department

Director: M. Leko

Graduate Coordinator: V. Gonsalves

The School of Special Education, School Psychology, and Early Childhood Studies offers online and face-to-face programs leading to the Master of Education (M.Ed., non-thesis), Master of Arts in Education (M.A.E., thesis), Specialist in Education (Ed.S.), Doctor of Education (Ed.D.), and Doctor of Philosophy (Ph.D.) degrees. Complete descriptions of the requirements for these degrees are provided in the *General Information* section of this catalog.

The School offers graduate study and research experience in 3 areas of specialization: Special Education, School Psychology, and Early Childhood Studies. Programs are accredited by the Florida Department of Education and approved by the National Council for Accreditation of Teacher Education (NCATE). The School Psychology program is approved by the NCATE and the National Association of School Psychologists (NASP). The Ph.D. program in School Psychology is accredited by the American Psychological Association (APA).

For more information, please visit <https://education.ufl.edu/special-education/>.

Majors

- Early Childhood Education (p. 178)
- School Psychology (p. 180)
- Special Education (p. 182)

Faculty

Professor

- Burns, Matthew Kevin
- Leko, Melinda
- Mccray, Erica Djuan
- Smith, Stephen W.
- Snyder, Patricia
- Waldron, Nancy L.

Associate Professor

- Anthony, Christopher James
- Irvin, Dwight W.
- Lane, Holly Barnes
- Maki, Kathrin Elizabeth
- Smith-Bonahue, Tina M.
- Splett, Joni Denise Williams

Assistant Professor

- Brunsting, Nelson Carl
- Cooley, John Lunsford
- Geer, Elyssa Aynslee
- Mathews, Hannah M.

Clinical Assistant Professor

- Chapman, Kathryn Patricia
- Mathien, Tara Dawn

Distinguished Professor

- Brownell, Mary T.

Clinical Associate Professor

- Cheyney-Collante, Kristi Lee
- Cornelius, Kyena Elrod
- Gonsalves, Vivian E.
- MacSuga-Gage, Ashley

Clinical Professor

- Colon, Elayne P.

Research Professor

- Pullen, Paige Cullen

Research Assistant Professor

- Corbin, Catherine Margaret

Affiliated Faculty

- Conroy, Maureen Almaz
Professor
- Lombardino, Linda J.
Professor
- Munson, Melissa Sue
Clinical Assistant Professor
- Nelson, Melanie Mcdiarmid
Clinical Associate Professor
- Romero, Regilda
Clinical Assistant Professor

Early Childhood Education

Overview

The Early Childhood studies program faculty recognize the importance of the three-fold mission of the University and actively seek to prepare early childhood educators who possess the competencies to provide for the education and care of a diverse group of children in inclusive early childhood programs. Effective early childhood programs can alter the lives of children, families, and communities that result in academic, social, personal, and economic benefits. Highly qualified teachers play a critical role in ensuring the success of young children in early childhood programs.

Degrees Offered

Degrees Offered with a Major in Early Childhood Education

- Master of Arts in Education
- Master of Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses**Early Childhood Education Courses**

Code	Title	Credits
EEC 6205	Early Childhood Curriculum	3
EEC 6304	Creativity in the Early Childhood Curriculum	3
EEC 6525	Issues in Child Care Administration	3
EEC 6615	Early Childhood Education: Background and Concepts	3
EEC 6905	Individual Work	1-4
EEC 6910	Supervised Research	1-5
EEC 6933	Special Topics	1-12
EEC 6940	Supervised Teaching	1-5
EEC 7056	Early Childhood Policy and Advocacy	3
EEC 7617	Early Childhood Assessment & Evaluation	3
EEC 7666	Theory and Research in Early Childhood Studies	3
EEC 7979	Advanced Research	1-12
EEC 7980	Research for Doctoral Dissertation	1-15

Special Education, School Psychology and Early Childhood Studies Departmental Courses

Code	Title	Credits
EEC 6205	Early Childhood Curriculum	3
EEC 6304	Creativity in the Early Childhood Curriculum	3
EEC 6326	Social and pre-academic instructional methods for young children	3
EEC 6405	Families as a Context in Early Childhood Studies	3
EEC 6419	Families, Disabilities, and Diversity	3
EEC 6525	Issues in Child Care Administration	3
EEC 6615	Early Childhood Education: Background and Concepts	3
EEC 6636	Examining Practices, Policies, and Key Issues in Early Childhood Policy	3
EEC 6665	History, Child Development, and Equity in Early Childhood Policy	3
EEC 6667	Theory and Analysis in Early Childhood Policy	3
EEC 6818	Assessment and Evaluation in Early Childhood Settings	3
EEC 6905	Individual Work	1-4
EEC 6910	Supervised Research	1-5
EEC 6933	Special Topics	1-12
EEC 6940	Supervised Teaching	1-5
EEC 7056	Early Childhood Policy and Advocacy	3
EEC 7617	Early Childhood Assessment & Evaluation	3
EEC 7666	Theory and Research in Early Childhood Studies	3
EEC 7979	Advanced Research	1-12
EEC 7980	Research for Doctoral Dissertation	1-15
EEX 6053	Foundations of Special Education	3
EEX 6056	Foundations of Special Education 2	3
EEX 6058	Family and Teacher Perspectives on Disability	3
EEX 6072	Accessing Academic and Social Communities for Students with Disabilities	3
EEX 6099	Social Perspectives on Disability	3
EEX 6125	Interventions for Language and Learning Disabilities	3

EEX 6135	Foundations of Literacy Development and Dyslexia	3
EEX 6136	Dyslexia: Language and the Brain	3
EEX 6137	Dyslexia: Assessment for Intervention	3
EEX 6138	Dyslexia: Methods for Intervention	3
EEX 6219	Reading Assessment and Intervention for Students with Disabilities	3
EEX 6222	Evaluation in Special Education	3
EEX 6233	Fundamentals of Academic Assessment and Intervention	3
EEX 6266	Strategies for Teaching and Learning	3
EEX 6290	Mathematics Assessment and Instruction for Struggling Learners	3
EEX 6296	Differentiated Instruction	3
EEX 6308	Single Subject Research Design	3
EEX 6347	Meta-Analysis in Prevention and Intervention Science	3
EEX 6525	Disability Related Policy and Legislation	3
EEX 6640	Prevention in Practice: MTSS & PBIS	3
EEX 6661	Fundamentals of Behavior Assessment and Intervention	3
EEX 6745	Historical and Theoretical Foundations of Disability in Education	3
EEX 6750	Families and Transition for Students with Disabilities	3
EEX 6778	Community and Work Access for Individuals with Disabilities	3
EEX 6786	Collaborative Practice in Inclusive Schools	3
EEX 6841	Practicum in Special Education: Mild Disabilities	1-6
EEX 6855	Dyslexia: Practicum in Dyslexia Assessment and Intervention	3
EEX 6863	Supervised Practice in Special Education	1-6
EEX 6905	Individual Work	1-4
EEX 6910	Supervised Research	1-5
EEX 6930	Seminar in Disabilities	3
EEX 6936	Special Topics	1-3
EEX 6940	Supervised Teaching	1-5
EEX 6971	Research for Master's Thesis	1-15
EEX 6973	Project in Lieu of Thesis	1-6
EEX 7303	Inquiry in Special Education: Analysis of the Literature	3
EEX 7304	Introduction to Field of Inquiry in Special Education	3
EEX 7305	Applied Research in Special Education	3
EEX 7526	Grant Writing Seminar in Education	3
EEX 7787	School Improvement for All Students	3
EEX 7934	Seminar: Trends in Special Education	3
EEX 7979	Advanced Research	1-12
EEX 7980	Research for Doctoral Dissertation	1-15
EEX 7981	Inquiry in SPED: Proposal Development	3
SPS 5000	Introduction to Psychoeducational Assessment	3
SPS 6052	Issues and Problems in School Psychology	3
SPS 6191	Psychoeducational Assessment I	3
SPS 6192	Psychoeducational Assessment II	3
SPS 6193	Academic Assessment & Intervention	3
SPS 6195	Developmental Psychopathology	3
SPS 6197	Psychoeducational Assessment III	3
SPS 6410	Direct Interventions I: Applied Behavior Analysis for School Psychologists	3

SPS 6707	Interventions in School Psychology II: Cognitive Behavioral Interventions	3
SPS 6708	Interventions in School Psychology III: System Level Interventions for Children and Youths	3
SPS 6815	Law and Ethics in Psychology	3
SPS 6905	Individual Study	1-3
SPS 6918	Supervised Research	1-5
SPS 6937	Special Topics in School Psychology	1-3
SPS 6941	Practicum in School Psychology	1-4
SPS 6942	School Psychology Practicum II	1-6
SPS 6945	Advanced Practicum in School Psychology	1-6
SPS 6948	Supervised Teaching	1-5
SPS 7205	School Psychology Consultation	3
SPS 7931	Seminar in School Psychology	1-3
SPS 7949	Internship in School Psychology	3-6
SPS 7979	Advanced Research	1-12
SPS 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Early Childhood Education (MAE)

SLO 1 Knowledge

Apply advanced levels of knowledge in the following core areas: a) curriculum and instruction; b) child development and assessment; c) family, diversity, and community relations; and, d) transition and public policy.

SLO 2 Skills

Apply advanced levels of skill in the following core areas: a) curriculum and instruction; b) child development and assessment; c) family, diversity, and community relations; and d) transition and public policy.

SLO 3 Professional Behavior

Displays ethical behavior, cultural sensitivity, and appropriate professional conduct & communication.

Early Childhood Education (MEd)

SLO 1 Knowledge

Candidates completing the M.Ed. as part of the Unified Early Childhood Teacher Education Program will know and apply early childhood concepts, principles, and teaching theory.

SLO 2 Skills

Candidates will learn and apply effective planning and implementation of classroom-based assessment and instruction.

SLO 3 Professional Behavior

Candidates will display ethical behavior and appropriate professional conduct & communication.

SLO 4 Professional Behavior

Candidates will know and apply cultural sensitivity and teamwork.

School Psychology

Overview

The mission of the University of Florida's School Psychology Program (SPP) is to prepare school psychology practitioners and scholars whose activities promote the psychological and educational development and well-being of children and youth. The program is grounded in a scientist-practitioner model as reflected in its commitment to a synthesis

between science and practice throughout all academic and professional preparation opportunities. As scientists, students develop a solid foundation of content knowledge in core areas of psychology, education, research methods, and professional school psychology. SPP students effectively utilize this body of evolving knowledge to prevent, assess, and intervene regarding psychological and educational issues impacting children, families, and institutions; and to conduct and evaluate basic and applied research. Program faculty strive to demonstrate that scholarly and applied practice roles are not distinct, and instead are inextricably linked when considering the work of school psychologists across a diverse range of practice settings.

The SPP is committed to preparing future school psychologists to assume professional leadership roles in university, school, clinical, and other community settings. Across these settings, school psychologists work to ensure positive educational outcomes for all children and youth, and utilize their professional knowledge and skills to function as change agents. School psychologists help others understand and attain their educational, legal, and individual rights and work to promote change at various levels. To fulfill these critical roles, SPP students develop competencies that sustain their ability to provide a comprehensive range of direct and indirect psychological services to children, youth, their families and educators. This includes competency to use a wide variety of assessment methods; to consult with families, educators and other professionals; to design and implement direct and indirect interventions tailored to individual and group needs; to develop prevention and other intervention programs that promote optimal development; and to evaluate the effectiveness of interventions, programs, and other school psychological services.

The SPP supports the missions of the university and college by preparing well-qualified practitioners and scholars to deliver psychological services and basic and applied research to meet the diverse needs of the diverse global community.

Degrees Offered

Degrees Offered with a Major in School Psychology

- Doctor of Education
- Doctor of Philosophy
 - concentration in Early Childhood Studies
- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School Psychology Courses

Code	Title	Credits
SPS 6052	Issues and Problems in School Psychology	3
SPS 6191	Psychoeducational Assessment I	3
SPS 6192	Psychoeducational Assessment II	3
SPS 6193	Academic Assessment & Intervention	3
SPS 6195	Developmental Psychopathology	3
SPS 6197	Psychoeducational Assessment III	3
SPS 6410	Direct Interventions I: Applied Behavior Analysis for School Psychologists	3

SPS 6707	Interventions in School Psychology II: Cognitive Behavioral Interventions	3
SPS 6708	Interventions in School Psychology III: System Level Interventions for Children and Youths	3
SPS 6815	Law and Ethics in Psychology	3
SPS 6937	Special Topics in School Psychology	1-3
SPS 6941	Practicum in School Psychology	1-4
SPS 6942	School Psychology Practicum II	1-6
SPS 6945	Advanced Practicum in School Psychology	1-6
SPS 7205	School Psychology Consultation	3
SPS 7931	Seminar in School Psychology	1-3
SPS 7949	Internship in School Psychology	3-6
SPS 7979	Advanced Research	1-12
SPS 7980	Research for Doctoral Dissertation	1-15

Special Education, School Psychology and Early Childhood Studies Departmental Courses

Code	Title	Credits
EEC 6205	Early Childhood Curriculum	3
EEC 6304	Creativity in the Early Childhood Curriculum	3
EEC 6326	Social and pre-academic instructional methods for young children	3
EEC 6405	Families as a Context in Early Childhood Studies	3
EEC 6419	Families, Disabilities, and Diversity	3
EEC 6525	Issues in Child Care Administration	3
EEC 6615	Early Childhood Education: Background and Concepts	3
EEC 6636	Examining Practices, Policies, and Key Issues in Early Childhood Policy	3
EEC 6665	History, Child Development, and Equity in Early Childhood Policy	3
EEC 6667	Theory and Analysis in Early Childhood Policy	3
EEC 6818	Assessment and Evaluation in Early Childhood Settings	3
EEC 6905	Individual Work	1-4
EEC 6910	Supervised Research	1-5
EEC 6933	Special Topics	1-12
EEC 6940	Supervised Teaching	1-5
EEC 7056	Early Childhood Policy and Advocacy	3
EEC 7617	Early Childhood Assessment & Evaluation	3
EEC 7666	Theory and Research in Early Childhood Studies	3
EEC 7979	Advanced Research	1-12
EEC 7980	Research for Doctoral Dissertation	1-15
EEC 6053	Foundations of Special Education	3
EEC 6056	Foundations of Special Education 2	3
EEC 6058	Family and Teacher Perspectives on Disability	3
EEC 6072	Accessing Academic and Social Communities for Students with Disabilities	3
EEC 6099	Social Perspectives on Disability	3
EEC 6125	Interventions for Language and Learning Disabilities	3
EEC 6135	Foundations of Literacy Development and Dyslexia	3
EEC 6136	Dyslexia: Language and the Brain	3
EEC 6137	Dyslexia: Assessment for Intervention	3

EEX 6138	Dyslexia: Methods for Intervention	3
EEX 6219	Reading Assessment and Intervention for Students with Disabilities	3
EEX 6222	Evaluation in Special Education	3
EEX 6233	Fundamentals of Academic Assessment and Intervention	3
EEX 6266	Strategies for Teaching and Learning	3
EEX 6290	Mathematics Assessment and Instruction for Struggling Learners	3
EEX 6296	Differentiated Instruction	3
EEX 6308	Single Subject Research Design	3
EEX 6347	Meta-Analysis in Prevention and Intervention Science	3
EEX 6525	Disability Related Policy and Legislation	3
EEX 6640	Prevention in Practice: MTSS & PBIS	3
EEX 6661	Fundamentals of Behavior Assessment and Intervention	3
EEX 6745	Historical and Theoretical Foundations of Disability in Education	3
EEX 6750	Families and Transition for Students with Disabilities	3
EEX 6778	Community and Work Access for Individuals with Disabilities	3
EEX 6786	Collaborative Practice in Inclusive Schools	3
EEX 6841	Practicum in Special Education: Mild Disabilities	1-6
EEX 6855	Dyslexia: Practicum in Dyslexia Assessment and Intervention	3
EEX 6863	Supervised Practice in Special Education	1-6
EEX 6905	Individual Work	1-4
EEX 6910	Supervised Research	1-5
EEX 6930	Seminar in Disabilities	3
EEX 6936	Special Topics	1-3
EEX 6940	Supervised Teaching	1-5
EEX 6971	Research for Master's Thesis	1-15
EEX 6973	Project in Lieu of Thesis	1-6
EEX 7303	Inquiry in Special Education: Analysis of the Literature	3
EEX 7304	Introduction to Field of Inquiry in Special Education	3
EEX 7305	Applied Research in Special Education	3
EEX 7526	Grant Writing Seminar in Education	3
EEX 7787	School Improvement for All Students	3
EEX 7934	Seminar: Trends in Special Education	3
EEX 7979	Advanced Research	1-12
EEX 7980	Research for Doctoral Dissertation	1-15
EEX 7981	Inquiry in SPED: Proposal Dev	3
SPS 5000	Introduction to Psychoeducational Assessment	3
SPS 6052	Issues and Problems in School Psychology	3
SPS 6191	Psychoeducational Assessment I	3
SPS 6192	Psychoeducational Assessment II	3
SPS 6193	Academic Assessment & Intervention	3
SPS 6195	Developmental Psychopathology	3
SPS 6197	Psychoeducational Assessment III	3
SPS 6410	Direct Interventions I: Applied Behavior Analysis for School Psychologists	3
SPS 6707	Interventions in School Psychology II: Cognitive Behavioral Interventions	3
SPS 6708	Interventions in School Psychology III: System Level Interventions for Children and Youths	3

SPS 6815	Law and Ethics in Psychology	3
SPS 6905	Individual Study	1-3
SPS 6918	Supervised Research	1-5
SPS 6937	Special Topics in School Psychology	1-3
SPS 6941	Practicum in School Psychology	1-4
SPS 6942	School Psychology Practicum II	1-6
SPS 6945	Advanced Practicum in School Psychology	1-6
SPS 6948	Supervised Teaching	1-5
SPS 7205	School Psychology Consultation	3
SPS 7931	Seminar in School Psychology	1-3
SPS 7949	Internship in School Psychology	3-6
SPS 7979	Advanced Research	1-12
SPS 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

School psychology (PHD)

SLO 1 Knowledge

Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2 Skills

Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment results.

SLO 3 Skills

Candidates will present orally and in writing the results and applications of their research and scholarship to demonstrate research proficiency.

SLO 4 Professional Behavior

Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

School psychology (edd)

SLO 1 Knowledge

Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2 Skills

Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment results.

SLO 3 Skills

Candidates will present orally and in writing the results and applications of their research and scholarship.

SLO 4 Professional Behavior

Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

School psychology (eds)

SLO 1 Knowledge

Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2 Skills

Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment.

SLO 3 Professional Behavior

Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

School Psychology (MAE)

SLO 1 Knowledge

Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2 Skills

Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment.

SLO 3 Professional Behavior

Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

School Psychology (MEd)

SLO 1 Knowledge Candidates will identify knowledge of core school psychology content areas including: psychological foundations, assessment, consultation, academic and behavioral interventions, counseling, professional and ethical standards.

SLO 2 Skills

Candidates will design, implement, and evaluate an empirically validated intervention to demonstrate proficiency in using psychological assessment results.

SLO 3 Professional Behavior

Candidates will display professional behaviors and attitudes consistent with School Psychology professional standards and ethical principles including: effective communication and interpersonal skills, respect for diversity and individual differences, and responsive to supervisory feedback.

Special Education

Overview

The mission of the Special Education program area is to promote the successful inclusion of individuals with disabilities and their families in

society through excellence in the education of teachers and leaders, the generation of new knowledge, and the application of existing knowledge.

UF seeks to strengthen the human condition and improve the quality of life for the citizens of Florida, the nation, and the world by pursuing new knowledge and its dissemination while building upon the rich experiences of the past. The University values quality and inclusive public education, leading-edge research, and meaningful outreach and public service as ways to distinguish itself among the finest public universities in the nation. The University of Florida must create the broadly diverse environment necessary to foster multi-cultural skills and perspectives in its teaching and research for its students to contribute and succeed in the world of the 21st century.

In keeping with this institutional perspective, the faculty in the special education doctoral program recognizes the importance of the three-fold mission and actively seek to improve the lives and outcomes of individuals with disabilities from birth through adulthood and their families (a) by generating new knowledge through a variety of research endeavors, (b) through practical application of knowledge in real world settings, and (c) by preparing doctoral students for leadership roles in colleges, universities, research centers, public policy institutes, professional associations, school districts or human service agencies.

The Special Education doctoral program faculty is committed to fostering a research community among professors and doctoral students whose work directly contributes to the advancement and betterment of infants, toddlers, children, youth, and adults with disabilities and their families and teachers.

Degrees Offered

Degrees Offered with a Major in Special Education

- Doctor of Education
- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Early Childhood Studies
 - *optional second concentration in Clinical and Translational Science*
- Master of Arts in Education
- Master of Education
- Specialist in Education

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Special Education Courses

Code	Title	Credits
EEX 6053	Foundations of Special Education	3
EEX 6072	Accessing Academic and Social Communities for Students with Disabilities	3
EEX 6125	Interventions for Language and Learning Disabilities	3
EEX 6219	Reading Assessment and Intervention for Students with Disabilities	3
EEX 6222	Evaluation in Special Education	3

EEX 6233	Fundamentals of Academic Assessment and Intervention	3
EEX 6661	Fundamentals of Behavior Assessment and Intervention	3
EEX 6750	Families and Transition for Students with Disabilities	3
EEX 6786	Collaborative Practice in Inclusive Schools	3
EEX 6841	Practicum in Special Education: Mild Disabilities	1-6
EEX 6863	Supervised Practice in Special Education	1-6
EEX 6905	Individual Work	1-4
EEX 6910	Supervised Research	1-5
EEX 6936	Special Topics	1-3
EEX 6940	Supervised Teaching	1-5
EEX 6971	Research for Master's Thesis	1-15
EEX 6296	Differentiated Instruction	3
EEX 7303	Inquiry in Special Education: Analysis of the Literature	3
EEX 7304	Introduction to Field of Inquiry in Special Education	3
EEX 7526	Grant Writing Seminar in Education	3
EEX 7787	School Improvement for All Students	3
EEX 7934	Seminar: Trends in Special Education	3
EEX 7979	Advanced Research	1-12
EEX 7980	Research for Doctoral Dissertation	1-15

Special Education, School Psychology and Early Childhood Studies Departmental Courses

Code	Title	Credits
EEC 6205	Early Childhood Curriculum	3
EEC 6304	Creativity in the Early Childhood Curriculum	3
EEC 6326	Social and pre-academic instructional methods for young children	3
EEC 6405	Families as a Context in Early Childhood Studies	3
EEC 6419	Families, Disabilities, and Diversity	3
EEC 6525	Issues in Child Care Administration	3
EEC 6615	Early Childhood Education: Background and Concepts	3
EEC 6636	Examining Practices, Policies, and Key Issues in Early Childhood Policy	3
EEC 6665	History, Child Development, and Equity in Early Childhood Policy	3
EEC 6667	Theory and Analysis in Early Childhood Policy	3
EEC 6818	Assessment and Evaluation in Early Childhood Settings	3
EEC 6905	Individual Work	1-4
EEC 6910	Supervised Research	1-5
EEC 6933	Special Topics	1-12
EEC 6940	Supervised Teaching	1-5
EEC 7056	Early Childhood Policy and Advocacy	3
EEC 7617	Early Childhood Assessment & Evaluation	3
EEC 7666	Theory and Research in Early Childhood Studies	3
EEC 7979	Advanced Research	1-12
EEC 7980	Research for Doctoral Dissertation	1-15
EEX 6053	Foundations of Special Education	3
EEX 6056	Foundations of Special Education 2	3

EEX 6058	Family and Teacher Perspectives on Disability	3	SPS 6192	Psychoeducational Assessment II	3
EEX 6072	Accessing Academic and Social Communities for Students with Disabilities	3	SPS 6193	Academic Assessment & Intervention	3
EEX 6099	Social Perspectives on Disability	3	SPS 6195	Developmental Psychopathology	3
EEX 6125	Interventions for Language and Learning Disabilities	3	SPS 6197	Psychoeducational Assessment III	3
EEX 6135	Foundations of Literacy Development and Dyslexia	3	SPS 6410	Direct Interventions I: Applied Behavior Analysis for School Psychologists	3
EEX 6136	Dyslexia: Language and the Brain	3	SPS 6707	Interventions in School Psychology II: Cognitive Behavioral Interventions	3
EEX 6137	Dyslexia: Assessment for Intervention	3	SPS 6708	Interventions in School Psychology III: System Level Interventions for Children and Youths	3
EEX 6138	Dyslexia: Methods for Intervention	3	SPS 6815	Law and Ethics in Psychology	3
EEX 6219	Reading Assessment and Intervention for Students with Disabilities	3	SPS 6905	Individual Study	1-3
EEX 6222	Evaluation in Special Education	3	SPS 6918	Supervised Research	1-5
EEX 6233	Fundamentals of Academic Assessment and Intervention	3	SPS 6937	Special Topics in School Psychology	1-3
EEX 6266	Strategies for Teaching and Learning	3	SPS 6941	Practicum in School Psychology	1-4
EEX 6290	Mathematics Assessment and Instruction for Struggling Learners	3	SPS 6942	School Psychology Practicum II	1-6
EEX 6296	Differentiated Instruction	3	SPS 6945	Advanced Practicum in School Psychology	1-6
EEX 6308	Single Subject Research Design	3	SPS 6948	Supervised Teaching	1-5
EEX 6347	Meta-Analysis in Prevention and Intervention Science	3	SPS 7205	School Psychology Consultation	3
EEX 6525	Disability Related Policy and Legislation	3	SPS 7931	Seminar in School Psychology	1-3
EEX 6640	Prevention in Practice: MTSS & PBIS	3	SPS 7949	Internship in School Psychology	3-6
EEX 6661	Fundamentals of Behavior Assessment and Intervention	3	SPS 7979	Advanced Research	1-12
EEX 6745	Historical and Theoretical Foundations of Disability in Education	3	SPS 7980	Research for Doctoral Dissertation	1-15
EEX 6750	Families and Transition for Students with Disabilities	3			
EEX 6778	Community and Work Access for Individuals with Disabilities	3			
EEX 6786	Collaborative Practice in Inclusive Schools	3			
EEX 6841	Practicum in Special Education: Mild Disabilities	1-6			
EEX 6855	Dyslexia: Practicum in Dyslexia Assessment and Intervention	3			
EEX 6863	Supervised Practice in Special Education	1-6			
EEX 6905	Individual Work	1-4			
EEX 6910	Supervised Research	1-5			
EEX 6930	Seminar in Disabilities	3			
EEX 6936	Special Topics	1-3			
EEX 6940	Supervised Teaching	1-5			
EEX 6971	Research for Master's Thesis	1-15			
EEX 6973	Project in Lieu of Thesis	1-6			
EEX 7303	Inquiry in Special Education: Analysis of the Literature	3			
EEX 7304	Introduction to Field of Inquiry in Special Education	3			
EEX 7305	Applied Research in Special Education	3			
EEX 7526	Grant Writing Seminar in Education	3			
EEX 7787	School Improvement for All Students	3			
EEX 7934	Seminar: Trends in Special Education	3			
EEX 7979	Advanced Research	1-12			
EEX 7980	Research for Doctoral Dissertation	1-15			
EEX 7981	Inquiry in SPED: Proposal Dev	3			
SPS 5000	Introduction to Psychoeducational Assessment	3			
SPS 6052	Issues and Problems in School Psychology	3			
SPS 6191	Psychoeducational Assessment I	3			

Student Learning Outcomes

Special Education (PhD)

SLO 1 Knowledge

Candidates will apply advanced levels of knowledge in the following core areas: (a) trends and issues in Special Education and their relationship to practice, policy, and research; (b) acquisition, organization, and interpretation of information about research in Special Education; c) identification of research questions and methodology emanating from different knowledge paradigms; and, (d) critique of Special Education research and practice from various knowledge paradigms.

SLO 2 Skills

Candidates will attain the technical knowledge and skills to become independent scholars capable of conducting research and evaluating educational programs, products, and practices.

SLO 3 Professional Behavior

Candidates will give a presentation to other professionals or submit a paper for publication based on a research project.

Special education (edd)

SLO 1 Knowledge

Candidates will apply advanced levels of knowledge in the following core areas: (a) trends and issues in Special Education and their relationship to practice, policy, and research; (b) acquisition, organization, and interpretation of information about research in Special Education; c) identification of research questions and methodology emanating from different knowledge paradigms; and, (d) critique of Special Education research and practice from various knowledge paradigms.

SLO 2 Skills

Candidates will attain the technical knowledge and skills to become independent scholars capable of conducting research and evaluating educational programs, products, and practices.

SLO 3 Professional Behavior

Candidates will give a presentation to other professionals or submit a paper for publication based on a research project.

special education (eds)

SLO 1 Knowledge

Program participants will identify and apply effective academic and behavioral interventions for students with disabilities and other learning differences.

SLO 2 Knowledge

Program participants will identify and discuss an area of study within the field of special education (e.g. reading; transition; behavior).

SLO 3 Skills

Program participants will use a variety of techniques/tools to determine academic and behavioral needs of students with disabilities and other learning differences.

SLO 4 Skills

Program participants will use professional literature to discuss current issues in special education.

SLO 5 Professional Behavior

Program participants will demonstrate leadership and professional growth through involvement in collaborative (e.g. consultation; coteaching), participatory (e.g. attending professional conferences), and/or leadership activities (e.g. conducting school/district level inservice, conference presentations, mentoring a new teacher).

Special Education (MAE)

SLO 1 Knowledge

Program participants will identify and apply effective academic and behavioral interventions for students with disabilities and other learning differences

SLO 2 Skills

Program participants will use a variety of techniques/tools to determine academic and behavioral needs of students with disabilities and other learning differences

SLO 4 Professional Behavior

Program participants will use data to monitor progress and make decisions regarding academic and behavioral programs and instruction for students with disabilities and other learning differences

Special Education (MEd)

SLO 1 Knowledge

Program participants will identify and apply effective academic and behavioral interventions for students with disabilities and other learning differences

SLO 2 Skills

Program participants will use a variety of techniques/tools to determine academic and behavioral needs of students with disabilities and other learning differences

SLO 4 Professional Behavior

Program participants will use data to monitor progress and make decisions regarding academic and behavioral programs and instruction for students with disabilities and other learning differences

College of Health and Human Performance

Dean: M. Reid

Research and teaching in HHP have an impact on almost every aspect of the human condition. The college's three centers – the Center for Exercise Science (<http://apk.hhp.ufl.edu/index.php/departments-centers/center-for-exercise-science-ces/>), the Center for Behavioral Economic Health Research (<http://hhp.ufl.edu/faculty-research/centers-institutes/cbehr/>), and the Eric Friedheim Tourism Institute (<http://efti.hhp.ufl.edu/>) – as well as its four primary departments – Applied Physiology and Kinesiology (p. 185), Health Education and Behavior (p. 188), Sport Management (<https://gradcatalog.ufl.edu/graduate/colleges-departments/health-human-performance/sport-management/>), and Tourism, Hospitality, and Event Management (<https://gradcatalog.ufl.edu/graduate/colleges-departments/health-human-performance/tourism-hospitality-event-management/>) – place the college firmly in a position to influence and improve an array of societal problems and challenges.

For more information about the College of Health and Human Performance, please see our website: <http://hhp.ufl.edu>

Departments

- Applied Physiology and Kinesiology (p. 185)
 - Applied Physiology and Kinesiology (p. 187)
- Health Education & Behavior (p. 188)
 - Health Education and Behavior (p. 189)
- Health and Human Performance (p. 190)
- Sport Management (p. 192)
 - Sport Management (p. 193)
- Tourism, Hospitality, and Event Management (p. 194)
 - Tourism, Hospitality and Event Management (p. 195)

Faculty

Complete faculty listings: Follow this link (<http://hhp.ufl.edu/about/faculty-staff/>).

Applied Physiology and Kinesiology Department

Chair: D. Vaillancourt

Graduate Coordinator: R. Seidler

Complete faculty listing by department: Follow this link (<http://hhp.ufl.edu/about/faculty-staff/apk/>).

The **Ph.D. program** is offered with concentrations in biobehavioral science and exercise physiology. Students in the biobehavioral science concentration specialize in one of four areas: biomechanics, performance psychology, motor control / learning, or sports medicine. These interdisciplinary concentrations focus on preparing students as researchers with a blend of course work and research training.

Programs leading to the **Master of Science** degree in applied physiology and kinesiology (thesis and non-thesis options) are also offered. Areas of concentration for the master's program include biobehavioral science, exercise physiology, and human performance. The thesis option gives the student an opportunity to study, conduct research, and prepare a

thesis in an area of special interest. The non-thesis option offers the student a specialization in a selected area of study, with additional work in other complimentary areas to meet the student's interests and the specialty skills needed to be leaders in the field. A comprehensive written examination is required for this option, as is a capstone internship experience. Requirements for these degrees are given in the *General Information* section of this catalog.

Biobehavioral Science: This thesis mandatory concentration is multidisciplinary and flexible, permitting students to tailor their scholarly experience to the development of research skills in one of several related disciplines: biomechanics, motor control and learning, and performance psychology. Each area of specialization is briefly described below.

- **Biomechanics:** The specialization in biomechanics draws from the fields of neuroscience, engineering, and medicine. The course work and training include kinematics and kinetics of movement. Course work also includes anatomy/kinesiology, biomechanics, engineering, neuroscience, medicine, psychology, physical therapy, and statistics.
- **Motor learning / control:** This interdisciplinary specialization draws on experiences and a knowledge base in the movement and sport sciences, cognitive sciences, and physical therapy. Students are prepared to conduct research and provide expertise in traditional motor performance and learning settings.
- **Performance psychology:** This area of specialization provides the basis for understanding and influencing the underlying thought processes and attitudes that will ultimately determine the performance of individuals involved in sport, exercise, and other achievement oriented activities. The primary emphasis is to develop the scientific background and skills necessary for doctoral training and research.

Exercise physiology: This thesis mandatory area of concentration is concerned with the scientific study of how the various physiological systems of the human body respond to physical activity. It is a multidisciplinary field with strong ties to the basic life sciences and medicine, and application to clinical, normal, and athletic populations.

Human performance: This non-thesis master's concentration merges a range of specializations within the Department into a curriculum that provides educational experiences to graduate students interested in studying the factors that determine human performance in both athletic and nonathletic domains. This flexible approach allows students to focus on specific applications that best meet their individual interests. Human performance incorporates components such as nutrition, psychology, motor behavior, and physiology that are applicable to athletic and clinical populations.

Majors

- Applied Physiology and Kinesiology (p. 187)

Faculty

Professor

- Barton, Elisabeth R.
- Cauraugh, James H.
- Christou, Evangelos A.
- Clanton, Thomas Lindsay
- Hass, Christopher J.
- Janelle, Christopher M.
- Reid, Michael B.

- Seidler, Rachael Dianne
- Vaillancourt, David E.

Associate Professor

- Borsa, Paul A.
- Christou, Demetra Demetriou
- Coombes, Stephen A.
- Ryan, Terence E.

Assistant Professor

- Adolphs, Max
- Choi, Julia
- Gordon, Benjamin T.
- Guarin Lopez, Diego Luis
- Laitano Lionello Neto, Orlando
- Mann, Derek Thomas
- Smuder, Ashley Joslin
- Vahdat, Shahabeddin
- Wang, Zheng
- Wei-LaPierre, Lan

Lecturer

- Beatty, Garrett Freeman
- Gardner, Anna Katlyn
- Mani, Diba

Clinical Associate Professor

- Brown, Christopher D.

Clinical Professor

- Tripp, Brady L.
- Tripp, Patricia M.

Senior Lecturer

- Harrison, Blain Christopher

Master Lecturer

- Ahlgren, Joslyn Korrin

Affiliated Faculty

- Clark, David J.
Associate Professor
- Costello, Kerry E.
Assistant Professor
- Cruz-Almeida, Yenisel
Associate Professor
- Liu, Bin
Assistant Professor
- Manini, Todd M.
Professor
- Mickle, Aaron
Assistant Professor
- Scali, Salvatore
Professor

- Taivassalo, Tanja
Research Associate Professor
- Vedam-Mai, Vinata
Research Assistant Professor
- Vincent, Heather K.
Associate Professor

Applied Physiology and Kinesiology Program Information

Graduate study in Applied Physiology and Kinesiology (APK) is focused on research in concentration areas including: biomechanics; motor control and learning; exercise physiology; and performance psychology. Graduate students are exposed to and directly involved in research covering the full multidisciplinary spectrum of human potential from young to old, fit to unfit, healthy to diseased, able-bodied to disabled, and from the casual recreational participant to the high-level athlete. In addition to human performance issues, APK faculty and students study the immediate and lasting effects of exercise and its use in disease prevention and rehabilitation.

For more information, please see our website: <http://apk.hhp.ufl.edu/index.php/current-students/prospective-students> (<http://apk.hhp.ufl.edu/index.php/current-students/prospective-students/>).

Degrees Offered

Degrees Offered with a Major in Applied Physiology and Kinesiology

- Doctor of Philosophy
 - concentration in Biobehavioral Science
 - *optional second concentration in Clinical and Translational Science*
 - concentration in Exercise Physiology
 - *optional second concentration in Clinical and Translational Science*
- Master of Science
 - without a concentration
 - concentration in Biobehavioral Science
 - concentration in Clinical Exercise Physiology
 - concentration in Exercise Physiology
 - concentration in Human Performance

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Applied Physiology and Kinesiology Departmental Courses

Code	Title	Credits
APK 5102	Kinetic Anatomy	3
APK 5121	Anatomy and Physiology for Sport and Exercise Science	3
APK 5127	Assessment in Exercise Science	3
APK 5133	Human Pathophysiology for the Exercise Sciences	3
APK 5150C	Clinical Anatomy for the Exercise Sciences	3
APK 5166	Sports Supplements	3

APK 5171	Clinical Exercise Prescription	3
APK 5177	Strength and Conditioning for Beginning Practitioners	3
APK 5404	Sport Psychology	3
APK 5620	Genetics of Human Performance	3
APK 5702	Applied Sport Science	3
APK 6116C	Physiological Bases of Exercise and Sport Sciences	3
APK 6118	Neuromuscular Adaptation to Exercise	3
APK 6124	Extreme Environment Physiology	3
APK 6145	Movement Disorders	3
APK 6167	Nutrition Aspects of Human Performance	3
APK 6170	Advanced Exercise Physiology	3
APK 6176	Strength and Conditioning for Advanced Practitioners	3
APK 6195	Cell Physiology & Biophysics	0
APK 6205C	Nature and Bases of Motor Performance	3
APK 6206	Planning Motor Actions	3
APK 6225	Biomechanical Instrumentation	3
APK 6226C	Biomechanics of Human Motion	3
APK 6320C	Corrective Exercise	3
APK 6406	Exercise Psychology	3
APK 6408	Performance Enhancement	3
APK 6417	Attention & Emotion in Tactical Athlete Populations	3
APK 6611	Tactical Strength & Conditioning	3
APK 6704	MATLAB for Biomedical Sciences	3
APK 6715	Grant Writing in Health & Human Performance	3
APK 6725	AI for Sport & Movement Sciences	3
APK 6900	Directed Independent Study	1-5
APK 6940	Advanced Practicum in Exercise and Sport Science	3-6
APK 7107	Cardiovascular Exercise Physiology	3
APK 7108	Environmental Stress Exercise Physiology	3
APK 7117	Exercise Metabolism	3
ATR 6124	Clinical Anatomy for the Exercise Sciences	3
ATR 6215	Evidence-Based Orthopedic Exam I: Upper-Extremity	3
ATR 6216	Evidence-Based Orthopedic Exam II: Lower-Extremity	3
ATR 6304	Rehabilitation and Modalities of Athletic Injuries	3
ATR 6624	Athletic Training Research and Technology I	3
ATR 6625	Athletic Training Research and Technology II	3
ATR 6934	Seminar in Athletic Training	3
HLP 6515	Evaluation Procedures in Health and Human Performance	3
HLP 6535	Research Methods in Health and Human Performance	3
HLP 6911	Research Seminar	1
HLP 6935	Variable International Topics	1-6
HLP 7939	HHP PhD Professional Development Seminar	3
HLP 7979	Advanced Research in Health and Human Performance	1-12
HLP 7980	Research for Doctoral Dissertation	1-15
PET 5064	Athlete Sexual Health and Wellness	3
PET 5936	Special Topics/Seminars	1-3
PET 6910	Supervised Research	1-5

PET 6947	Graduate Internship in Exercise and Sport Sciences	3-9
PET 6971	Research for Master's Thesis	1-15

Student Learning Outcomes

Applied Physiology & Kinesiology (MS)

SLO 1 Subject Matter

Discuss, explain, and defend subject matter relevant to the discipline – exercise physiology, biobehavioral science, clinical exercise physiology, human performance, athletic training

SLO 2 Discipline specific skills

Discuss, explain, and defend in the discipline specific skills - exercise physiology, biobehavioral science, clinical exercise physiology, human performance, athletic training

SLO 3 Professional Behavior

Display ethical behavior, cultural sensitivity, team work, professional conduct and professional communication

Health Education and Behavior Department

Chair: M. Maldonado-Molina

Graduate Coordinator: A. Mobley

Complete faculty listing by department: Follow this link (<http://hhp.ufl.edu/about/faculty-staff/heb/>).

The Department of Health Education and Behavior offers a Doctor of Philosophy (Ph.D.) in Health and Human Performance with a concentration in Health Behavior, a non-thesis 30-credit hour Master of Science and a 36-credit Master of Science (M.S.) in Health Education and Behavior. Requirements for the Ph.D. and M.S. degrees are given in the Graduate Degrees section of this catalog.

The Ph.D. degree program trains health behavior researchers for academic positions in federal health agencies such as the Centers for Disease Control and Prevention and the National Institutes of Health, for postdoctoral research fellowships, and for the private sector.

The 30-credit hour, non-thesis M.S. degree program is designed for students seeking an advanced practitioner's degree. A distinctive feature of this option allows students to choose a minimum of 15 credit hours of major elective coursework that matches their interests with faculty expertise to plan a program that achieves their professional goals. The degree prepares health promotion specialists to work in local, state, and federal health agencies, nongovernmental health organizations, patient care settings, and the private sector. Full-time students can complete this M.S. option in one year. This degree may also give students unique and distinguishing training experiences when applying to professional schools such as law, medicine, physician assistant, dentistry, chiropractic, osteopathy, nursing, occupational therapy, and physical therapy.

The 36-credit hour project in lieu of thesis, and the 36-credit hour thesis options are designed for students interested in developing research skills through conducting evaluation projects and empirical studies, as well as pursuing advanced graduate study, particularly the doctoral degree. Students typically can complete these options in about 4 semesters. The Department also offers an accelerated B.S./M.S. program in Health Education and Behavior to enable students to receive both B.S. and M.S.

degrees with a reduction of 12 credits (about one semester of course work).

Students who complete a graduate degree program in the Department of Health Education and Behavior acquire a range of skills required to research, plan, implement, and evaluate health promotion policies and programs aimed at improving the health and well-being of individuals, families, and communities. Specific skills include:

- Conducting needs and capacity assessments to identify health priorities
- Planning, implementing, and evaluating health promotion policies and programs
- Conducting research on questions associated with determinants of health, as well as health promotion policies and programs
- Administering and managing health promotion programs
- Advocating for health promotion policies and programs in schools, communities, health care facilities, and worksites
- Developing social marketing and health communication messages and campaigns
- Researching and developing social media and new media-based health promotion applications
- Serving as a resource person for health information and referrals
- Using a variety of teaching-learning strategies appropriate to the target audience and setting
- Writing scholarly and professional articles
- Working collaboratively with public and private agencies, nongovernmental organizations (NGOs), and the private sector to achieve the goal of a healthier population.

This degree prepares the health promotion specialists and health behavior scientists to work in:

- Local, state, and federal health, education and social agencies
- Nongovernmental health organizations
- Schools and universities
- Healthcare settings
- Private sector

Sample position titles for individuals with this degree include:

- Health education specialist
- Health promotion specialist
- Public health adviser or public health analyst
- Health promotion coordinator or health promotion consultant
- Campus health educator or patient health educator,
- Health communication specialist
- Wellness specialist
- Wellness promotion coordinator
- Prevention specialist

For additional information, visit <http://www.heb.hhp.ufl.edu>. (<http://www.heb.hhp.ufl.edu>)

Majors

- Health Education and Behavior (p. 189)

Faculty

Professor

- Maldonado Molina, Mildred Merisa
- Tucker, Jalie A.

Associate Professor

- Cheong, JeeWon
- James, Delores Corinne
- McVay, Megan Apperson
- Mobley, Amy Rossi

Assistant Professor

- Berry, Meredith S.
- Hone, Liana
- Jake-Schoffman, Danielle Erin
- Reesor-Oyer, Layton
- Scaglione Palchick, Nichole Marie
- Wende, Marilyn E.

Health Education and Behavior

Program Information

The 30-credit hour, non-thesis Master of Science in Health Education and Behavior degree program is designed for students seeking an advanced practitioner's degree. A distinctive feature of this option allows students to choose a minimum of 15 credit hours of major elective coursework that matches their interests with faculty expertise to plan a program that achieves their professional goals. The degree prepares health promotion specialists to work in local, state, and federal health agencies, nongovernmental health organizations, patient care settings, and the private sector.

The 30-credit, non-thesis Pre-Professional Health Science Track is designed for students seeking a career in health care. This option allows you to choose a minimum of 12 credits of basic science elective coursework which are prerequisites for dental, medical, nursing, occupational therapy, physician assistant, physical therapy, and other health professional programs including 6 credits of undergraduate science courses (3000-4999). This degree track prepares students who are interested in graduate studies in the health sciences and/or pursuing health professional training. Full-time students can complete the 30-credit hour M.S. options in one year.

The 36-credit Thesis and the 36-credit Project In Lieu Of Thesis Master of Science in Health Education and Behavior degree options are designed for students interested in improving their research skills through conducting evaluation projects and empirical studies, as well as pursuing advanced graduate study, particularly the doctoral degree. Students typically complete these options in about 4 semesters.

For more information, please see our website: <http://hhp.ufl.edu/about/departments/heb/>.

Degrees Offered

Degrees Offered with a Major in Health Education and Behavior

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Health Education and Behavior Departmental Courses

Code	Title	Credits
HLP 6515	Evaluation Procedures in Health and Human Performance	3
HLP 6535	Research Methods in Health and Human Performance	3
HLP 6911	Research Seminar	1
HLP 6935	Variable International Topics	1-6
HLP 7939	HHP PhD Professional Development Seminar	3
HLP 7979	Advanced Research in Health and Human Performance	1-12
HLP 7980	Research for Doctoral Dissertation	1-15
HSC 5135	Emotional Health Education	3
HSC 5138	Human Sexuality	3
HSC 5142	Drug Education and Behavior	3
HSC 5536C	Medical Terminology for the Health Professions	3
HSC 5576	Nutrition Education for Special Populations	3
HSC 5606	Spirituality and Health	3
HSC 5618	Advanced Exercise Therapy, Adapted Physical Activity, & Health	3
HSC 5626	Minority Health Issues	3
HSC 5657	Health and End-of-Life Issues	3
HSC 5925	Seminar in Health Education	1-3
HSC 5956	Writing for Professional Publications	3
HSC 6037	Philosophy and Principles of Health Education	3
HSC 6235	Patient Health Education	3
HSC 6318	Planning Health Education Programs	3
HSC 6506	Epidemiology	3
HSC 6567	Health Promotion and Programming in Gerontology	3
HSC 6571	Contemporary Issues in Health Promotion	3
HSC 6575	Women's Health Issues	3
HSC 6595	HIV/AIDS Education	3
HSC 6603	Theories of Health Behavior and Practice in Health Education	3
HSC 6605	Scientific Foundations of Holistic Health	3
HSC 6625	Trends in International Health	3
HSC 6629	Health Promotion for Priority Populations	3
HSC 6637	Social Marketing and Health	3
HSC 6646	Community Health Methods in Injury Prevention & Control	3
HSC 6665	Health Communication	3
HSC 6695	Worksite Health Promotion	3
HSC 6712	Evaluating Health Education Programs	3
HSC 6735	Research Methods in Health Education	3
HSC 6850	Internship in Health Education	1-12

HSC 6904	Readings in Health Education	1-3
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6935	Current Topics in Health Education	1-3
HSC 6940	Supervised Teaching	1-5
HSC 6971	Research for Master's Thesis	1-15
HSC 6973	Project in Lieu of Thesis	1-9
HSC 7904	Advanced Readings in Health Education	1-3
HSC 7905	Advanced Independent Study in Health Education	1-3
HSC 7937	Advanced Seminar in Health Education	1-3

Student Learning Outcomes

Health Education & Behavior (MS)

SLO 1 Knowledge

Identify, define, and describe principles and foundations of health education/promotion.

SLO 2 Skills

Assess needs, assets and capacity for health education/promotion.

SLO 3 Skills

Plan, implement, and conduct evaluation and research related to health education/promotion

SLO 4 Skills

Administer and manage health education/promotion programs.

SLO 5 Skills

Serve as a health education/promotion resource person.

SLO 6 Skills

Communicate and advocate for health and health education and health promotion.

SLO 7 Skills

Illustrate the highest standards of conduct and ethical behavior when making professional decisions in accordance to the Unified Code of Ethics for the Health Education Profession (Coalition of National Health Education Organizations, 2011)

Health and Human Performance

Program Information

The Ph.D. in Health and Human Performance is a single college-wide Ph.D. program with 5 concentrations that are housed and administered by the four departments, according to the following organizational structure:

- **Applied Physiology and Kinesiology (APK):** Ph.D. students in APK study the immediate and lasting effects of exercise and its use in disease prevention and rehabilitation as well as fundamental mechanisms within muscle biology, cardiovascular function, motor neuroscience, biomechanics, environmental physiology, sports medicine, and emotion regulation. APK Ph.D. concentrations include Exercise Physiology and Biobehavioral Science, with further specializations in biomechanics, motor control and learning, performance psychology, and sports medicine / athletic training.
- **Health Education & Behavior (HEB):** Ph.D. students in HEB investigate health promotion strategies aimed at modifying behaviors which will improve individual, family, workplace, and community health and well-being. The HEB Ph.D. concentration is in Health Behavior.

- **Sport Management (SPM):** SPM Ph.D. students study the business of sport and the impact of sports on individuals and the industry. SPM improves the understanding of factors that help the sport industry thrive. Sport Management students and faculty explore organizational and marketing theories, sociological concepts and sport consumption behaviors among sport organizations and sport consumers to improve the quality of the sport industry practices and the experiences of sport consumers and participants. The Ph.D. concentration in SPM is Sport Management.
- **Tourism, Hospitality, and Event Management (THEM):** THEM Ph.D. students study the impact of tourism, recreation activities, professional and amateur sports, ecotourism, parks and beaches on the personal, social, economic, environmental and resource infrastructures of society. Ph.D. concentration in THEM is Recreation, Parks, and Tourism.

Students are expected to be involved in research throughout their Ph.D. program, which requires approximately three to five years of full-time study for completion. Graduates of the program are trained to assume positions as post-doctoral research scientists, or entry level professorships at colleges and universities throughout the country. The program of study is developed by the student and the supervisory committee based on the student's background, interests, and career goals, as well as faculty expertise. By design, the program is multidisciplinary and flexible, permitting students to tailor their scholarly experience to the development of research skills in their areas of concentration.

For more information, please see our website: <http://hhp.ufl.edu/about/academics/phd/>.

Degrees Offered

Degrees Offered with a Major in Health and Human Performance

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Biobehavioral Science
 - optional second concentration in Clinical and Translational Science
 - concentration in Clinical and Translational Science
 - concentration in Exercise Physiology
 - optional second concentration in Clinical and Translational Science
 - concentration in Health Behavior
 - optional second concentration in Clinical and Translational Science
 - concentration in Historic Preservation
 - concentration in Recreation, Parks and Tourism
 - concentration in Sport Management
 - concentration in Tourism, Hospitality, and Event Management

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Applied Physiology and Kinesiology Departmental Courses

Code	Title	Credits
APK 5102	Kinetic Anatomy	3
APK 5121	Anatomy and Physiology for Sport and Exercise Science	3
APK 5127	Assessment in Exercise Science	3
APK 5133	Human Pathophysiology for the Exercise Sciences	3
APK 5150C	Clinical Anatomy for the Exercise Sciences	3
APK 5166	Sports Supplements	3
APK 5171	Clinical Exercise Prescription	3
APK 5177	Strength and Conditioning for Beginning Practitioners	3
APK 5404	Sport Psychology	3
APK 5620	Genetics of Human Performance	3
APK 5702	Applied Sport Science	3
APK 6116C	Physiological Bases of Exercise and Sport Sciences	3
APK 6118	Neuromuscular Adaptation to Exercise	3
APK 6124	Extreme Environment Physiology	3
APK 6145	Movement Disorders	3
APK 6167	Nutrition Aspects of Human Performance	3
APK 6170	Advanced Exercise Physiology	3
APK 6176	Strength and Conditioning for Advanced Practitioners	3
APK 6195	Cell Physiology & Biophysics	0
APK 6205C	Nature and Bases of Motor Performance	3
APK 6206	Planning Motor Actions	3
APK 6225	Biomechanical Instrumentation	3
APK 6226C	Biomechanics of Human Motion	3
APK 6320C	Corrective Exercise	3
APK 6406	Exercise Psychology	3
APK 6408	Performance Enhancement	3
APK 6417	Attention & Emotion in Tactical Athlete Populations	3
APK 6611	Tactical Strength & Conditioning	3
APK 6704	MATLAB for Biomedical Sciences	3
APK 6715	Grant Writing in Health & Human Performance	3
APK 6725	AI for Sport & Movement Sciences	3
APK 6900	Directed Independent Study	1-5
APK 6940	Advanced Practicum in Exercise and Sport Science	3-6
APK 7107	Cardiovascular Exercise Physiology	3
APK 7108	Environmental Stress Exercise Physiology	3
APK 7117	Exercise Metabolism	3
ATR 6124	Clinical Anatomy for the Exercise Sciences	3
ATR 6215	Evidence-Based Orthopedic Exam I: Upper-Extremity	3
ATR 6216	Evidence-Based Orthopedic Exam II: Lower-Extremity	3
ATR 6304	Rehabilitation and Modalities of Athletic Injuries	3
ATR 6624	Athletic Training Research and Technology I	3
ATR 6625	Athletic Training Research and Technology II	3
ATR 6934	Seminar in Athletic Training	3
HLP 6515	Evaluation Procedures in Health and Human Performance	3

HLP 6535	Research Methods in Health and Human Performance	3
HLP 6911	Research Seminar	1
HLP 6935	Variable International Topics	1-6
HLP 7939	HHP PhD Professional Development Seminar	3
HLP 7979	Advanced Research in Health and Human Performance	1-12
HLP 7980	Research for Doctoral Dissertation	1-15
PET 5064	Athlete Sexual Health and Wellness	3
PET 5936	Special Topics/Seminars	1-3
PET 6910	Supervised Research	1-5
PET 6947	Graduate Internship in Exercise and Sport Sciences	3-9
PET 6971	Research for Master's Thesis	1-15

Health Education and Behavior Departmental Courses

Code	Title	Credits
HLP 6515	Evaluation Procedures in Health and Human Performance	3
HLP 6535	Research Methods in Health and Human Performance	3
HLP 6911	Research Seminar	1
HLP 6935	Variable International Topics	1-6
HLP 7939	HHP PhD Professional Development Seminar	3
HLP 7979	Advanced Research in Health and Human Performance	1-12
HLP 7980	Research for Doctoral Dissertation	1-15
HSC 5135	Emotional Health Education	3
HSC 5138	Human Sexuality	3
HSC 5142	Drug Education and Behavior	3
HSC 5536C	Medical Terminology for the Health Professions	3
HSC 5576	Nutrition Education for Special Populations	3
HSC 5606	Spirituality and Health	3
HSC 5618	Advanced Exercise Therapy, Adapted Physical Activity, & Health	3
HSC 5626	Minority Health Issues	3
HSC 5657	Health and End-of-Life Issues	3
HSC 5925	Seminar in Health Education	1-3
HSC 5956	Writing for Professional Publications	3
HSC 6037	Philosophy and Principles of Health Education	3
HSC 6235	Patient Health Education	3
HSC 6318	Planning Health Education Programs	3
HSC 6506	Epidemiology	3
HSC 6567	Health Promotion and Programming in Gerontology	3
HSC 6571	Contemporary Issues in Health Promotion	3
HSC 6575	Women's Health Issues	3
HSC 6595	HIV/AIDS Education	3
HSC 6603	Theories of Health Behavior and Practice in Health Education	3
HSC 6605	Scientific Foundations of Holistic Health	3
HSC 6625	Trends in International Health	3
HSC 6629	Health Promotion for Priority Populations	3
HSC 6637	Social Marketing and Health	3
HSC 6646	Community Health Methods in Injury Prevention & Control	3
HSC 6665	Health Communication	3
HSC 6695	Worksite Health Promotion	3

HSC 6712	Evaluating Health Education Programs	3
HSC 6735	Research Methods in Health Education	3
HSC 6850	Internship in Health Education	1-12
HSC 6904	Readings in Health Education	1-3
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6935	Current Topics in Health Education	1-3
HSC 6940	Supervised Teaching	1-5
HSC 6971	Research for Master's Thesis	1-15
HSC 6973	Project in Lieu of Thesis	1-9
HSC 7904	Advanced Readings in Health Education	1-3
HSC 7905	Advanced Independent Study in Health Education	1-3
HSC 7937	Advanced Seminar in Health Education	1-3

SPM 6606	Management of Olympic Games Functional Areas	3
SPM 6610	Sport Events and Community Development	3
SPM 6721	Advanced Sport Law	3
SPM 6726	Issues in Sport Law	3
SPM 6727	The Application of Fair Competition Laws to Sport Management	3
SPM 6905	Directed Independent Study	1-6
SPM 6910	Supervised Research	1-6
SPM 6947	Graduate Internship in Sport Management	3-9
SPM 6948	Advanced Practicum in Sport Management	1-3
SPM 6971	Research for Master's Thesis	1-15
SPM 7750	Theories in Sport Management	3
SPM 7900	Readings in Sport Management	3

sport MANAGEMENT Departmental Courses

Code	Title	Credits
HLP 6515	Evaluation Procedures in Health and Human Performance	3
HLP 6535	Research Methods in Health and Human Performance	3
HLP 6911	Research Seminar	1
HLP 6935	Variable International Topics	1-6
HLP 7939	HHP PhD Professional Development Seminar	3
HLP 7979	Advanced Research in Health and Human Performance	1-12
HLP 7980	Research for Doctoral Dissertation	1-15
PET 5185	High-Performance Coaching: Priority Alignment	3
PET 5186	High-Performance Coaching: Exploring Team Dynamics	3
PET 5187	High-Performance Coaching: Creating Winning Environments	3
PET 5188	High-Performance Coaching: Building Character through Sport	3
PET 5766	High-Performance Coaching: Leadership through a Sport Lens	3
PET 6177	Athlete-Centered Coaching and Leadership	3
SPM 5016	Sport Sociology	3
SPM 5107	Sport Event Management: Principles and Applications	3
SPM 5181	Athlete Development	3
SPM 5185	Name, Image, and Likeness: Amateur Athletes as Brands	3
SPM 5205	Environmental Sustainability and Sports	3
SPM 5206	Sport Ethics	3
SPM 5207	Sport Sponsorship	3
SPM 5309	Sport Marketing	3
SPM 5405	Sport Mass Media	3
SPM 5506	Sport Finance	3
SPM 5518	Nonprofit Management in Sport	3
SPM 5726	Sport Business Law	3
SPM 5936	Current Topics in Sport Management	1-3
SPM 6036	Research Seminar in Sport Management	3
SPM 6106	Management and Planning of Sport and Physical Activity Facilities	3
SPM 6158	Management and Leadership in Sport	3
SPM 6308	Study of Sport Consumer Behaviors	3
SPM 6326	Sport Marketing Analytics	3

Student Learning Outcomes

Health and human performance

SLO 1 Knowledge

Discuss, explain, and defend subject matter relevant to the discipline – exercise physiology, biobehavioral science, health behavior, recreation, parks and tourism, or sport management.

SLO 2 Knowledge

Discuss, explain, and defend traditional and current research methods in their discipline - exercise physiology, biobehavioral science, health behavior, recreation, parks and tourism, or sport management.

SLO 3 Skills

Discuss, explain, and defend the use of appropriate research methods as determined by the discipline and faculty committee.

SLO 4 Skills

Articulate and defend, orally and in writing, the results of their research and scholarship.

SLO 5 Professional Behavior

Ethically conduct research that is suitable for the discipline.

Faculty

Professor

- Ko, Yong Jae

Sport Management Department

Interim Chair: Y. J. Koe

Graduate Coordinator: K. Kaplanidou

Complete faculty listing: Follow this link (<http://hhp.ufl.edu/about/faculty-staff/spm/>).

The Master of Science in Sport Management is offered by the Department of Sport Management. This program offers thesis and non-thesis formats. The Department participates in the Ph.D. program in Health and Human Performance. Minimum requirements for these degrees are given in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

The Master's program provides advanced preparation of sport management professionals for positions of leadership in planning, developing, administering, and marketing of programs in a variety of

employment settings in the sports industry. Major coursework may be taken in a number of areas, such as:

- Sport Marketing
- Management and Leadership
- Sport Finance
- Sport Law
- Sport Sociology

Doctoral program: The Doctoral program in Sport Management is offered as a concentration through the College of Health and Human Performance. The doctoral program blends course work and research. The curriculum is individualized, and applicants with degrees from unrelated fields can be accepted into the program. However, their previous work will be evaluated and their programs planned according to their individual needs, interests, and career objectives.

Combination program: The Department offers a combination bachelor's/master's degree program. This program allows qualified students to earn both a bachelor's degree and a master's degree with a savings of approximately one semester. Up to 12 approved graduate credit hours can be utilized toward both degrees.

Sport Event Management Graduate Certificate: The Department offers a graduate certificate in sport event management. The sport event management graduate certificate offers a tremendous opportunity for individuals with a Bachelor's degree interested to acquire sport event management skills and gain insights into how to run large and small scale sport events. The Graduate certificate includes three courses that can be completed in three semesters (Fall, Spring, Summer). All students enrolled in the certificate program will gain knowledge in sport event management principles and applications, the management of mega events such as the Olympic Games and also how to manage the impacts of these sport events for their community.

MS/MSM Concurrent Degree Program: This joint degree program is offered through the College of Business Administration (Master of Science in Business Management [MSM]) and the College of Health and Human Performance's, Department of Sport Management (Master of Science in Sport Management [MS]). Applicants must apply to both programs and be admitted to both to participate. The MS/MSM is a non-thesis degree. The MS/MSM is designed for students who seek a graduate business degree and who lack the work experience necessary for admission to the MBA program. The MS/MSM curriculum is similar to the first year of the MBA program, giving students a good foundation in business principles. Concurrent degree students can share up to 9 credit hours of the same coursework towards both degree programs. They do not have to graduate during the same semester. Students admitted into the concurrent program must work closely with both departments to verify all requirements are being met during their course of study.

M.S./J.D. joint program: This 98-credit-hour joint degree program culminates in the Master of Science and the Juris Doctor degrees. Applicants must meet the entrance requirements for the Department of Sport Management and the College of Law. Admission to the second degree program is required no later than the end of the fourth consecutive semester after beginning one of the degree programs. The student's supervisory committee comprises faculty members from both the Department of Sport Management and the College of Law. Students admitted into the joint program are permitted to share up to 12 credit hours of the same coursework towards both degree programs. Students must graduate during the same semester from both programs.

Majors

- Sport Management (p. 193)

Faculty

Assistant Professor

- Chang, Yonghwan
- Harry, Molly Page
- Hill, Jasamine
- Jakar, Gidon
- Mcleod, Christopher M.

Other

- Nestler, Scott

Affiliated Faculty

- Connaughton, Daniel P.
Professor
- Kaplanidou, Kyriaki
Professor
- Ko, Yong Jae
Professor
- Tavormina, Alyssa L.
Lecturer
- Wegner, Christine
Senior Lecturer
- Willming, Cynthia L.
Senior Lecturer

Sport Management Program Information

Sport Management integrates concepts of management, marketing, finance and law to apply to sport organizations at various levels and prepares students for a variety of volunteer and employment opportunities at the professional, collegiate, community and amateur level sport entities.

For more information, please see our website: <http://hnp.ufl.edu/about/academics/ms-sport-mgmt/>.

Degrees Offered

Degrees Offered with a Major in Sport Management

- Master of Science
 - without a concentration
 - concentration in Historic Preservation
 - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Sport Management Departmental Courses

Code	Title	Credits
HLP 6515	Evaluation Procedures in Health and Human Performance	3
HLP 6535	Research Methods in Health and Human Performance	3
HLP 6911	Research Seminar	1
HLP 6935	Variable International Topics	1-6
HLP 7939	HHP PhD Professional Development Seminar	3
HLP 7979	Advanced Research in Health and Human Performance	1-12
HLP 7980	Research for Doctoral Dissertation	1-15
PET 5185	High-Performance Coaching: Priority Alignment	3
PET 5186	High-Performance Coaching: Exploring Team Dynamics	3
PET 5187	High-Performance Coaching: Creating Winning Environments	3
PET 5188	High-Performance Coaching: Building Character through Sport	3
PET 5766	High-Performance Coaching: Leadership through a Sport Lens	3
PET 6177	Athlete-Centered Coaching and Leadership	3
SPM 5016	Sport Sociology	3
SPM 5107	Sport Event Management: Principles and Applications	3
SPM 5181	Athlete Development	3
SPM 5185	Name, Image, and Likeness: Amateur Athletes as Brands	3
SPM 5205	Environmental Sustainability and Sports	3
SPM 5206	Sport Ethics	3
SPM 5207	Sport Sponsorship	3
SPM 5309	Sport Marketing	3
SPM 5405	Sport Mass Media	3
SPM 5506	Sport Finance	3
SPM 5518	Nonprofit Management in Sport	3
SPM 5726	Sport Business Law	3
SPM 5936	Current Topics in Sport Management	1-3
SPM 6036	Research Seminar in Sport Management	3
SPM 6106	Management and Planning of Sport and Physical Activity Facilities	3
SPM 6158	Management and Leadership in Sport	3
SPM 6308	Study of Sport Consumer Behaviors	3
SPM 6326	Sport Marketing Analytics	3
SPM 6606	Management of Olympic Games Functional Areas	3
SPM 6610	Sport Events and Community Development	3
SPM 6721	Advanced Sport Law	3
SPM 6726	Issues in Sport Law	3
SPM 6727	The Application of Fair Competition Laws to Sport Management	3
SPM 6905	Directed Independent Study	1-6
SPM 6910	Supervised Research	1-6
SPM 6947	Graduate Internship in Sport Management	3-9
SPM 6948	Advanced Practicum in Sport Management	1-3
SPM 6971	Research for Master's Thesis	1-15
SPM 7750	Theories in Sport Management	3
SPM 7900	Readings in Sport Management	3

Student Learning Outcomes

Sport Management (MS)

SLO 1 Knowledge

Identify, define and describe current key concepts and theories in sport management

SLO 2 Knowledge

Critique emerging and critical issues in the sport industry and recommend appropriate business strategies and research methods utilized within sport management

SLO 3 Skills

Develop skills to identify, analyze and make decisions and recommendations to sport management problems

SLO 4 Professional Behavior

Conducts her/himself/themselves professionally in a manner appropriate and expected for the discipline

Tourism, Hospitality, and Event Management Department

Chair: R. Fu

Graduate Coordinator: J. Kim

The degree Master of Science in Tourism and Hospitality Management is offered by the Department of Tourism, Hospitality, and Event Management. This program offers thesis and non-thesis formats. The Department participates in the Ph.D. program in Health and Human Performance. Minimum requirements for these degrees are given in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

Master's program: The program provides advanced preparation of tourism, hospitality, and recreation management professionals for positions of leadership in planning, developing, administering, and marketing of programs in a variety of employment settings both public and private. The coursework is taken the areas of

- Tourism
- Tourism Analytics
- Destination Development
- Crisis Management and Natural Resource Recreation

Doctoral program: The program is offered through the College of Health and Human Performance with a concentration in Recreation, Parks and Tourism. This interdisciplinary specialization blends course work and research. The curriculum is individualized, and applicants with degrees from unrelated fields can be accepted into the program. However, their previous work will be evaluated and their programs planned according to their individual needs, interests, and career objectives.

Combination program: The Department offers a combination bachelor's/master's degree program. This program allows qualified students to earn both a bachelor's degree and a master's degree with a savings of approximately one semester. Up to 9 approved graduate credit hours can be utilized toward the degree.

Majors

- Tourism, Hospitality and Event Management (p. 195)

Faculty

Affiliated Faculty

- Binesh, Fatemeh
Assistant Professor
- Chi, Hengxuan
Assistant Professor
- Fu, Rachel Juichi
Professor
- Gibson, Heather Julie
Professor
- Kim, Jin Won
Associate Professor
- Kirilenko, Andrei Petrovich
Associate Professor
- Stepchenkova, Svetlana O.
Professor
- Wang, Yao-Chin
Assistant Professor

Tourism, Hospitality and Event Management

PROGRAM INFORMATION

The Master of Science with a major in Tourism, Hospitality and Event Management offers the following areas of concentration:

1. Natural Resource Recreation
2. Tourism
3. Tropical Conservation and Development

Graduates of the Master of Science in Tourism and Hospitality Management will be trained for middle and/or upper level management positions, in their respective fields. Students can choose between three options:

1. Thesis, or
2. Non-Thesis with Practicum, or
3. Non-Thesis with Professional Paper.

For more information, please see our website: <http://hhp.ufl.edu/about/academics/ms-tourism/>.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN Tourism, Hospitality and Event Management

- Master of Science
 - without a concentration
 - concentration in Natural Resource Recreation
 - concentration in Tourism

Requirements for these degrees are given in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

Courses

Tourism, Hospitality and Event Management department courses

Code	Title	Credits
HLP 6515	Evaluation Procedures in Health and Human Performance	3
HLP 6535	Research Methods in Health and Human Performance	3
HLP 6911	Research Seminar	1
HLP 6935	Variable International Topics	1-6
HLP 7939	HHP PhD Professional Development Seminar	3
HLP 7979	Advanced Research in Health and Human Performance	1-12
HLP 7980	Research for Doctoral Dissertation	1-15
HMG 6203	Advanced Strategic Event Management	3
HMG 6296	Strategic Hospitality Business Management	2
HMG 6440	AI Revolutions and Applications in THEM (Tourism, Hospitality and Event Management)	3
HMG 6448C	GIS and Spatial Analysis for Tourism and Social Data	3
HMG 6466	Revenue Management in Hosp Bus	2
HMG 6563	Branding Strategies in Tourism, Hospitality and Event Management	2
HMG 6566	Tourism and Hospitality Business Perspectives	2
HMG 6583C	Data Mining with Social Data	3
HMG 6589C	Applied Multivariate Analysis for Tourism and Hospitality	3
HMG 6630	Destination and Hospitality Crisis Management	2
HMG 6740	Smart Cities, Attractions, and Theme Parks	3
HMG 6747	Marketing in Hospitality/Tourism	2
LEI 5121	Outdoor Recreation and Park Management	3
LEI 5188	Trends & Issues in Tourism, Hospitality and Event Management	3
LEI 6325	Ecotourism	3
LEI 6326	Sport Tourism	3
LEI 6336	Tourism Planning and Development	3
LEI 6351	Heritage Tourism	3
LEI 6895	Tourism Theory and Concepts	3
LEI 6903	Readings in Recreation, Parks, and Tourism	1-3
LEI 6905	Directed Independent Study	1-5
LEI 6910	Supervised Research	1-5
LEI 6931	Special Topics in Recreation, Parks, and Tourism	1-6
LEI 6940	Supervised Teaching	1-5
LEI 6944	Practicum in Tourism & Recreation Management	1-6
LEI 6971	Research for Master's Thesis	1-15
LEI 7170	Foundations of Leisure Behavior	3
LEI 7901	Tourism, Hospitality, and Event Management in Higher Education	3
LEI 7904	Advanced Readings in Tourism, Hospitality and Event Management.	1-3
LEI 7905	Advanced Independent Study in Recreation, Parks and Tourism	1-3
LEI 7910	Advanced Supervised Research	1-5

LEI 7933 Advanced Special Topics in Tourism, Hospitality, and Event Management

Student Learning Outcomes**Tourism, Hospitality and Event Management (MS)****SLO 1 Key Concepts**

Discuss and explain key concepts and theories relevant to recreation, parks and tourism

SLO 2 Research Methods

Identify, describe, explain, and apply traditional and current research methods within recreation, parks and tourism

SLO 3 Identify and Apply Skills

Identify and apply skills to solve recreation, and tourism problems

SLO 4 Ethical Behavior

Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and professional communication

College of Journalism and Communications

Dean: H. Brown

Associate Dean for Graduate Studies: M. DiStaso

Graduate Coordinators:

- (Public Relations—thesis-based) J. Hmielowski
- (Professional Communication) T. Spiker
- (Research and Theory—no concentration) J. Hmielowski

Through the Division of Graduate Studies, the College of Journalism and Communications offers the Doctor of Philosophy degree and the Master of Arts in Mass Communication (thesis or project option) degree, which is divided into two areas: PhD preparation and professional development.

For a full list of programs, please see <https://gradcatalog.ufl.edu/graduate/colleges-departments/journalism-communications/mass-communication/>. Additionally, requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Doctoral students work closely with faculty members in research leading to a dissertation embodying a humanities, law/policy, or social sciences approach. Emphases within these approaches for which faculty members have expertise include advertising, AI and emerging technology, cultural and social change, health communication, journalism, law/policy/history, media industry and consumers, media psychology, public interest communication, public relations, science communication, social media, sports communication, trust in media, visual communication, and political communication. Details of doctoral faculty research interests and other aspects of the program are given in the College's Ph.D. Handbook and is available online at: <https://www.jou.ufl.edu/home/about/faculty-staff-directory/doctoral-faculty-directory/>.

The master's program is a two-track system, one focused on PhD preparation and one on professional development. In the PhD-preparation program, you learn the ideas and skills you need for satisfying life-long careers in mass communication. You can choose to obtain a Master of Arts in Mass Communication degree by selecting either

1-3 the no concentration or public relations concentration for the PhD preparation programs or professional communication for the professional development on-campus master's program. Master's students in the PhD-preparation track may complete a thesis in many areas, including but not limited to advertising, journalism, public relations, media and technology, and science/health communication. A project in lieu of thesis option is available for some specializations.

The Professional Communication track allows recent graduates or professionals to develop additional skills for today's communication job market.

General admission: Admission is granted to applicants with and without backgrounds in mass communication. Students without academic preparation in mass communication or appropriate experience may be required to take articulation work. These courses are taken concurrently with general graduate courses, starting in the first term of registration.

The master's degree normally can be earned in three to four semesters of full-time study. Doctoral studies require three or more years of full-time study and research. Students who may require articulation courses should contact the Associate Dean of Graduate Studies.

Grading policy: Students may be placed on probation if their progress becomes unsatisfactory. Students who earn a truncated GPA less than 3.0 and/or receives a C-, C+, D+, D-, E, I, N or U grade will be placed on probation, except for courses taken from the Levin College of Law, undergraduate statistics course, or articulation classes. For these courses, any student receiving one grade that is a C-, D+, D-, E, I, N or U will be placed on probation.

If a student satisfies their probation plan but does not achieve cumulative truncated GPA of 3.00 or above as calculated by the UF graduate school, the probation period will be extended until the truncated 3.0 GPA is achieved. Students may only have one semester with grade(s) that is/are a C-, C+, D+, D-, E, I, N or U. If the student has more than one semester with grade(s) of C-, C+, D+, D-, E, I, N or U, the student will face suspension. These semesters do not need to be consecutive semesters of enrollment. Students will be allowed only one suspension..

Combination degree program: The College offers a combination bachelor's/master's program. For information, contact the Combination Degree advisor.

For additional information, please see our website: <http://www.jou.ufl.edu/grad>.

Programs

- Mass Communication (p. 197)

Faculty**Professor**

- Babanikos, James
- Brown, Hubert
- DiStaso, Marcia
- Kelleher, Thomas A.
- Kiouisis, Spiro K.
- Mcadams, Melinda Jeanne
- Men, Linjuan
- Morton Padovano, Cynthia R.

- Nah, Seungahn
- Ostroff, David Howard
- Sorel, Timothy
- Spiker, Theodore D.
- Walsh-Childers, Kimberly B.

Associate Professor

- Camaj, Lindita
- Chen, Huan
- Coche, Roxane
- Dalisay, Francis
- Feng, Yang
- Freeman, John Glenn
- Goodman, Jennifer Robyn
- Hmielowski, Jay
- Hutchens, Myiah Joan
- Johnson, Benjamin K.
- Lee, Yu-Hao
- Leslie, Michael
- Lewis, Norman Paul
- Liu, Wenlin
- McNealy, Jasmine E.
- Tripp, Bernell E.
- Waddell, Thomas F.
- Windels, Kasey Farris
- Xu, Kun

Other

- Esterline, Eric C.
Senior Lecturer
- Fisher, Carla L.
Professor
- Hernandez, Joanna
Senior Lecturer
- Hove, Harrison Chandler
Other
- Kember, Santiago
Lecturer
- Kropp, Evan
Other
- Lowe, Herbert
Senior Lecturer
- Nall, Mickey Glen
Senior Lecturer
- Reid, Czerne
Other
- Searight, Ann Elizabeth
Clinical Professor
- Selepak, Andrew G.
Senior Lecturer
- Thompson, Geoffrey
Lecturer
- Wells, Houston A.
Senior Lecturer
- Windels, Daniel M.
Lecturer
- Zawahry, Iman Kamal
Senior Lecturer

Assistant Professor

- Buckley, Christen
- Bullock, Olivia M.
- Chu, Haoran
- Fernandes, Juliana D.
- Frazer, Rebecca Danielle
- Grant, Rachel L.
- Ham, Jeongmin
- Haywood, Antoine
- Liu, Jiawei
- Moon, Won Ki
- Shin, Jieun
- Sun, Yuan
- Wang, Jinping

Eminent Scholar

- Bambauer, Jane

Affiliated Faculty

- Barnett, Cynthia Lynn
Senior Lecturer
- Bridis, Theodore W.
Senior Lecturer
- Calienes Lay, Elizabeth C.
Senior Lecturer
- Cuillier, David

Mass Communication

Program Information

Ph.D. with a major in Mass Communication

The Ph.D. degree is a research degree. The Ph.D. program is designed to help develop knowledge, attitudes, and skills so graduates can make important contributions to understanding mass communication. Faculty members help students lay the foundation for a lifetime of significant, creative work.

The doctoral program prepares students for a variety of opportunities in mass communication. Graduates are expected to teach at colleges and universities; conduct research for organizations in advertising, journalism, public relations, telecommunication, and other mass communication fields; do consulting; and conduct research and contribute to policy in government and private organizations. Doctoral students in the College of Journalism and Communications gain valuable experience in both teaching and research. Assistantships help prepare students for academic and other research positions. Students in the program have consistently been among the nation's leaders in winning top-paper awards at national and regional scholarly meetings.

Master of Arts in Mass Communication (M.A.M.C.)

The Master of Arts in Mass Communication includes both thesis and non-thesis options on campus and several non-thesis concentrations offered fully online.

On-Campus Options

Customizable Research and Theory (thesis)

The customizable on-campus thesis option focuses on research and theory in mass communication, including courses in the areas of advertising; journalism; international and intercultural communication; and media production, management and technology. Students are required to take courses that focus on research, theory, ethics, and writing, leading to a master's thesis as the capstone. This option is appropriate for students wishing to pursue careers in research or a Ph.D.

Public Relations Concentration (thesis)

The **Public Relations Concentration** is an on-campus research-based program designed to prepare students for careers and advancement in the industry or for entering doctoral studies. Students learn the conceptual foundations of public relations and develop professional and research competency within the duration of the program. Courses in the public relations specialization focus on conceptual foundations of public relations, including mass communication and society; professional and managerial skills mastery; and research expertise.

For more information, please see our website: <https://www.jou.ufl.edu/graduate/research-and-theory/mamc-public-relations/>

Science and Health Communication Concentration (thesis)

The **Science and Health Communication Concentration** is an on-campus program designed to teach scientists and health specialists to communicate effectively via media, and to teach mass media specialists the background science to translate the language of science and health into meaningful and understandable stories for their audiences. These goals are achieved through theoretical writing and applied courses. At least two aspects of the program make it unique among science communication programs nationwide. First, other existing science communication programs in the U.S. focus on training journalists. UF's program is open to journalists who want to specialize in covering science and health, offers training for people planning to work as public affairs or public information officers for science and health organizations, for other communication specialists, and for scientists who need to be able to communicate with the public about their work. Second, the program focuses on training students to understand and communicate effectively about science and health policy.

For more information, please see our website: <https://www.jou.ufl.edu/graduate/research-and-theory/mamc-science-health/>

Professional Master's (non-thesis)

The **Professional Communication Concentration** (or "Professional Master's") is an on-campus professional program designed specifically for those who want to develop additional skills to become more competitive in the job market. The program's "mix and match" coursework structure allows students to develop their own customizable degree plans, with only six required core courses and a wide range of electives available across the college's four departments. Degree plans culminate with a capstone

project, completed over at least two semesters and supervised by a graduate faculty committee. Student projects range from documentary films and long-form journalistic narrative pieces to public relations and advertising campaigns, and many others in between. These projects allow students to explore various interests within the college and showcase a variety of skills learned during their course of studies.

The Professional Master's can be completed at your own pace, in as little as one year for those who want an accelerated program, or two years for a more traditional path.

For more information, please see our website: <https://www.jou.ufl.edu/current-students/masters/promasters/>.

Online Concentrations (non-thesis)

UF CJC Online offers eight comprehensive, current, and digitally focused online master's concentrations: Audience Analytics, Digital Strategy, Global Strategic Communication, Political Communication, Public Interest Communication, Public Relations and Communication Management, Social Media, and Web Design and Online Communication.

Audience Analytics

The **Audience Analytics Concentration** is an online program offered through the University of Florida College of Journalism and Communications designed to prepare students with the theoretical foundations, industry knowledge, and analytical tools to understand the nature, value, and behaviors of audiences across multiple media platforms and disciplines. The courses equip students with the analytical tools and methodological foundations to assess and analyze audience-related datasets. Students will also learn how to use such data and present insights in order to tell fundamental stories that will ultimately drive the ability to make informed decisions for their stakeholders.

For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/audience-analytics/>

Digital Journalism and Multimedia Storytelling

The **Digital Journalism and Multimedia Storytelling Concentration** is an online program offered through the University of Florida College of Journalism and Communications designed for students who want to master the latest reporting, writing, and technical skills for traditional journalism, digital media, and various genres of storytelling across a variety of multimedia platforms. Students will learn to explain the role and apply principles and laws of a free press, identify key events in the history of journalism, and trends in artificial intelligence and current media. They will learn to exhibit respectful collaboration and professional ethical principles and work in the pursuit of truth, accuracy, and fairness. Further, students will apply tools and technologies appropriate for various communications professions including social media.

For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/digital-journalism/>

Digital Strategy

The **Digital Strategy Concentration** is an online program offered through the University of Florida College of Journalism and Communications designed for students who want to become better digital marketers. This concentration is designed to challenge students to develop effective messaging to drive increased conversions and create loyal customers. Our courses focus on teaching students the skills they need to be effective at copywriting

for every type of social and digital channel, developing an inbound strategy, generating leads, analyzing effectiveness, designing around the user's experience, and more.

For more information, please see our the program's website: <https://onlinemasters.jou.ufl.edu/digital-strategy/>

Global Strategic Communication

The **Global Strategic Communication Concentration** is an online program offered through the University of Florida College of Journalism and Communications and is designed for students who are passionate about solving global issues. This specialization embodies three core pillars: Messaging, Communication, and Culture. Students in this concentration will learn how to communicate across cultures, influence public policy, engage audiences, and initiate dynamic change despite geographical boundaries. The Global Strategic Communication program will allow students to offer solutions to world problems, business ethics, education, and more using strategic interpersonal communication skills with attention to cultural considerations. For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/global-strategic-communication/>

Political Communication

The **Political Communication Concentration** is an online program offered through the University of Florida College of Journalism and Communications that prepares students to become digital political professionals with an understanding of cutting-edge digital advertising, engagement, and analysis techniques. Professionals in the field will prepare students to navigate the ever-evolving political landscape by giving them the tools of modern campaigning to help increase political engagement and drive change. The Political Communication Concentration is narrowly focused on communicating online for political organizations, nonprofits and corporations. Ultimately, this program provides hands on experience on how to effectively design a political campaign in the new digital age.

For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/political-communication/>

Public Interest Communication

The **Public Interest Communication Concentration** is an online program offered through the University of Florida College of Journalism and Communications that embraces the vision of creating science-based, strategic communications designed to advance the human condition. It is critical to achieving significant behavioral or social changes on an issue that transcends the particular interests of any single organization. This program offers students the opportunity to develop the skills, strategies, theory and techniques required to build movements and drive positive social change using strategic communication. This interdisciplinary concentration includes both theoretical and practical work and draws from practice and scholarship in public relations, journalism, advertising, psychology, sociology, political science, anthropology, and neuroscience. The coursework places an emphasis on working across organizations and sectors, system-level thinking, strategic planning and the core skills critical to any effective social change effort.

For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/public-interest/>

Public Relations and Communication Management

The Public Relations and Communication Management

Concentration is an online program offered through the University of Florida College of Journalism and Communications that focuses not only on strategic communication, but also incorporates elements of copywriting, graphic design, and business. This program will teach students how to effectively communicate during crises, build meaningful relationships with the media, manage a brand's reputation, evaluate and measure change, in addition to influence opinions. With the Public Relation and Communication Management Concentration, students will be able to approach Public Relations like a strategic conversation where they control the narrative to get the results clients need. For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/public-relations/>

Social Media

The **Social Media Concentration** is an online program offered through the University of Florida College of Journalism and Communications that focuses on making meaningful online connections and ensuring students have the tools and training to be effective at reaching their audience. This comprehensive program will not only teach students how to use current social media platforms, but it will also team them to approach social media marketing in a holistic way, by incorporating writing, video production, and brand marketing.

The program will also teach students how to use research to drive content creative, how to create effective advertising and public relations campaigns, and how to use new and emerging technologies to appeal to target audiences and drive meaningful social change. For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/social-media/>

Web Design and Online Communication

The **Web Design and Online Communication Concentration** is an online program offered through the University of Florida College of Journalism and Communications that takes a three-pronged approach with courses on design skills, communication theory and code. The curriculum starts off with a solid foundation of graphic design principles along with best practices of HTML5 and CSS. Students then take additional coding courses to learn how to use JavaScript, PHP, jQuery, and more. By the end of the program, students will be able to code a completely customized, mobile responsive website for a real client.

For more information, please see the program's website: <https://onlinemasters.jou.ufl.edu/web-design/>

For more help with any of our graduate degree programs, please refer to our website: <https://www.jou.ufl.edu/graduate/>

Combination Degrees:

The College of Journalism and Communications offers a robust Combination Degree program that is open to undergraduate students from any major who meet the program's admission criteria.

For more information, please see the program's website: <https://www.jou.ufl.edu/combination-degree-main/>

Degrees Offered**Degrees Offered with a Major in Mass Communication**

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
- Master of Arts in Mass Communication
 - without a concentration
 - concentration in Audience Analytics
 - concentration in Digital Journalism and Multimedia Storytelling
 - concentration in Digital Strategy
 - concentration in Global Strategic Communication
 - concentration in Political Communication
 - concentration in Professional Communication
 - concentration in Public Interest Communication
 - concentration in Public Relations
 - concentration in Public Relations and Communication Management
 - concentration in Science and Health Communication
 - concentration in Social Media
 - concentration in Web Design and Online Communication

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses**College of Journalism and Communications Courses**

Code	Title	Credits
ADV 5005	Advertising Planning	3
ADV 5407	Content Marketing	3
ADV 5409	Principles of Political Advertising	3
ADV 5815	Inbound Marketing Strategy	3
ADV 5825	Search and Display Advertising	3
ADV 6006	Theories of Advertising	3
ADV 6325	Advertising and Social Media	3
ADV 6405	International Advertising	3
ADV 6503	Advertising Creative Strategy and Research	3
ADV 6505	Advertising Research Methods	3
COM 5256	Translational Com Science	3
COM 6255	Science and Health Policy	3
COM 6338	Advanced Web Topics I: Advanced Design	4
COM 6565	Social Media Community Management	3
COM 6715	Grant Writing	3
COM 6815	Risk Communication	3
COM 6940	Supervised Teaching	1-3
JOU 5007	History of Journalism	3
JOU 6391	Seminar in Journalism as Literature	3
MMC 5006	Introduction to Multimedia Communication	3
MMC 5007	Introduction to Audiences	3
MMC 5046	Presentation Power	3
MMC 5155	Copywriting Digital Messaging	3
MMC 5165	Influence and Selling	3
MMC 5206	Advanced Law of Mass Communication	3
MMC 5215	Technology Policy	3
MMC 5259	Customer Management and the Nurturing of Enduring Relationships	3
MMC 5277	Web Design Principles	4

MMC 5279	UX Design Theory	3
MMC 5306	International Communication	3
MMC 5308	Communicating for Success	3
MMC 5406	Selling Today	3
MMC 5422	Customer Research and the Fundamentals of Online Testing	3
MMC 5427	Research Methods in Digital Communication	3
MMC 5435	Messaging Strategy and the Centrality of the Value Proposition	3
MMC 5436	Messaging Methodologies and the Practice of Conversion Optimization	3
MMC 5449	Consumer and Audience Analytics	3
MMC 5458	Statistics for Analysts in Communication	3
MMC 5465	Communication Leadership	3
MMC 5468	Understanding Audiences	3
MMC 5495	Introduction to Public Interest Communication	3
MMC 5616	Introduction to Political Organizing	3
MMC 5625	Political Engagement Strategy	3
MMC 5626	Introduction to Political Campaigning	3
MMC 5636	Introduction to Social Media	3
MMC 5648	Public Affairs Communication	3
MMC 5708	Foundations of Intercultural Communication	3
MMC 5717	Cross Platform Media Selling	3
MMC 5731	Digital Sales and Engagement	3
MMC 5737	Lead Generation and Management	3
MMC 5739	Social Media Advertising for Conversions	3
MMC 6035	Personal Branding and Digital Reputation Management	3
MMC 6047	Academic Writing For Mass Communication	3
MMC 6135	Data Visualization	3
MMC 6137C	Audio-Visual Storytelling	3
MMC 6145	Web Interactivity and Engagement	3
MMC 6205	Social Media Ethics	3
MMC 6213	Strategic Communication Ethics and Concepts	3
MMC 6269	Computer-Mediated Communication	3
MMC 6278	Advanced Web Topics II	4
MMC 6400	Mass Communication Theory	3
MMC 6402	Seminar in Mass Communication Theory	4
MMC 6406	Innovation and Entrepreneurship in Mass Communication	3
MMC 6408	Applied Theories in Mass Communication	3
MMC 6409	Science/Health Communication	3
MMC 6414	Strategic Public Interest Communication	3
MMC 6417	New Media, Health Behavior and the Health Environment	3
MMC 6421	Research Methods in Mass Communication	3
MMC 6423	Content-Analysis Methods	3
MMC 6426	Qualitative Research	3
MMC 6428	Collaborative Communication Research	3
MMC 6455	Mass Communication Statistics	3
MMC 6456	Data Storytelling and Visualization	4
MMC 6457	Mass Communication Statistics 2	3
MMC 6466	Digital Persuasive Communication	3
MMC 6475	Audience Research Methods	3
MMC 6476	Understanding Audiences	3
MMC 6477	Measuring Social Change: Research and Evaluation	3
MMC 6485	Advanced Qualitative Methods: Narrative Health Methods and Analyses	3

MMC 6486	Family Communication and Health Across the Lifespan	3	RTV 6801	Media Management and Theory	3
MMC 6487	Interpersonal Health Communication Theory	3	RTV 6973	Project in Lieu of Thesis	1-9
MMC 6496	Public Interest Communication Theory	3	VIC 5006	Foundations of Design for Communicators	3
MMC 6497	Media Psychology	3	VIC 5315	Corporate and Brand Identity on the Web	3
MMC 6506	Critical and Cultural Theories in Media Studies	3	VIC 5325	Digital Imagery in Web Design	4
MMC 6566	Communicating Privacy	3	VIC 5326	Digital Media Layout and Design	3
MMC 6568	Communication in Healthcare	3	VIC 6008	Video Storytelling	4
MMC 6612	New Media and a Democratic Society	3	VIC 6316	Brand Management	3
MMC 6615	Race, Class, Gender, and Media	3-4	Student Learning Outcomes		
MMC 6618	Survey of Political Communication	3			
MMC 6638	Global Activism and Social Change Communication	3	mass communications (PHD)		
MMC 6639	Non-Profit and Government Communication	3	SLO 1 Knowledge		
MMC 6647	Financial Business Essentials for Communication Professionals	3	Develop a thorough identification and review of mass communication theory and proficiency in research methods surrounding a specific area of expertise in the mass communication field.		
MMC 6660	Communication, Technology and Society	3	SLO 2 Knowledge		
MMC 6665	Seminar in First Amendment Theory	4	Discuss and translate mass communication theory and proficiency in research methods surrounding a specific area of expertise in the mass communication field.		
MMC 6666	Seminar in Research in Mass Communication Law	4	SLO 3 Skills		
MMC 6709	The Art and Science of Storytelling	3	Explain and report communication subject matter and methodology, successfully complete research studies through conceptualization, methodological expertise, analysis and submission to professional conferences and publication in peer-reviewed journals.		
MMC 6725	Social Media and News	3	SLO 4 Professional Behavior		
MMC 6726	Social Media and Emerging Technology	3	Display of ethical behaviors, cultural sensitivity and appreciation for diverse viewpoints, leadership, independent and creative thinking.		
MMC 6727	Social Media Metrics	3	SLO 5 Professional Behavior		
MMC 6728	Branding Using Social and Mobile Media	3	Participate in professional and academic service activities that develop leadership skills.		
MMC 6730	Social Media Management	3	Mass Communications (MAMC)		
MMC 6738	Digital Promotions/Campaigns	3	SLO 1 Knowledge		
MMC 6746	Developing Intercultural Competence	3	Identify, describe, explain, and apply communication theory research methods, aiding in a synthesized perspective for evaluating and addressing professional or theoretical problems		
MMC 6905	Individual Work	1-3	SLO 2 Skills		
MMC 6910	Supervised Research	1-3	Address communication subject matter and issues through application, analysis, or synthesis of subjects, theories and methodologies		
MMC 6929	Communication Colloquium	2	SLO 3 Professional Behavior		
MMC 6930	Seminar in Mass Communication Teaching	3	Display ethical behaviors, teamwork, cultural sensitivity/appreciation for diverse viewpoints, and meet professional standards for effective and ethical decision making		
MMC 6936	Special Topics in Mass Communication	1-3	College of Liberal Arts and Sciences		
MMC 6945	Professional Master's Practicum	1-3	<i>Interim Dean:</i> M. Watt		
MMC 6949	Professional Internship	1-3	The College of Liberal Arts and Sciences constitutes the intellectual core of the university. Its principal mission is to lead the academic quest to understand our place in the universe and to help shape our society and environment.		
MMC 6950	Mass Communication Capstone	3	For more information, please see our website: http://www.clas.ufl.edu		
MMC 6951	Masters Project Seminar	1			
MMC 6960C	Professional Master's Seminar	3			
MMC 6971	Research for Master's Thesis	1-15			
MMC 6973	Project in Lieu of Thesis	1-9			
MMC 7979	Advanced Research	1-12			
MMC 7980	Research for Doctoral Dissertation	1-12			
PUR 5107	Strategic Writing for Public Relations	3			
PUR 5507	Persuasion Theory and Research	3			
PUR 6005	Theories of Public Relations	3			
PUR 6006	Public Relations Foundations	3			
PUR 6206	Public Relations Ethics and Professional Responsibility	3			
PUR 6403	Crisis and Risk Management	3			
PUR 6409	International Issues and Crisis Communication	3			
PUR 6475	Digital Social Advocacy	3			
PUR 6506	Public Relations Research	3			
PUR 6509	Public Relations Measurement and Evaluation	3			
PUR 6603	Public Relations Strategy and Messaging	3			
PUR 6607	Public Relations Management	3			
PUR 6608	International Public Relations	3			
PUR 6616	Corporate Reputation and Communication	3			
PUR 6934	Problems in Public Relations	3			
RTV 6508	Audience Analysis	3			

Departments

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 - Women's Studies (p. 229)
- Geography Department (p. 231)
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 - Sociology (p. 269)
- Spanish and Portuguese Studies Department (p. 270)
 - Romance Languages (Spanish and Portuguese Studies) (p. 271)
 - Spanish (p. 273)
- Statistics Department (p. 274)
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Faculty

Professor

- Fagan, Abigail A.

Associate Professor

- Barnes, Riche J Daniel
- Canton, David

Other

- Evans, Bianca Danyell

Lecturer

- Johns, Tracy Lynn

This listing represents faculty appointed to the College of Liberal Arts and Sciences. For individual programs' faculty lists within CLAS, please see each of the individual faculty tabs within the individual CLAS departmental pages of this catalog.

Anthropology Department

Chair: P. Collings

Graduate Coordinator: A. Strong

The Department of Anthropology offers the Master of Arts and Doctor of Philosophy Degrees. Complete descriptions of the minimum requirements for these degrees are provided in the General Information section of this catalog.

The Department provides training in the four main areas of specialization or subfields:

- Anthropological Linguistics,
- Archaeology,
- Biological Anthropology, and
- Cultural Anthropology.

Department strengths include training in Social Research Methods, Medical Anthropology, and the Archaeology of the Americas. The C.A. Pound Human Identification Lab provides opportunities for specialized training in Forensic Anthropology.

Given the holistic nature of Anthropology, the Department maintains close ties with other units in Liberal Arts and Sciences, including the Center for African Studies (CAS), the Center for Latin American Studies (LAS), the School of Natural Resources and Environment (SNRE), the African American Studies program, the Center for European Studies (CES), and the Department of Linguistics. Many department faculty hold

joint appointments or affiliations with these programs. We also maintain close ties with the Bureau of Economic and Business Research (BEER), the Florida Museum of Natural History (FLMNH), the Emerging Pathogens Institute (EPI), the Land Use and Environmental Change Institute (LUECI), the Water Institute, and the Genetics Institute.

Prospective students are encouraged to examine the research interests of individual faculty for a more detailed perspective on the Department's strengths and specialties. Applicants to the graduate program should preferably have an undergraduate major in anthropology, but the Department accepts applicants with degrees in the humanities, arts, social sciences, and physical sciences into the graduate program. All students are required to take the two Proseminar courses, which provide students with baseline knowledge of the discipline's four subfields.

Majors

- Anthropology (p. 203)

Faculty

Professor

- Broadwell, George Aaron
- Chalfin, Brenda Helene
- Daegling, David
- Defrance, Susan D.
- Gillespie, Susan D.
- Heckenberger, Michael Joseph
- Johnson, Jeffrey C.
- Krigbaum, John
- Kugelmass, Jack M.
- McCarty, Christopher
- Mulligan, Connie Jo
- Sassaman, Kenneth Edward
- Stepp, John Richard
- Tucker, Catherine May

Associate Professor

- Collings, Peter F.
- Contreras, Daniel A.
- Davidson, James M.
- Deleon, Valerie Burke
- Grillo, Katherine M.
- Kane, Abdoulaye
- Kernaghan, Richard B.
- Ostebo, Marit Tolo
- Oyuela-Caycedo, Augusto
- Prieto, Oscar Gabriel
- Strong, Adrienne E.

Assistant Professor

- Schroder, Whittaker Carl
- Valenta, Kim L.
- Waters, Gifford J.

Lecturer

- Sudcharoen, Moodjalin

Research Assistant Scientist

- Stubblefield, Phoebe Regina

Curator

- Cobb, Charles R.
- Emery, Katherine Freances
- Wallis, Neill Jansen

Senior Lecturer

- Bogart, Stephanie L.

Affiliated Faculty

- Barnes, Riche J Daniel
Associate Professor
- Bloch, Jonathan I.
Curator
- Gauthier, Nicolas Edouard
Assistant Curator
- Lefebvre, Michelle J.
Assistant Curator
- Mahar, Ginessa Jean
Assistant Librarian
- Martinez Novo, Maria Del
Professor
- Paulson, Susan
Professor
- Torvinen, Andrea
Other

Anthropology

Program Information

The department of Anthropology offers graduate work leading to the Master of Arts (thesis or non-thesis option) and Doctor of Philosophy degrees. Requirements for these degrees are given in the General Information section of this catalog. For more information, visit the departmental website: <http://anthro.ufl.edu>. Graduate training is offered in cultural anthropology, archaeology, biological anthropology, and linguistic anthropology.

Each graduate student should specify a major field of study among the four fields of anthropology. In addition, each must choose one of three tracks: the specialized track in which a student focuses on one field of anthropology, the multifield track in which a student combines two fields, or the interdisciplinary track in which a student adds study in a second discipline to anthropology. Knowledge of a foreign language or of statistics may be required by the student's supervisory committee.

The department generally requires applicants to have acceptable scores on the GRE (verbal and quantitative portions) and a 3.5 overall grade point average based on a 4.0 system. Previous work in anthropology is an asset but not a strict requirement for admission. Potential applicants are urged to visit the website to familiarize themselves with the specializations of our faculty and to indicate in their application

those faculty with whom they might work. Barring special circumstances, the Department restricts admission to applicants interested in earning a Ph.D. Entering students who have earned a master's degree in anthropology may apply for direct admission to the doctoral program. Students who enter without an M.A. in anthropology will generally work for their M.A. on the way to the Ph.D. This requires either a formally-defended thesis or written comprehensive exams combined with a publishable paper or research report. With their adviser's permission, they may opt to bypass the M.A, although this is not recommended.

Students enrolled in the M.A. program who wish to continue their studies for a Ph.D. must apply to the Department for certification.

New students are admitted into the graduate program only in the fall of each academic year. The deadline for receiving completed applications for admission into the graduate program is December 15 of the previous year.

Degrees Offered

Degrees Offered with a Major in Anthropology

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Historic Preservation
 - concentration in Tropical Conservation and Development
 - concentration in Women's/Gender Studies
- Master of Arts
 - without a concentration
 - concentration in Historic Preservation
 - concentration in Tropical Conservation and Development
- Master of Arts in Teaching
 - without a concentration
 - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Anthropology Departmental Courses

Code	Title	Credits
ANG 5012	Fantastic Anthropology and Fringe Science	3
ANG 5126	Zooarcheology	3
ANG 5164	The Inca and Their Ancestors	3
ANG 5172	Historical Archeology	3
ANG 5184	Principles of Archaeology	3
ANG 5265	Methods in Ethnoecology	3
ANG 5266	Economic Anthropology	3
ANG 5303	Women and Development	3
ANG 5336	The Peoples of Brazil	3
ANG 5354	Anthropology of Modern Africa	3
ANG 5393	Media Anthropology	3
ANG 5395	Visual Anthropology	3
ANG 5420	Social Network Analysis in Cultural Anthropology	3
ANG 5464	Culture and Aging	3
ANG 5485	Research Design in Anthropology	3
ANG 5488	Geospatial Analysis in Cultural Anthropology	3

ANG 5494	Text Analysis	3
ANG 5525	Human Osteology and Osteometry	3
ANG 5531	Culture and Nutrition	3
ANG 5536	Bioarchaeology	3
ANG 5595	Proseminar in Biological and Archaeological Anthropology	3
ANG 5620	Language and Culture	3
ANG 5621	Proseminar in Cultural and Linguistic Anthropology	3
ANG 5702	Anthropology and Development	3
ANG 5802	Methods for the Observation of Behavior	3
ANG 5824L	Field Sessions in Archeology	6
ANG 5931	Special Topics	1-6
ANG 6034	Seminar in Anthropological History and Theory	3
ANG 6070	Digital Methods in Archaeology	3
ANG 6086	Historical Ecology	3
ANG 6110	Archaeological Theory	3
ANG 6113	Ideology and Symbolic Approaches in Archaeology	3
ANG 6120C	Environmental Archaeology	3
ANG 6122C	Archaeological Ceramics	3
ANG 6128	Lithic Technology	3
ANG 6146	Archaeology of Maritime Adaptations	3
ANG 6155	Southeastern U.S. Prehistory	3
ANG 6161	Problems in Caribbean Prehistory	3
ANG 6165	Problems in South American Archaeology	3
ANG 6183	Laboratory Training in Archeology	3
ANG 6185	Ethnoarchaeology	3
ANG 6186	Seminar in Archeology	3
ANG 6187	Experimental Archaeology	3
ANG 6191	Archaeology of Death	3
ANG 6192	Archaeological Data Analysis and Visualization	3
ANG 6241	Special Topics in Ecology of Religion	3
ANG 6267	Anthropology, Geographic Information System, and Human Ecosystems	3
ANG 6273	Legal Anthropology	3
ANG 6274	Principles of Political Anthropology	3
ANG 6286	Seminar in Contemporary Theory	3
ANG 6304	Seminar in Gender and International Development	3
ANG 6314	Peoples of the Arctic	3
ANG 6366	Family, Gender, and Population in China	3
ANG 6391	Ethnographic Writing	3
ANG 6394	Hospital Ethnography: Theory, Method, and Ethics	3
ANG 6407	Sickness and Power	3
ANG 6408	Enviro/Cultre/Disease	3
ANG 6421	Landscape, Place, Dwelling	3
ANG 6426	Cattle Cultures	3
ANG 6427	The Social Lives of Things	3
ANG 6452	Race and Racism in Anthropological Theory	3
ANG 6453	Human Rights in Cross-Cultural Perspective	3
ANG 6481	Research Methods in Cognitive Anthropology	3
ANG 6514	Human Origins	3
ANG 6524	Skeletal Mechanics in Biological Anthropology	3
ANG 6532	Molecular Genetics of Disease	3
ANG 6555	Issues in Evolutionary Anthropology	3
ANG 6583	Primate Functional Morphology	3

ANG 6591L	Advanced Molecular Anthropology Laboratory	1-3
ANG 6592	Genetic Perspectives on Human Diversity	3
ANG 6701	Seminar on Applied Anthropology	3
ANG 6734	Anthropology of Pregnancy, Birth, & Child Dev	3
ANG 6737	Medical Anthropology	3
ANG 6740	Advanced Techniques in Forensic Anthropology	3
ANG 6780	Foundations for a Career in Anthropology	3
ANG 6801	Ethnographic Field Methods	3
ANG 6804	Ethnographic Writing	3
ANG 6853	Applying GIS in Archaeological Research	3
ANG 6905	Individual Work	1-3
ANG 6910	Supervised Research	1-5
ANG 6915	Research Projects in Social, Cultural, and Applied Anthropology	1-3
ANG 6930	Special Topics in Anthropology	1-3
ANG 6940	Supervised Teaching	1-5
ANG 6945	Internship in Anthropology	1-8
ANG 6971	Research for Master's Thesis	1-15
ANG 7979	Advanced Research	1-12
ANG 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Anthropology (PHD)

SLO 1 Foundational Knowledge
Identify, define and describe the foundational concepts of the discipline of Anthropology and its subfields.

SLO 2 Professionalization
Prepare and deliver conference-level presentations.

SLO 3 Methodology
Students apply appropriate research methods and skills in the discipline to formulate a cogent research problem for the Ph.D. thesis.

Anthropology (MA)

SLO 1 Foundational Knowledge
Identify, define and describe the foundational concepts of the discipline of Anthropology and its subfields.

SLO 2 Skills
Identify, describe and explain research methods in the discipline, and apply those skills to formulate a cogent research problem for the M.A. paper or thesis.

SLO 3 Professional Behavior
Conduct research and report findings in a written publication-qualify paper.

Astronomy Department

Chair: C. Telesco

Graduate Coordinator: V. Sarajedini

The University of Florida's Astronomy Department is one of the largest in the country. Research is an integral part of the graduate program. Students have opportunities to work with faculty and staff on a broad range of astronomical problems using in-house, national and international, and ground- and space-based facilities. Support for graduate studies is available through fellowships, research assistantships, and teaching assistantships. For more information on

the program, please follow the link below or visit our website (<https://www.astro.ufl.edu/academics/graduate-studies/>).

Majors

- Astronomy (p. 205)

Faculty

Professor

- Gonzalez, Anthony Hernan
- Guzman, Rafael
- Lada, Elizabeth Anne
- Telesco, Charles Michael

Associate Professor

- Ginsburg, Adam
- Hoadley, Keri
- Narayanan, Desika T.
- Slepian, Zachary Scott

Assistant Professor

- Bae, Jaehan
- Ballard, Sarah
- Dittmann, Jason
- Ezzeddine, Rana
- Tayar, Jamie N.
- Torrey, Paul Adam

Senior Lecturer

- Marinas, Naibi
- Sell, Paul

Astronomy

Program Information

The Astronomy Department offers graduate programs leading to the M.S., M.S.T. or Ph.D. degrees in astronomy. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Planetary Systems: Observational and theoretical studies concentrate in the areas of planet formation, the dynamical evolution of planetary systems and the detection and characterization of extrasolar planets. Members of the department are active in Kepler Mission and ground-based Dopple surveys to identify extrasolar planets. Researchers are also active in studying the origins and orbital evolution of interplanetary dust and small bodies in the solar system and around nearby stars.

Stellar populations: Observational studies concentrate on resolved stars in the Milky Way and nearby galaxies. Studies of particular classes of stars include various types of binary stars and blue stragglers. The goal of these studies is to apply our theoretical understanding of stellar structure and evolution to the properties of stars in a variety of environments.

Origins of stars and planets: Observational studies focus on the properties of giant molecular clouds, the collapse of molecular cloud cores, the formation of stars in clusters and in isolation, and the formation and evolution of circumstellar and protoplanetary disks.

The department is active in several star formation surveys, involving many international ground- and space-based facilities. Theoretical studies emphasize the development of analytic models and numerical simulations, as well as their testing against observational constraints.

Structure and evolution of galaxies: Observational programs use multi-wavelength photometry of stars and star clusters in galaxies throughout the Local Group and in nearby groups, including the Milky Way, to study galaxy evolution. Other observations focus on the structure and dynamics of galaxies and their interstellar medium using neutral hydrogen (HI) and molecules such as carbon monoxide.

Extragalactic astronomy and cosmology: Observational programs investigate the nature of ultra-luminous galaxies, active galactic nuclei (AGNs), and the formation and chemical evolution of distant galaxies and clusters of galaxies. Theoretical investigations focus on the emission/absorption features in AGN spectra, the star-formation and chemical-evolution properties of galaxies, and applications of general relativity and particle physics to conditions in the very early universe.

Instrumentation programs: The UF Infrared Astrophysics Laboratory is a world leader in designing and constructing advanced near-infrared and mid-infrared instrumentation for major telescopes around the world, including the 8m Gemini North and South Telescopes and the 10m Gran Telescopio Canarias. Instrumentation is also developed in the area of high precision Doppler techniques for planet searches and the development of high contrast imaging techniques for direct imaging of extrasolar planets.

Computing facilities: The Astronomy Department maintains a network of high-performance computers running Linux and OS-X. The local network is maintained by a full-time systems manager. Astronomy students have access to supercomputing facilities maintained by the UF High Performance Computing Center, including thousands of CPU cores with high-performance networking.

Degrees Offered

Degrees Offered with a Major in Astronomy

- Doctor of Philosophy
- Master of Science
- Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Astronomy Courses

Code	Title	Credits
AST 6112	Solar System Astrophysics	3
AST 6215	Stars and the Galaxy	3
AST 6245	Stellar Atmospheres and Radiative Processes	3
AST 6309	Galaxies and Cosmology	3
AST 6336	Astrophysics of the Interstellar Medium	3
AST 6725C	Fundamentals of Observational Astronomy	3
AST 6905	Individual Work	1-6
AST 6925	Departmental Colloquium	1
AST 6935	Frontiers in Astronomy	1
AST 6936	Astronomy Journal Club	1
AST 7939	Special Topics	2-4

AST 7979	Advanced Research	1-12
AST 7980	Research for Doctoral Dissertation	1-15

Astronomy Departmental Courses

Code	Title	Credits
AST 6112	Solar System Astrophysics	3
AST 6215	Stars and the Galaxy	3
AST 6245	Stellar Atmospheres and Radiative Processes	3
AST 6309	Galaxies and Cosmology	3
AST 6336	Astrophysics of the Interstellar Medium	3
AST 6725C	Fundamentals of Observational Astronomy	3
AST 6905	Individual Work	1-6
AST 6925	Departmental Colloquium	1
AST 6935	Frontiers in Astronomy	1
AST 6936	Astronomy Journal Club	1
AST 7939	Special Topics	2-4
AST 7979	Advanced Research	1-12
AST 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Astronomy (PHD)

SLO 1 Knowledge
Students identify, define and describe the fundamental astrophysics covered by the core curriculum in astronomy

SLO 2 Skills
Students will conduct original, independent research in astrophysics

SLO 3 Professional Behavior
Students will write scholarly research that conforms to academic publishing conventions

Astronomy (MS)

SLO 1 Knowledge
Students will identify, define and describe the fundamental astrophysics covered by the core curriculum

SLO 2 Skills
Students will conduct supervised research in astrophysics

SLO 3 Professional Behavior
Students will communicate their research in oral presentations in a style appropriate for conferences

SLO 4 Professional Behavior
Students will write articles at the level of a conference proceeding based upon their research

Astronomy (MST)

SLO 1 Knowledge
Students will identify, define and describe the fundamental astrophysics covered by the core curriculum

SLO 2 Skills
Students will effectively teach astronomy

SLO 3 Professional Behavior
Students will effectively communicate with their peers in a professional environment

Biology Department

Chair: M. L. Wayne

Graduate Coordinator: J. (Gordon) Burleigh

The Department of Biology offers two graduate programs: Botany and Zoology. Both programs offer graduate work leading to the degrees of Master of Science, Master of Science in Teaching, and Doctor of Philosophy. Requirements for these degrees are available in the Graduate Degrees (p. 778) section of this catalog. More information regarding these programs is available by following the links below and by visiting our departmental website: <http://www.biology.ufl.edu>.

Combination Bachelor's/master's program: the Department of Biology in collaboration with the College of Medicine offer a combination Bachelor of Science with a major in Biology and Master of Science with a major in Biochemistry & Molecular Biology degree program. Eligible students may substitute up to 12 semester hours of graduate courses for undergraduate electives. These letter-graded, graduate level courses earned with a grade of B or better are double-counted toward the 30 credits required for the Master of Science (with thesis) in Biochemistry & Molecular Biology.

The combination degree program allows students to complete the M.S. degree with a research thesis in as little as one year after receiving the B.S. degree. The program is intended for students who want to complete a mentored research project while taking additional graduate coursework to gain more experience and be more competitive for applications to Ph.D. programs or professional programs (for example, Medical, Dental, or Veterinary school).

Eligibility Requirements for the admission to the undergraduate portion of the combination degree program:

1. Minimum cumulative GPA of 3.2 and minimum upper division GPA of 3.3
2. Completion of all critical-tracking requirements in the Biology B.S.
3. Completion of at least three semester hours of mentored research (e.g., through BSC 4910 Individual Mentored Research in Biology (0-3 cr.) and BSC 4912 Advanced Mentored Research in Biology (0-4 cr.)) or equivalent research experience

Eligibility Requirements for the graduate portion of the combination degree program:

1. Satisfactory completion of the undergraduate portion of the combination degree program
2. Meet the requirements for admission, including minimum GRE score, as established by the Graduate School and the Biochemistry & Molecular Biology graduate program in the College of Medicine.
3. A member of the Biochemistry & Molecular Biology graduate faculty has agreed to serve as the student's advisor.

Interested students must apply to the combination degree program by the end of the junior year. Upon acceptance, the Biology Major Undergraduate Coordinator and the Biochemistry & Molecular Biology Graduate Coordinator will identify up to 12 credits of 5000+ level courses that the student may take in the senior year. The GRE should be taken by the summer before the senior year. In the fall of the senior year, the student will apply to the M.S. Program. Upon acceptance to the M.S. program, the eligible combination degree graduate coursework will be

transferred to count toward the M.S. degree during the first semester following award of the B.S. degree.

Students should note the following regarding tuition and fees in this program:

1. the tuition for graduate courses is higher than for undergraduate courses, regardless of whether the courses are taken as an undergraduate or graduate student, and
2. there is no guarantee of a stipend or tuition waiver for graduate students in the MS program.

Majors

- Botany (p. 208)
- Zoology (p. 209)

Faculty

Professor

- Baer, Charles
- Barbazuk, William Bradley
- Braun, Edward Louis
- Cummings, Derek Adam
- Kimball, Rebecca T.
- Leibold, Mathew
- Liao, James C.
- Lichstein, Jeremy W.
- Maden, Malcolm
- McDaniel, Stuart
- Palmer, Todd
- Ponciano Castellanos, Jose Miguel
- Seaver, Elaine C.
- Smocovitis, Vassiliki B.
- Wayne, Marta L.

Associate Professor

- Choe, Keith P.
- Fraser, Gareth John
- Gillooly, James F.
- Hauser, Bernard A.
- Her, Young Gu
- Julian, David
- Longo Berrios, Ana Veronica
- Oppenheimer, David G.
- Ryan, Joseph Francis
- Yan, Hua

Assistant Professor

- Abil, Zhanar
- Cai, Liming
- Duffy, David John
- Durham, Bryndan P.
- Dutton, Christopher Lee
- John, Grace
- Keiser, Carl N.

- McCulloch, Kyle
- Sessa, Emily Butler
- Strother, James
- Subalusky, Amanda L.
- Vander Zanden, Hannah B.
- Yao, Zepeng
- Zhou, Juannan

Eminent Scholar

- Holt, Robert D.

Scientist

- Gitzendanner, Matthew Aaron

Distinguished Professor

- Putz, Francis E.
- Soltis, Douglas Edward
- Soltis, Pamela S.

Courtesy Assistant Professor

- Romero, Claudia

Curator

- Guralnick, Robert Penn
- Kawahara, Akito
- Manchester, Steven R.
- Page, Larry M.
- Paulay, Gustav

Courtesy Associate Professor

- Gordon, Doria R.

Affiliated Faculty

- Bai, Xiaofei
Assistant Professor
- Blackburn, David C.
Curator
- Bloch, Jonathan I.
Curator
- Cellinese, Nicoletta
Curator
- Cohn, Martin J.
Professor
- Kowalewski, Michal
Curator
- Majure, Lucas C.
Associate Curator
- Martindale, Mark Q.
Professor
- Moroz, Leonid Leonidovich
Distinguished Professor
- Naylor, Gavin
Curator
- Porto, Arthur

Assistant Curator

- Reed, David Lee
Curator
- Robinson, Scott K.
Eminent Scholar
- Schnitzler, Christine
Associate Professor
- Stanley, Edward Leo
Research Associate Scientist

Botany

Program Information

Chair: M. L. Wayne

Graduate Coordinator: J. (Gordon) Burleigh

The Department of Biology offers graduate work in Botany leading to the degrees of Master of Science, Master of Science in Teaching, and Doctor of Philosophy.

The Department offers studies in the areas of biochemistry, molecular biology, cell biology, physiology, ecology, systematics, and evolution. Specific areas of specialization include anatomy/morphology with emphasis on extant and fossil vascular plants; ecology and environmental studies including ecosystem ecology, conservation biology and genetics, fire ecology, exotic invasive species, and tropical botany and ecology; cell biology with emphasis on the cytoskeleton and cell morphogenesis; physiology, biochemistry, and molecular biology with emphasis on photosynthesis, growth and development of angiosperms, protein phosphorylation and signal transduction, global analysis of spatial patterns of gene expression; plant secondary metabolism and proteomics; systematics with emphasis on DNA- and morphology-based phylogenetic analyses, phylogeographic studies, molecular evolution/development, and monographic and floristic studies. To be considered for admission to graduate studies, students should have:

- The equivalent of an undergraduate degree in botany or biology with basic course work in their area of interest
- Acceptable GRE scores (verbal, quantitative, and analytical writing)
- Letters of recommendation
- International students must submit an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program. The program of graduate study for each student will be determined by a supervisory committee, and deficiencies in background coursework will be made up early in the graduate program. No more than 9 credits of BOT 6905 Individual Studies in Botany (1-3 cr.) may be used to satisfy the credit requirements for a master's degree.

Degrees Offered

Degrees Offered with a Major in Botany

- Doctor of Philosophy
 - without a concentration
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences
- Master of Science

- without a concentration
- concentration in Tropical Conservation and Development
- concentration in Wetland Sciences
- Master of Science in Teaching
 - without a concentration
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Botany Courses

Code	Title	Credits
BOT 5225C	Plant Anatomy	4
BOT 5305	Paleobotany	3
BOT 5505C	Intermediate Plant Physiology	3
BOT 5655C	Physiological Plant Ecology	3
BOT 5685C	Tropical Botany	5
BOT 5695C	Ecosystems of Florida	3
BOT 5725C	Taxonomy of Vascular Plants	4
BOT 6566	Plant Growth and Development	3
BOT 6716C	Advanced Taxonomy	2
BOT 6726C	Principles of Systematic Biology	4
BOT 6905	Individual Studies in Botany	1-3
BOT 6910	Supervised Research	1-5
BOT 6927	Advances in Botany	1-3
BOT 6935	Special Topics	1-4
BOT 6936	Graduate Student Seminar	1-2
BOT 6971	Research for Master's Thesis	1-15
BOT 7979	Advanced Research	1-12
BOT 7980	Research for Doctoral Dissertation	1-15
PCB 5046C	Advanced Ecology	3
PCB 5338	Principles of Ecosystem Ecology	3
PCB 5356	Tropical Ecology	3
PLP 6656C	Fungal Biology	4

Biology Departmental Courses

Code	Title	Credits
BOT 6276C	Phylogenomics	4
BOT 6656	Plant Symbiosis	3
BSC 6038	Broader Impacts of Science on Society	2
BSC 6451	Computational Tools for Research in Biology	3
BSC 6895	AI in Biology	3
PCB 6675C	Evolutionary Biogeography	3
PCB 6685	Population Genetics	4
ZOO 6930	Seminar in Molecular Evolution	2

Student Learning Outcomes

Botany (PHD)

SLO 1 Knowledge

Students will identify, define, and describe basic fundamentals of biology and a thorough understanding of the fundamentals of botany

SLO 2 Skills

Students will design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form

SLO 3 Skills

Students design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form

SLO 4 Professional Behavior

Students will practice ethical behaviors and professional conduct

SLO 5 Professional Behavior

Students will be able to interact and communicate with professionals at scientific conferences

Botany (MS)

SLO 1 Knowledge

Students will identify, define, and describe the basic fundamentals of biology and botany

SLO 2 Skills

Students will design a research project, collect data, analyze and interpret the results and present this in written and oral form

SLO 3 Professional Behavior

Students will practice ethical behaviors and professional conduct

SLO 4 Professional Behavior

Students will interact and communicate with professionals at scientific conferences, and practice ethical behaviors and professional conduct

Botany (MST)

SLO 1 Knowledge

Students will identify, define, and describe the basic fundamentals of botany and pedagogy.

SLO 2 Skills

Students will teach botany and biology classroom sessions

SLO 3 Professional Behavior

Students will interact and communicate with professionals at scientific conferences, and practice ethical behaviors and professional conduct

Zoology

Program Information

Chair: M. L. Wayne

Graduate Coordinator: J. (Gordon) Burleigh

The Department of Biology offers graduate programs in Zoology leading to the Master of Science in Teaching, Master of Science, and Doctor of Philosophy degrees. The requirements for these degrees can be found in the Graduate Degrees (p. 778) section of this catalog.

Our program emphasizes Integrative Biology, with integration accomplished through a focus on the theoretical foundations provided by evolutionary biology and ecology. Our faculty has expertise in ecology, evolution, behavior, comparative and environmental physiology, genetics, development, and phylogenetics. We work in a variety of terrestrial and aquatic environments and geographic regions (tropics through subpolar), and on a range of organisms (including plants). Our faculty value integrative research (e.g., by crossing levels of organization from gene expressions to species interactions), linking theory with data (through use of statistical and mathematical tools), and using natural history to guide the development and testing of rigorous conceptual frameworks. Many of our faculty also are interested in applying and

testing basic science in applied contexts (e.g., conservation biology and ecotoxicology).

Our approach is highlighted through our first-year, required, graduate course, Integrative Principles. Each student’s supervisory committee will recommend additional courses according to the academic background and research plans of the student.

Degrees Offered

Degrees Offered with a Major in Zoology

- Doctor of Philosophy
 - without a concentration
 - concentration in Animal Molecular and Cellular Biology
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences
- Master of Science in Teaching
 - without a concentration
 - concentration in Tropical Conservation and Development
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Zoology Courses

Code	Title	Credits
BOT 6726C	Principles of Systematic Biology	4
BSC 6038	Broader Impacts of Science on Society	2
PCB 5307C	Limnology	4
PCB 5415C	Behavioral Ecology	4
PCB 5615	Molecular Evolution and Systematics	4
PCB 6049	Seminar in Ecology	1-3
PCB 6377C	Physiological Ecology of Vertebrates	4
PCB 6447C	Community Ecology	4
PCB 6675C	Evolutionary Biogeography	3
PCB 6685	Population Genetics	4
PCB 6695	Seminar in Evolutionary Biology	1
ZOO 5115C	Vertebrate Paleontology	3
ZOO 5486C	Mammalogy	4
ZOO 6005	Integrative Principles of Zoology I	4
ZOO 6308	Dynamic Optimization Modeling in Behavioral and Evolutionary Ecology	3
ZOO 6406	Biology of Sea Turtles	3
ZOO 6456C	Ichthyology	4
ZOO 6542	Nutritional Ecology	3
ZOO 6905	Individual Studies	1-8
ZOO 6910	Supervised Research	1-5
ZOO 6920	Zoology Colloquium	1
ZOO 6927	Special Topics in Zoology	1-4
ZOO 6930	Seminar in Molecular Evolution	2
ZOO 6931	Seminar in Marine Turtle Biology	1-2
ZOO 6939	Seminar in Animal Behavior	1-3
ZOO 6971	Research for Master’s Thesis	1-15

ZOO 7979	Advanced Research	1-12
ZOO 7980	Research for Doctoral Dissertation	1-15

Biology Departmental Courses

Code	Title	Credits
BOT 6276C	Phylogenomics	4
BOT 6656	Plant Symbiosis	3
BSC 6038	Broader Impacts of Science on Society	2
BSC 6451	Computational Tools for Research in Biology	3
BSC 6895	AI in Biology	3
PCB 6675C	Evolutionary Biogeography	3
PCB 6685	Population Genetics	4
ZOO 6930	Seminar in Molecular Evolution	2

Student Learning Outcomes

zoology (PHD)

SLO 1 Knowledge
Students will identify, define, and describe basic fundamentals of biology and a thorough understanding of the fundamentals of zoology

SLO 2 Skills
Students will design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form

SLO 3 Skills
Students design a research project, collect data, analyze and interpret the results. They will be able to present the results of original research in oral and written form

SLO 4 Professional Behavior
Students will demonstrate ethical behaviors, professional conduct

SLO 5 Professional Behavior
Students will be able to interact and communicate with professionals at scientific conferences

Zoology (MS)

SLO 1 Knowledge
Students will identify, define, and describe the basic fundamentals of biology and zoology

SLO 2 Skills
Students will design a research project, collect data, analyze and interpret the results and present this in written and oral form

SLO 3 Professional Behavior
Students will practice ethical behaviors and professional conduct

SLO 4 Professional Behavior
Students will interact and communicate with professionals at scientific conferences

Zoology (MST)

SLO 1 Knowledge
Students will identify, define, and describe the basic fundamentals of zoology

SLO 2 Skills
Students will define, explain and communicate key concepts in zoology and biology

SLO 3 Professional Behavior

Students will engage in ethical behaviors and professional conduct

SLO 4 Professional Behavior

Students will practice ethical behaviors and professional conduct

Center for Latin American Studies

Director: P. J. Williams

Graduate Coordinator: S. Paulson

The Center for Latin American Studies offers the following graduate programs:

- Latin American Studies
- Sustainable Development Practice

The department also offers a combination bachelor's/master's program. Contact the graduate coordinator for further information regarding this option. For more information about all of our programs, please see our individual major pages, following the links below, or by visiting our website: <http://www.latam.ufl.edu>.

Majors

- Latin American Studies (p. 213)
- Sustainable Development Practice (p. 213)

Faculty

Professor

- Bruna, Emilio M.
- De La Torre Espinosa, Carlos
- Martinez Novo, Maria Del
- Paulson, Susan

Assistant Professor

- Baquero Melo, Jairo
- Solorzano, Rafael
- Tenorio Lopez, Ariadna Nohemi
- Weeks, Margaret Clinton

Other

- Risner, Mary E.

Lecturer

- Gomez Lomeli, Luis Felipe
- Korsant, Clate J.

Research Assistant Scientist

- Almeyda Zambrano, Angelica Maria

Master Lecturer

- Galloway, Glenn Erwin

Affiliated Faculty

- Acevedo Torres, Miguel A.
Assistant Professor
- Anderson, Leslie Elin

Professor

- Bet, Carlos German
Assistant Professor
- Blake, John G.
Professor
- Branch, Lyn Clarke
Professor
- Branham, Marc A.
Professor
- Brenner, Mark
Professor
- Bretones Lane, Fernanda
Assistant Professor
- Broadbent, Eben North
Associate Professor
- Broadwell, George Aaron
Professor
- Clarke, Mysha
Assistant Professor
- Crane, Jonathan H.
Professor
- Defrance, Susan D.
Professor
- Diaz, John M.
Associate Professor
- Emery, Katherine Freances
Curator
- Essegbey, James
Professor
- Evans, Edward Anthony
Professor
- Fletcher, Robert Jeffrey
Professor
- Gendreau, Brian
Clinical Professor
- Gillespie, Susan D.
Professor
- Ginway, Mary E.
Professor
- Guerra, Lillian
Professor
- Hansen, Quinn M.
Lecturer
- Hanson, Rebecca Annice
Assistant Professor
- Hebblethwaite, Benjamin John
Professor
- Heckenberger, Michael Joseph
Professor
- Hedrick, Tace Megan
Professor
- Hernandez, Jillian
Associate Professor
- Hernandez, Jorge A.
Professor
- Hernandez, Berta Esperanza

Professor

- Hind, Emily Ann
Professor
- Kainer, Karen A.
Professor
- Kaplan, David A.
Professor
- Kernaghan, Richard B.
Associate Professor
- Kohen, Martha
Professor
- Lamino Jarmillo, Pablo
Assistant Professor
- Leslie, Michael
Associate Professor
- Loiselle, Bette Ann
Professor
- Longo Berrios, Ana Veronica
Associate Professor
- Martins, Samuel J.
Assistant Professor
- Mejia Puig, Luis Alfonso
Assistant Professor
- Monaghan, Paul F.
Associate Professor
- Moore, Porchia
Assistant Professor
- Munoz-Carpena, Rafael
Distinguished Professor
- Naranjo, Andy
Professor
- Oliveira, Mariana
Lecturer
- Ortiz, Paul Andrew
Professor
- Oyuela-Caycedo, Augusto
Associate Professor
- Pacheco, Mark B.
Assistant Professor
- Pascual Cabo, Diego
Associate Professor
- Peluffo, Maria Cecilia
Assistant Professor
- Perez Munoz, Cristian David
Assistant Professor
- Perz, Stephen George
Professor
- Peterson, Anna
Professor
- Pharies, David A.
Professor
- Powell, Heidi C.
Associate Professor
- Prevatt, David
Professor
- Restrepo Sanin, Juliana

Assistant Professor

- Roberts, Thomas G.
Professor
- Robinson, Scott K.
Eminent Scholar
- Rogal, Maria K.
Professor
- Rojas Barros, Eugenio Ignacio
Assistant Professor
- Rua, Colleen
Associate Professor
- Ruiz, Jorge
Associate Professor
- Ryan, Sadie Jane
Professor
- Sanchez, Raul
Associate Professor
- Sandoval Gutierrez, Hector Hugo
Research Assistant Professor
- Schroder, Whittaker Carl
Assistant Professor
- Seale, James L.
Professor
- Simmons, Cynthia S.
Professor
- Soledade, Augusto Cesar
Professor
- Sollenberger, Lynn E.
Distinguished Professor
- Southworth, Jane
Professor
- Stanfield-Mazzi, Maya
Professor
- Stepp, John Richard
Professor
- Suarez Carrasquillo, Carlos Alberto
Senior Lecturer
- Tremura, Welson Alves
Professor
- Tucker, Catherine May
Professor
- Uparela Reyes, Paola Andrea
Assistant Professor
- Useche, Maria Del-Pilar
Professor
- Valdes Kroff, Jorge Rodrigo
Associate Professor
- Valle-Levinson, Arnoldo
Professor
- Vargas-Betancourt, Margarita
Associate University Librarian
- Vittor, Amy Yomiko
Assistant Professor
- Vrana, Heather A.
Associate Professor

- Walker, Robert T.
Professor

Latin American Studies

Program Information

The Center for Latin American Studies offers the following graduate programs:

- An interdisciplinary Master of Arts degree in Latin American Studies
- A graduate certificate in Latin American studies
- A graduate certificate and concentration in Tropical Conservation and Development

The graduate program in Latin American studies relies on over 250 courses with Latin American content taught in more than 35 academic units of the above colleges. The degree and certificate programs in Latin American studies are described on our website www.latam.ufl.edu/academics/graduate-programs (<http://www.latam.ufl.edu/academics/graduate-programs/>). Complete course listings are also available on the Center's website: <http://www.latam.ufl.edu/academics/las-courses> (<http://www.latam.ufl.edu/academics/las-courses/>).

Degrees Offered

Degrees

- Master of Arts
 - without a concentration
 - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

center for Latin American Studies Courses

Code	Title	Credits
FOT 6941	Translation Studies Practicum	3
INR 6708	Foundations of Economics for Sustainable Development	3
LAS 6045	Gender and Empowerment in Development	3
LAS 6046	Development Administration	3
LAS 6047	Conservation and Development Practicum	3
LAS 6049	Design and Methods for Sustainable Development Practice	3
LAS 6220	Issues and Perspectives in Latin American Studies	3
LAS 6290	Tropical Conservation and Development	3
LAS 6291	Conservation and Development Skills	3
LAS 6292	Tropical Conservation and Development Research Methods	3
LAS 6293	Design and Methods of Research in Latin American Studies	3
LAS 6295	Latin American Business Environment	2
LAS 6905	Individual Work	1-3
LAS 6938	Seminar in Modern Latin American Studies	3
LAS 6941	Tropical Conservation and Development Practicum	3
LAS 6943	Development Theory and Practice in Latin America	3

LAS 6949	Internship In Latin American Studies	1-6
LAS 6971	Research for Master's Thesis	1-15

Student Learning Outcomes

Latin American Studies (MA)

SLO 1 Content

Students will identify, describe and explain the prevailing issues in and scholarly perspectives on Latin American Studies

SLO 2 Skills

Students will critically evaluate the significance, quality and veracity of information gathered in the literature, apply it effectively in research for a thesis, and communicate that knowledge effectively in spoken and written formats

SLO 3 Professional Behavior

Students will defend their thesis in an oral exam before their committee members. Many MALAS students will present their research in professional meetings or other academic settings

Sustainable Development Practice

Program Information

Director: G. Galloway

Program Coordinator: A. Noss

The Master of Sustainable Development Practice (MDP) Program offers the following academic programs:

- An interdisciplinary Master's degree in Sustainable Development Practice (MDP)
- A graduate certificate in Sustainable Development Practice (SDP)

The MDP Program is jointly administered by the Center for Latin American Studies and the Center for African Studies. The Master's degree is described in the Other Master's Degrees (p. 778) section of the Graduate Catalog.

The MDP prepares development practitioners to address development challenges in creative and dynamic ways, integrating the academic and development pillars of natural sciences, social sciences, health sciences and management through a vigorous and innovative program curriculum. The MDP Degree requires 45 credits of course work: 24 major or core credits across the four pillars, and 21 elective credits through which a student focuses on a specialization (for example entrepreneurship, agriculture, ecotourism, gender, community forest management, nonprofits, or M&E). The MDP is a non-thesis degree. Each student must successfully complete a set of requirements including a summer field practicum with a host organization, the development of a poster presented in a public poster session, a final practicum report approved by their committee, and a public presentation and private defense with committee members of the final report. All students will be expected to meet learning outcome objectives defined for knowledge, skills and professional behavior. Students are required to develop a study plan approved by the MDP Program Graduate Coordinator and by their supervisory committee.

The SDP certificate provides training in interdisciplinary knowledge and skills related to sustainable development practice. The 12 credits for Master's students and 15 credits for Ph.D. students include one required cross-cutting overview course plus 3-4 additional courses in the fields

of social sciences, health sciences, natural sciences, and management skills.

MDP major or core courses are listed under the listings for Sustainable Development Courses, African Studies Courses, and Latin American Studies Courses. Please visit the MDP program's website for additional information on the SDP certificate, MDP degree and curriculum, including detailed course descriptions and syllabi: <http://mdp.africa.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Sustainable Development Practice

- Master of Sustainable Development Practice
 - without a concentration
 - concentration in Climate Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Sustainable Development Courses

Code	Title	Credits
AEB 6933	Special Topics	1-6
AGR 5277C	Tropical Crop Production	3
EVR 5705	Natural Resources and Innovation Systems	3
GEO 6408	Parks and People	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6404	Gender, Sexuality, and Health	3
PHC 6410	Designing & Implementing Public Health Solutions	3
PHC 6445	Global Public Health and Development II	3
PHC 6704	Community-Based Participatory Research	3
PHC 6764	Global Public Health and Development I	3
SWS 5551	Soils, Water, and Public Health	3

African Studies Courses

Code	Title	Credits
AFH 5934	Topics in African History	3
AFH 6259	Seminar in Modern Africa	3
AFH 6805	Theo/Met African Hist	3
AFH 6934	Africa	3
AFS 5061	Africana Bibliography	1
AFS 6060	Research Problems in African Studies	3
AFS 6062	Design and Methods for Sustainable Development Practice	3
AFS 6303	Development Administration	3
AFS 6305	Development Theory and Practice Intro	3
AFS 6306	Gender and Empowerment in Development	3
AFS 6307	Foundations of Economics for Sustainable Development	3
AFS 6346	Conservation and Development Practicum	3
AFS 6905	Individual Work in African Studies	1-3

Latin American Studies Courses

Code	Title	Credits
FOT 6941	Translation Studies Practicum	3
INR 6708	Foundations of Economics for Sustainable Development	3
LAS 6045	Gender and Empowerment in Development	3
LAS 6046	Development Administration	3
LAS 6047	Conservation and Development Practicum	3
LAS 6049	Design and Methods for Sustainable Development Practice	3
LAS 6220	Issues and Perspectives in Latin American Studies	3
LAS 6290	Tropical Conservation and Development	3
LAS 6291	Conservation and Development Skills	3
LAS 6292	Tropical Conservation and Development Research Methods	3
LAS 6293	Design and Methods of Research in Latin American Studies	3
LAS 6295	Latin American Business Environment	2
LAS 6905	Individual Work	1-3
LAS 6938	Seminar in Modern Latin American Studies	3
LAS 6941	Tropical Conservation and Development Practicum	3
LAS 6943	Development Theory and Practice in Latin America	3
LAS 6949	Internship In Latin American Studies	1-6
LAS 6971	Research for Master's Thesis	1-15

Student Learning Outcomes

Sustainable Development Practice

SLO 1 Knowledge Outcome

Students will define, identify and describe complex interdisciplinary dimensions of sustainable development

SLO 2 Skills Outcome

Students will plan and utilize participatory methodologies and/or tasks related to the planning, implementation, monitoring and evaluation of development initiatives

SLO 3 Professional Behavior Outcome

Students will interface with professional peers with honesty, ethical behavior, cultural sensitivity, teamwork, and effective communication

Chemistry Department

Chair: L. McElwee-White

Graduate Coordinator: A. Aponick

The Department of Chemistry granted its first master's degree in 1909 and the first Ph.D. in 1930. Specializations in biochemistry, organic, physical, inorganic and analytical are offered with extensive interdisciplinary research opportunities (e.g., bio/nano-science, particle science, green chemistry, polymer chemistry, chemical physics, health related biochemistry, chemistry-engineering, and genomics).

The Department presently offers the Master of Science and Doctor of Philosophy degrees with a major in chemistry. The non-thesis Master of Science in Teaching degree is also offered with a major in chemistry.

For more information, please visit <https://www.chem.ufl.edu/>.

Majors

- Chemistry (p. 215)

Faculty

Professor

- Angerhofer, Alexander
- Aponick, Aaron
- Bowers, Clifford Russell
- Bruner, Steven Douglas
- Cao, Yunwei Charles
- Castellano, Ronald K.
- Colina, Coray Mariu
- Fanucci, Gail E.
- Guo, Zhongwu
- Harris, Michael
- Kleiman, Valeria Dana
- McElwee-White, Lisa Ann
- Miller, Stephen Albert
- Murray, Leslie Justin
- Richardson, David E.
- Roitberg, Adrian E.
- Seidel, Daniel
- Stewart, Jon Dale
- Sumerlin, Brent S.
- Talham, Daniel R.
- Veige, Adam S.
- Wei, Wei
- Zeng, Yong

Associate Professor

- Brucat, Philip J.
- Butcher, Rebecca Ann
- Grenning, Alexander James
- Loesgen, Sandra
- Savin, Daniel Andrew

Assistant Professor

- Eddy, Matthew T.
- Evans, Austin
- Feng, Kaibo
- Hong, Fan
- Liu, Mingjie
- Miranda Quintana, Ramon Alain
- Narayanan, Amal
- Perez, Alberto
- Prentice, Boone Monroe
- Rudolf, Jeffrey D.
- Searles, Keith
- TANG, FENG
- Zeng, Chenjie

Scientist

- Basso, Kari B.
- Deumens, Erik
- Ghiviriga, Ion

Distinguished Professor

- Christou, George
- Martin, Charles R.

Research Professor

- Omenetto, Nicolo

Courtesy Professor

- Wagener, Kenneth B.

Graduate Research Professor

- Bartlett, Rodney J.

Affiliated Faculty

- Bowden, John A.
Associate Professor
- Garrett, Timothy J.
Associate Professor
- Tanner, David B.
Distinguished Professor

Chemistry

Program Information

The department offers the Master of Science (thesis or non-thesis) and Doctor of Philosophy degrees with a major in chemistry and specialization in biochemistry, analytical, organic, inorganic, or physical chemistry. The non-thesis degree Master of Science in Teaching is also offered with a major in chemistry. New graduate students should have adequate undergraduate training in inorganic, analytical, organic, and physical chemistry. Normally this will include as a minimum a year of general chemistry, one semester of quantitative analysis, one year of organic chemistry, one year of physical chemistry, and one semester of advanced inorganic chemistry. Additional courses in instrumental analysis, biochemistry, and advanced physical and organic chemistry are desirable. Deficiencies in any of these areas may be corrected during the first year of graduate study. Such deficiencies are determined by a series of placement tests given prior to registration, and the results of these tests are used in planning the student's program. Doctoral candidates are required to complete at least 9 semester credits of courses specified by the division of the Chemistry Department in which they choose to specialize, as well as at least 9 semester credits of out-of-major-division courses. There are some minor restrictions on courses that may be used to meet this requirement. Additional courses may be required by the student's supervisory committee or major professor.

Ph.D. candidates must serve not less than one year as teaching assistants. This requirement will be waived only when, in the opinion of the department, unusual circumstances justify such action. A chemical physics option is offered for students who will be doing research in areas of physical chemistry which require a strong background in physics. For this option, a student meets the departmental requirements for

concentration in physical chemistry, except that only one out-of-major division course is required. In addition, a minimum of 14 credits in 4000 level or higher physics courses or a minimum of 7 such credits in physics and 7 in 4000 level or higher mathematics courses is required. Candidates for the master's degree are required to complete any two core courses. The Master of Science degree in chemistry has both thesis and non-thesis options. The non-thesis degree Master of Science in Teaching is offered with a major in chemistry and requires a written paper of substantial length (30 to 50 pages) on an approved topic pertaining to some phase of chemistry, under the course CHM 6905 Individual Problems, Advanced (1-5 cr.).

Degrees Offered

Degrees Offered with a Major in Chemistry

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Imaging Science and Technology
- Master of Science
- Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Chemistry Departmental Courses

Code	Title	Credits
CHM 5224	Basic Principles for Organic Chemistry	3
CHM 5235	Organic Spectroscopy	3
CHM 5275	The Organic Chemistry of Polymers	2
CHM 5305	Chemistry of Biological Molecules	3
CHM 5416L	Advanced Physical Chemistry Laboratory	2
CHM 5511	Physical Chemistry of Polymers	2
CHM 6036	Chemical Biology	3
CHM 6037	Chemical Biology and Biochemistry Seminar	1
CHM 6153	Electrochemical Processes	3
CHM 6154	Chemical Separations	3
CHM 6155	Spectrochemical Methods	3
CHM 6158C	Electronics and Instrumentation	1-4
CHM 6159	Mass Spectrometric Methods	3
CHM 6165	Chemometrics	3
CHM 6180	Special Topics in Analytical Chemistry	1-3
CHM 6190	Analytical Chemistry Seminar	1
CHM 6225	Advanced Principles of Organic Chemistry	4
CHM 6226	Advanced Synthetic Organic Chemistry	3
CHM 6227	Topics in Synthetic Organic Chemistry	2
CHM 6251	Organometallic Compounds	3
CHM 6271	The Chemistry of High Polymers	2
CHM 6301	Enzyme Mechanisms	3
CHM 6302	Chemistry and Biology of Nucleic Acids	3
CHM 6303	Methods in Computational Biochemistry and Structural Biology	3
CHM 6306	Special Topics in Biological Chemistry Mechanisms	3
CHM 6381	Special Topics in Organic Chemistry	1-3
CHM 6390	Organic Chemistry Seminar Presentation	1
CHM 6391	Organic Chemistry Seminar Discussion	1
CHM 6430	Chemical Thermodynamics	3
CHM 6461	Statistical Thermodynamics	3

CHM 6470	Chemical Bonding and Spectra I	3
CHM 6471	Chemical Bonding and Spectra II	3
CHM 6480	Elements of Quantum Chemistry	3
CHM 6490	Theory of Molecular Spectroscopy	3
CHM 6580	Special Topics in Physical Chemistry	1-3
CHM 6586	Computational Chemistry	3
CHM 6590	Physical Chemistry Seminar	1
CHM 6620	Advanced Inorganic Chemistry I	3
CHM 6621	Advanced Inorganic Chemistry II	3
CHM 6626	Applications of Physical Methods in Inorganic Chemistry	3
CHM 6628	Chemistry of Solid Materials	3
CHM 6670	Inorganic Biochemistry	3
CHM 6680	Special Topics in Inorganic Chemistry	1-3
CHM 6690	Inorganic Chemistry Seminar	1
CHM 6720	Chemical Dynamics	3
CHM 6905	Individual Problems, Advanced	1-5
CHM 6910	Supervised Research	1-5
CHM 6934	Advanced Topics in Chemistry	1
CHM 6935	Chemistry Colloquium	1
CHM 6943	Internship in College Teaching	2
CHM 6971	Research for Master's Thesis	1-15
CHM 7485	Special Topics in Theory of Atomic and Molecular Structure	1-3
CHM 7979	Advanced Research	1-12
CHM 7980	Research for Doctoral Dissertation	1-15
CHS 5110	Radiochemistry	2
PHA 6435	Biosynthetic Logic of Medicinal Natural Products	3

Student Learning Outcomes

Chemistry (PHD)

SLO 1 Knowledge

Students will define, identify, and describe the fundamental science of the declared sub-discipline within chemistry (physical, biochemistry, organic, inorganic and analytical chemistry)

SLO 2 Skills

Students will formulate new research ideas and carry them out in the laboratory

SLO 3 Professional Behavior

Practice ethical behaviors, cultural sensitivity, teamwork, professional conduct and high level oral and written communication skills

Chemistry (MS)

SLO 1 Knowledge Students will define, identify, and describe the fundamental science of the declared sub-discipline within chemistry (physical, biochemistry, organic, inorganic and analytical chemistry)

SLO 2 Skills Students will formulate new research ideas and carry them out in the laboratory

SLO 3 Professional Behavior Practice ethical behaviors, cultural sensitivity, teamwork, professional conduct and high level oral and written communication skills

Chemistry (MST)

SLO 1 Knowledge

Students will define, identify, and describe the fundamental science of chemistry with a focus on teaching

SLO 2 Skills

Students will formulate and evaluate new strategies and approaches to teaching chemistry and practice them in the classroom or the teaching laboratory

SLO 3 Professional Behavior

Practice ethical behaviors, cultural sensitivity, teamwork, professional conduct and high level oral and written communication skills

Classics Department

Chair: J. Rea

Graduate Coordinators: A. Wolpert, V. Yates

The department offers the following degrees and programs: the Doctor of Philosophy with a major in classical studies; the Master of Arts degree with a major in Latin; and the Master of Latin degree. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Within the Ph.D. program are three tracks:

- Philology (prepares students for careers in colleges and universities)
- Classical civilization (available via distance course work)
- Latin and Roman studies (available via distance course work).

Requirements for the philology track of the doctoral degree include:

- 60 credit hours after the M.A. (or a total of 90 credit hours)
- Five additional seminars after the M.A. in classics at the 500 level or higher
- Three of the following seminars:

Code	Title	Credits
GRE 6425	Greek Prose Composition	3
GRW 6105	The Greek Tradition	3
LAT 6425	Latin Prose Composition	3
LNW 6105	The Roman Tradition	3
CLA 6805	The Classical Research Tradition	3

- A reading knowledge of two modern languages, one of which must be German
- Reading lists in Greek and Roman authors
- Supervised experience in teaching Latin, Greek, or civilization courses is advised
- Successful completion of a series of qualifying examinations appropriate to the chosen specialization (Greek reading; Latin reading; classical Greek literature in its historical context; classical Latin literature in its historical context; special author/topic)
- An oral preliminary examination, dissertation, and final examination

The M.A. degree with a major in Latin is recommended for students who plan to pursue a career in secondary teaching. Both M.A. programs require 30 credit hours, including 6 credits of GRW 6971 Research for Master's Thesis (1-15 cr.) or LNW 6971 Research for Master's Thesis (1-15 cr.), a thesis, and final examination.

The Master of Latin degree is a non-thesis degree, designed for currently employed and/or certified teaching professionals who wish to widen their knowledge of Latin, broaden their education in the field of classics, and enhance their professional qualifications through a program of summer course work and directed independent study and/or distance learning courses during the regular academic year. The Master of Arts in Teaching,

a non-thesis degree, is offered with a program in Latin and is intended for students preparing to teach in community colleges or high schools.

Majors

- Classical Studies (p. 217)
- Latin (p. 219)

Faculty

Professor

- Kapparis, Konstantinos
- Pagan-Wolpert, Victoria Emma
- Rea, Jennifer Ann
- Wagman, Robert Sergius

Associate Professor

- Bozia, Eleni
- Giannadaki, Ifigeneia
- Wolpert, Andrew Oxman

Assistant Professor

- Iff-Noel, Flora Simone

Lecturer

- Nichols, Andrew G.
- Yates, Velvet Lenore

Classical Studies

Program Information

(The following information refers only to our on-campus programs. Please visit the Distance Learning Homepage (<https://distance.ufl.edu/online-degree-programs/>) for further details on our Distance Learning programs, especially aimed at elementary, secondary, or community college teachers.)

Ph.D. with a major in Classical Studies

The Ph.D. program with a major in classical studies is a traditional course of study in Greek and Latin language and literature that prepares students for careers in research and teaching at colleges and universities. Students awarded a TA position receive a stipend plus a full tuition waiver. The University also offers competitive fellowships. The department routinely provides research fellowships for its Ph.D. candidates. Department awards are also available for study abroad opportunities. Students are expected to become Florida residents after one year.

Admissions Requirements to the Classical Studies Programs:

Admission into the university and the program for Classics is ultimately determined and granted according to the rules established by the Graduate School of the University of Florida (see the Graduate Catalog).

All students seeking admission to the department must submit satisfactory scores on the GRE General Test (with at least 320 [old scoring scale] or 140 [new scoring scale] on the verbal portion.

Ph.D. program (Level II) requirements include:

1. M.A. in Classics or the equivalent.
2. A GPA of at least 3.25 in previous graduate work, and an undergraduate average of at least 3.0.
3. Demonstrated reading knowledge of German, French, Italian or Modern Greek (competency in the second language to be demonstrated before the completion of the second year at Level II).
4. Deficiencies that can be corrected within one year will not necessarily prevent admission, if the applicant's record gives evidence of the capacity to undertake and complete guided independent reading and research at the doctoral level.

Degrees Offered

Degrees Offered with a Major in Classical Studies

- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Classics Departmental Courses

Code	Title	Credits
CLA 6125	Augustan Age	3
CLA 6795	Greek and Roman Archeology	3
CLA 6805	The Classical Research Tradition	3
CLA 6895	Athenian Law and Society	3
CLA 6905	Individual Work	2-4
CLA 6930	Greece and the Near East	3
CLA 6932	Topics in Classical Civilization	3

Greek studies Courses

Code	Title	Credits
GRE 6425	Greek Prose Composition	3
GRE 6755	Epigraphy	3
GRK 6905	Individual Work in Modern Greek	3-5
GRW 6105	The Greek Tradition	3
GRW 6216	Greek Novel	3
GRW 6316	Greek Tragedy	3
GRW 6317	Ancient Greek Comedy	3
GRW 6345	Greek Lyric Poetry	3
GRW 6346	Pindar	3
GRW 6347	Homer	3
GRW 6386	Greek Historians	3
GRW 6506	Plato	3
GRW 6705	Attic Orators	3
GRW 6905	Individual Work	2-4
GRW 6930	Special Topics in Greek Literature	3
GRW 6931	Comparative Study of Greek and Latin Literature	3
GRW 6971	Research for Master's Thesis	1-15
GRW 7979	Advanced Research	1-15
GRW 7980	Research for Doctoral Dissertation	1-15

Latin Courses

Code	Title	Credits
LAT 6425	Latin Prose Composition	3
LNW 5325	Roman Elegiac Poetry	3
LNW 5655	Roman Poets: Horace	3

LNW 5665	Roman Poets: Vergil	3
LNW 5675	Roman Poets: Ovid	3
LNW 6105	The Roman Tradition	3
LNW 6225	The Ancient Roman Novel	3
LNW 6315	Plautus and Terence	3
LNW 6335	Roman Oratory and Rhetoric	3
LNW 6365	Studies in Roman Satire	3
LNW 6385	Roman Historians	3
LNW 6495	Late Latin Literature	3
LNW 6905	Independent Study	1-4
LNW 6933	Special Topics in Latin Literature	3
LNW 6935	Proseminar in Classics	3
LNW 6940	Supervised Teaching	1-5
LNW 6971	Research for Master's Thesis	1-15
LNW 7979	Advanced Research	1-12
LNW 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Classical Studies (PhD)

SLO 1 Knowledge

Students identify, define, and relate knowledge of the research methods and theories that pertain to the field of Classical Studies and can bring that knowledge to the classroom in pedagogically-sound ways

SLO 2 Knowledge

Students identify and define expert knowledge of Greek and Roman languages, literatures, and cultures.

SLO 3 Skills

Students develop the skills to complete conference papers, research abstracts and chapters, and peer-reviewed publications.

SLO 4 Skills

Students will practice their interviewing skills to achieve successful job preparation.

SLO 5 Professional Behavior

Students show the capacity to work ethically and professionally with students and colleagues of all backgrounds.

SLO 6 Professional Behavior

Students illustrate a willingness to take on service commitments or leadership positions through, for example, participation in departmental, college, or university committees, service to professional or community organizations.

Classical Studies (MA)

SLO 1 Knowledge

Students identify and parse elements of Latin grammar, vocabulary, and syntax to an advanced level of competence.

SLO 2 Knowledge

Students identify and define essential aspects of Roman literature, history, and culture.

SLO 3 Skills

Students distinguish research methods and theories that pertain to the field of Classical Studies.

SLO 4 Skills

Students translate and interpret Latin passages at an advanced level of competence.

SLO 5 Professional Behavior

Students develop at least one academic research project of publishable quality.

SLO 6 Professional Behavior

Students work ethically and professionally with students and colleagues of all backgrounds.

Latin

Program Information

(The following information refers only to our on-campus programs. Please visit the Distance Learning Homepage (<http://classics.ufl.edu/programs/distance-learning/>) for further details on our Distance Learning MA and ML Programs, especially aimed at elementary, secondary, or community college teachers.)

The Department of Classics at the University of Florida offers an M.A. degree with a major in Latin, an M.A.T. degree with a major in Latin, as well as a Master of Latin degree. Students are expected to become Florida residents after one year.

The **Master of Arts with a major in Latin** is a thesis degree designed specifically for students who are aiming toward a career in secondary teaching, but who still desire the writing experience and credential that a thesis provides.

The **Master of Arts in the Teaching (M.A.T.) with a major in Latin** is recommended for students who wish to pursue a career in teaching and who want to include educational courses in their program. This is a non-thesis degree.

The **Master of Latin (M.L.) degree** is designed primarily for currently employed, and/or certified teaching professionals who wish to widen their knowledge of Latin, broaden their education in the field of Classics, and enhance their professional qualifications. This is a non-thesis degree.

For minimum degree requirements, see the Graduate Degrees (p. 778) section of the catalog. For additional requirements, please see the department website: <http://classics.ufl.edu>.

Admission Requirements to the Latin Programs:

Admission into the university and the program for Classics is ultimately determined and granted according to the rules established by the Graduate School of the University of Florida (see the Graduate Catalog).

All students seeking admission to the department must submit satisfactory scores on the GRE General Test (with at least 320 [old scoring scale] or 140 [new scoring scale on the verbal portion]).

Master's level (Level I) requirements include:

1. Extensive study of Greek and Latin, with at least three years of coursework in one language and at least two years in the other language.
2. At least six hours in one or more of the following: ancient history, ancient art, archaeology, philosophy, literary criticism, linguistics.
3. A GPA of at least a 3.0.
4. Deficiencies that can be corrected within one year will not necessarily prevent admission, if the record shows promise on other grounds.

Degrees Offered

Degrees Offered with a Major in Latin

- Master of Arts
- Master of Latin

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Classics Departmental Courses

Code	Title	Credits
CLA 6125	Augustan Age	3
CLA 6795	Greek and Roman Archeology	3
CLA 6805	The Classical Research Tradition	3
CLA 6895	Athenian Law and Society	3
CLA 6905	Individual Work	2-4
CLA 6930	Greece and the Near East	3
CLA 6932	Topics in Classical Civilization	3

greek courses

Code	Title	Credits
GRE 6425	Greek Prose Composition	3
GRE 6755	Epigraphy	3
GRK 6905	Individual Work in Modern Greek	3-5
GRW 6105	The Greek Tradition	3
GRW 6216	Greek Novel	3
GRW 6316	Greek Tragedy	3
GRW 6317	Ancient Greek Comedy	3
GRW 6345	Greek Lyric Poetry	3
GRW 6346	Pindar	3
GRW 6347	Homer	3
GRW 6386	Greek Historians	3
GRW 6506	Plato	3
GRW 6705	Attic Orators	3
GRW 6905	Individual Work	2-4
GRW 6930	Special Topics in Greek Literature	3
GRW 6931	Comparative Study of Greek and Latin Literature	3
GRW 6971	Research for Master's Thesis	1-15
GRW 7979	Advanced Research	1-15
GRW 7980	Research for Doctoral Dissertation	1-15

Latin Courses

Code	Title	Credits
LAT 6425	Latin Prose Composition	3
LNW 5325	Roman Elegiac Poetry	3
LNW 5655	Roman Poets: Horace	3
LNW 5665	Roman Poets: Vergil	3
LNW 5675	Roman Poets: Ovid	3
LNW 6105	The Roman Tradition	3
LNW 6225	The Ancient Roman Novel	3
LNW 6315	Plautus and Terence	3
LNW 6335	Roman Oratory and Rhetoric	3
LNW 6365	Studies in Roman Satire	3
LNW 6385	Roman Historians	3
LNW 6495	Late Latin Literature	3
LNW 6905	Independent Study	1-4
LNW 6933	Special Topics in Latin Literature	3

LNW 6935	Proseminar in Classics	3
LNW 6940	Supervised Teaching	1-5
LNW 6971	Research for Master's Thesis	1-15
LNW 7979	Advanced Research	1-12
LNW 7980	Research for Doctoral Dissertation	1-15

Computer and Information Science and Engineering Department

Chair: J. Gilbert

The Department of Computer and Information Science and Engineering is concerned with the theory, design, development, and application of computer systems and information processing techniques. The mission of the CISE Department is to educate undergraduate and graduate majors as well as the broader campus community in the fundamental concepts of the computing discipline, to create and disseminate computing knowledge and technology, and to use our expertise in computing to help society solve problems.

The Department of Computer and Information Science and Engineering (CISE) offers

- Ph.D. in Computer Engineering, Computer Science, and Human-Centered Computing.
- Master of Engineering in Computer Engineering.
- Master of Science in Computer Engineering.
- Master of Science degree in Computer Science through the College of Engineering.
- Master of Science degree in Digital Arts and Sciences through the College of Engineering.
- Master of Science degree in Computer Science through the College of Liberal Arts and Sciences.

The CISE Department has six broad areas of specialization:

- **Computer systems:** computer architecture, distributed systems, networks and communication, operating systems, performance evaluation, security, mobile computing, software engineering, programming languages, multimedia systems, and web technologies
- **Database and information systems:** database management systems, database design, database theory and implementation, data mining, database machines, parallel and distributed databases, digital libraries, E-services and commerce, medical, and bio-informatics
- **High-performance computing/applied algorithms:** design and analysis of algorithms, data structures, parallel and distributed computing, medical algorithms, numerical methods, computational complexity, and applied computational geometry
- **Computer graphics, modeling, and art:** modeling methodology, simulation, virtual reality, aesthetic computing, computer arts, animation, real-time rendering, medical modeling, digital media, and musical acoustics
- **Intelligent systems and computer vision:** artificial intelligence, machine learning, visualization, image analysis and processing, pattern recognition, signal processing, biomedical imaging, and image databases
- **Computer networks and security:** wired and wireless networks, network routing and protocols, and QoS.

Applications for admission must be approved by both the Department and the college in which the student wishes to enroll. Applicants should have a strong computer science background.

All master's students must satisfy a core requirement by completing the appropriate number of core courses as specified by their degree program. According to Graduate School rule, students must maintain a 3.0 overall GPA, as well as a cumulative 3.0 GPA for all courses taken from CISE, to graduate. Students can select a thesis or non-thesis option for the master's degree. Digital Arts and Sciences students must choose either thesis or project in lieu of thesis. All options require a minimum of 30 credit hours. The thesis degree requires:

- A minimum of 6 credit hours must be taken in CIS 6971 Research for Master's Thesis (1-15 cr.).
- Specific degree requirements can be found at: <https://www.cise.ufl.edu/academics/grad> (<https://www.cise.ufl.edu/academics/grad/>)

The non-thesis option requires:

- Each nonthesis master's student is required to pass a comprehensive examination.
- Specific degree requirements can be found at: <https://www.cise.ufl.edu/academics/grad> (<https://www.cise.ufl.edu/academics/grad/>)

The Digital Arts and Sciences project in lieu of thesis option requires 6 credit hours of project/performance credits.

To demonstrate breadth and proficiency, all Ph.D. students must take required core courses. Depending upon the major, they must earn a 3.4 GPA in specific (to the major) required core courses, with no more than one of the core courses receiving a letter grade below B, to be eligible to take the Ph.D. qualifying examinations.

Ph.D. students are required to take a minimum of 90 credit hours. Of these, at least 36 hours must be graduate-level CISE course work excluding individual study and research credits. A minimum of 3 hours must be taken in CIS 7980 Research for Doctoral Dissertation (1-15 cr.). A maximum of 30 credits may be awarded toward the Ph.D. degree from an appropriate master's degree.

The Database Systems Research and Development Center, the Software Engineering Research Center, the Center for Computer Vision and Visualization Center, and a number of other campus research centers provide opportunities for students enrolled in the program.

The department offers a combination bachelor's/master's degree program. Contact the Department's Student Services Center for information.

For more information, please see the program pages below, or visit our website: <http://www.cise.ufl.edu>

Majors

- Computer Science (CLAS) (p. 221)

Faculty

Professor

- Boyer, Kristy
- Butler, Kevin

- Chen, Shigang
- Dorr, Bonnie J.
- Kahveci, Tamer
- Lok, Benjamin
- Mishra, Prabhat Kumar
- Peters, Jorg
- Rangarajan, Anand
- Sitharam, Meera
- Thai, My Tra
- Traynor, Patrick
- Wang, Zhe

Associate Professor

- Anthony, Lisa
- Banerjee, Arunava
- Boucher, Christina A.
- Chuyew Yee, Sharon Lynn
- Dobra, Alin Viorel
- Entezari, Alireza
- Gardner-McCune, Christina
- Grant, Christan Earl
- Jain, Eakta
- Jiang, Zhe
- Kavalan, Jonathan C L
- McMullen, Kyla
- Ragan, Eric D.
- Ruiz, Jaime
- Ungor, Alper
- Wilson, Joseph N.
- Xia, Ye

Assistant Professor

- Bindschaedler, Vincent Christophe
- Dorley, Emmanuel Johnson
- Fairbanks, James Paul
- Graim, Kiley S.
- Huang, Kejun
- Rampazzi, Sara

Distinguished Professor

- Gilbert, Juan Eugene
- Ranka, Sanjay
- Sahni, Sartaj Kumar
- Vemuri, Baba C.

Senior Lecturer

- Zhang, Rong

Affiliated Faculty

- Blanchard, Jeremiah J.
Associate Engineer
- Fang, Ruogu
Associate Professor

- Fortes, Jose A.
Eminent Scholar
- Glenn, Alina Zare
Professor
- Li, Yanjun
Assistant Professor
- Rashidi, Parisa
Professor
- Woodard, Damon
Professor
- Yavuz, Tuba
Associate Professor

Computer Science (CLAS)

Program Information

The Department of Computer and Information Science and Engineering offers the Master of Science degree in Computer Science through the College of Liberal Arts and Sciences. Minimum requirements for this degree are given in the Graduate Degrees (p. 778) section of this catalog.

The department offers graduate study and research in Algorithms, Computer Vision, Databases, Graphics and Modeling, Machine Learning, Networks, and Systems, with active labs in Bioinformatics; Computational Science and Intelligence; Vision, Graphics and Medical Imaging; Database Systems Research and Development; Data Science Research; Mobile and Pervasive Computing; Human-Centered Computing; and Cybersecurity.

Specific degree requirements and options may be found here: <http://cise.ufl.edu/academics/grad> (<http://cise.ufl.edu/academics/grad/>)

Instructions for application for admission may be found here: <http://cise.ufl.edu/admissions/graduate> (<http://cise.ufl.edu/admissions/graduate/>)

Degrees Offered

Degrees Offered with a Major in Computer Science

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Computer and Information Science and Engineering Departmental Courses

Code	Title	Credits
CAI 5731	Biostatistics for AI	2
CAI 5732	AI for Clinical Decision Support	3
CAI 6108	Machine Learning Engineering	3
CAI 6307	Natural Language Processing	3
CAI 6726	Clinical AI Design Studio I	3
CAI 6727	Clinical AI Design Studio II	3
CAI 6826	Project in Artificial Intelligence Systems	3
CAI 6910	Supervised Research in AI for Health	1-5
CAP 5100	Human-Computer Interaction	3

CAP 5108	Research Methods for Human-Centered Computing	3
CAP 5404	Deep Learning for Computer Graphics	3
CAP 5416	Computer Vision	3
CAP 5510	Bioinformatics	3
CAP 5705	Computer Graphics	3
CAP 5771	Introduction to Data Science	3
CAP 5841	Modeling and Computing with Geometry	3
CAP 6137	Malware Reverse Engineering	3
CAP 6516	Medical Image Analysis	3
CAP 6610	Machine Learning	3
CAP 6615	Neural Networks for Computing	3
CAP 6617	Advanced Machine Learning	3
CAP 6701	Advanced Computer Graphics	3
CAP 6769	Advanced Topics in Data Science	3
CAP 6779	Projects in Data Science	3
CDA 5155	Computer Architecture Principles	3
CDA 5636	Embedded Systems	3
CDA 6325C	Cyber-physical System Security	3
CEN 5035	Software Engineering	3
CEN 5726	Natural User Interaction	3
CEN 5728	User Experience Design	3
CEN 5735	Human-Centered Input Recognition Algorithms	3
CEN 6070	Software Testing and Verification	3
CEN 6075	Software Specification	3
CIS 5209	Penetration Testing – Ethical Hacking	3
CIS 5370	Computer and Information Security	3
CIS 5371	Introduction to Cryptology	3
CIS 6261	Trustworthy Machine Learning	3
CIS 6307	Internet Data Streaming	3
CIS 6905	Individual Study	1-3
CIS 6910	Supervised Research	1-5
CIS 6930	Special Topics in CIS	3
CIS 6935	Graduate Seminar	1-12
CIS 6940	Supervised Teaching	3
CIS 6971	Research for Master's Thesis	1-15
CIS 7979	Advanced Research	1-12
CIS 7980	Research for Doctoral Dissertation	1-15
CNT 5106C	Computer Networks	3
CNT 5410	Computer and Network Security	3
CNT 5517	Mobile Computing	3
CNT 6107	Advanced Computer Networks	3
CNT 6530	Mobile Networking	3
CNT 6885	Distributed Multimedia Systems	3
COP 5536	Advanced Data Structures	3
COP 5556	Programming Language Principles	3
COP 5615	Distributed Operating System Principles	3
COP 5618	Concurrent Programming	3
COP 5725	Database Management Systems	3
COP 6726	Database System Implementation	3
COT 5405	Analysis of Algorithms	3
COT 5442	Approximation Algorithms	3
COT 5520	Computational Geometry	3
COT 5615	Mathematics for Intelligent Systems	3
COT 6315	Formal Languages and Computation Theory	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3
IDC 5715	Virtual Reality for the Social Good	3

Student Learning Outcomes

Computer Science - Liberal Arts (MS)

SLO 1 Knowledge

Students identify, formulate, and solve computer science problems

SLO 2 Knowledge

Students can critically read computer science literature

SLO 3 Skills

Students use the techniques, skills, and tools necessary for computer science practice at an advanced level.

SLO 4 Professional Behavior

Professional experience: an understanding of professional and ethical responsibility

SLO 5 Professional Behavior

Professional experience: Students can communicate effectively

Department of Languages, Literatures and Cultures

Chair: A. Akinyemi

The Department of Languages, Literatures, and Cultures offers the Master of Arts degree (M.A.) and the Doctor of Philosophy degree in French and Francophone Studies and the Master of Arts degree (M.A.) in German Studies. Complete descriptions of the minimum requirements for the M.A. degree are provided in the Graduate Degrees (p. 778) section of this catalog. For more information about our programs, please follow the hyperlinks below or visit our website: <https://languages.ufl.edu/academics/graduate-studies/>.

Majors

- French and Francophone Studies (p. 223)
- German (p. 224)
- Romance Languages (Language, Literature and Culture) (p. 224)

Faculty

Professor

- Akinyemi, Akintunde
- Blondeau, Helene
- Bloom, Rori I.
- Blum, Sylvie E.
- Essegbey, James
- Gorham, Michael S.
- Hasty, Willard R.
- Hebblethwaite, Benjamin John
- McLaughlin, Fiona
- Mennel, Barbara Caroline
- Pham, Andrea Hoa
- Rylkova, Galina S.
- Wang, Richard G.
- Watt, Mary A.
- Weltman-Aron, Brigitte

Associate Professor

- Amberson, Deborah
- Antes, Theresa A.
- Burak, Alexander Lvovich
- Goodwin, James E.
- Kleespies, Ingrid
- Kligerman, Eric Matthew
- Moskowitz Zachmann, Gayle
- Shaw, Sherry Ying Xiao
- Sow, Alioune Badaradim
- Tlili, Sarra

Assistant Professor

- Belletti, Gabriele
- Felt, Matthieu A.
- Holler, Roy
- Kory, Stephan Nicholas
- Smith, Christopher

Affiliated Faculty

- Huet, Helene I.
Assistant Librarian
- Lord-Ward, Gillian E.
Professor

French and Francophone Studies

Program Information

Chair: A. Akinyemi

Graduate Coordinator: R. Bloom

Bachelor's/master's program: French and Francophone Studies offers a combination 4/1 degree program that enables outstanding undergraduates to obtain both the B.A. and M.A. degrees after successful completion of 152 credit hours. The program is designed for the students who wish to continue their education in French and Francophone Studies past the bachelor's level but do not intend to pursue a doctorate or for students who wish to expand their training in a specific field before moving on to a doctoral program. Since students in the bachelor's/master's program have a graduate classification, students receiving undergraduate scholarships or Pell grants should check with the funding provider to make sure that they will not lose eligibility.

Degrees Offered

Degrees Offered with a Major in French and Francophone Studies

- Master of Arts
- Master of Arts in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

French and Francophone Studies Courses

Code	Title	Credits
FRE 6060	Beginning French for Graduate Students I	3
FRE 6061	Beginning French for Graduate Students II	3
FRE 6466	Advanced Translation and Stylistics	3
FRE 6735	Special Studies in French Linguistics	3
FRE 6736	The French language in the Americas	3
FRE 6785	French Phonetics and Phonology	3
FRE 6827	Sociolinguistics of French	3
FRE 6845	History of the French Language	3
FRE 6855	Structure of French	3
FRE 6856	French in the 21st Century	3
FRE 6945	Practicum in Advanced College Teaching	2
FRE 6956	Overseas Studies in French	1-5
FRW 6217	Seventeenth-Century French Prose	3
FRW 6276	Readings in Eighteenth-Century Literature	3
FRW 6288	Twentieth-Century French Novel	3
FRW 6315	Seventeenth-Century French Drama	3
FRW 6328	20th & 21st Century French and Francophone Theater	3
FRW 6346	French Poetry of the Renaissance	3
FRW 6355	Modern French Poetry	3
FRW 6396	French Cinema	3
FRW 6536	The Romantic Period	3
FRW 6556	French Realism and Naturalism	3
FRW 6715	The Philosophic Movement	3
FRW 6780	Studies in Francophone Literature and Culture (Excluding the Caribbean and Sub-Saharan Africa)	3
FRW 6805	Introduction to Graduate Study and Research	3
FRW 6825	French Critical Theory	3
FRW 6900	Special Study in French Literature	3
FRW 6905	Individual Work	1-3
FRW 6910	Supervised Research	1-5
FRW 6938	Seminar in French Literature	3
FRW 6971	Research for Master's Thesis	1-15
FRW 7979	Advanced Research	1-12
FRW 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

French (MA)

SLO 1 Knowledge
Identify, define and describe core areas of French and Francophone literary/cultural or linguistic studies, as agreed upon by the faculty of the department

SLO 2 Skills
Literary/Cultural Studies: Analyze and interpret French and Francophone literary and cultural products

SLO 3 Skills
French and Francophone Linguistics: Analyze and interpret French and Francophone language and language-related data

SLO 4 Professional Behavior
Display knowledge of ethical human data collection, professional conduct and ethical academic writing skills (as established by Linguistic

Society of America Ethics Statement and/or Modern Language Association)

German

Program Information

Chair: A. Akinyemi
Graduate Coordinator: E. Kligerman

The Department of Languages, Literatures and Cultures offers Master of Arts (thesis or professional non-thesis option). Please contact the academic unit for more information about the available master's degree.

Degrees Offered

Degrees Offered with a Major in German

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

German Literature and Cinema Courses

Code	Title	Credits
GET 6526	Weimar Cinema	3
GET 6529	New German Cinema and its Legacy	3
GEW 6205	Foundations of Literary Study	3
GEW 6266	History of the German Novel	3
GEW 6305	Studies in German Drama and Theater	3
GEW 6405	Medieval and Renaissance Literature	3
GEW 6425	From Luther to Lessing: Early Modern German Literature	3
GEW 6535	German Classical and Romantic Literature	3
GEW 6725	Culture and Society in the Weimar Republic	3
GEW 6735	Modern German Literature	3
GEW 6736	Contemporary German Literature	3
GEW 6745	Literature and Culture in the Third Reich	3
GEW 6826	German Literary Theory	3
GEW 6900	Seminar in Germanic Languages and Literatures	3
GEW 6901	Special Study in Germanic Languages and Literatures	3
GEW 6905	Independent Study	3
GEW 6910	Supervised Research	1-5
GEW 6971	Research for Master's Thesis	1-9
GEW 7979	Advanced Research	1-12
GEW 7980	Research for Doctoral Dissertation	1-15

German Language Courses

Code	Title	Credits
GER 6060	Beginning German for Graduate Students I	3
GER 6061	Beginning German for Graduate Students II	3
GER 6940	Supervised Teaching	1-5

Student Learning Outcomes

german (PHD)

- SLO 1 Knowledge
- SLO 2 Skills

Literary/Cultural Studies: Students analyze and interpret German literary and cultural products, apply results to broader contexts and engage in academic discourse via writing and oral presentation

SLO 3 Professional Behavior
Students display knowledge of ethical human data collection, professional conduct and ethical academic writing skills (as established by the Modern Language Association)

German (MA)

SLO 1 Knowledge
Students identify, define and describe the core areas of German literary and cultural studies for the MA, as agreed upon by the faculty of the department

SLO 2 Skills
Literary/Cultural Studies: Students analyze and interpret German literary and cultural products, apply results to broader contexts and engage in academic discourse via writing and oral presentation

SLO 3 Professional Behavior
Students display knowledge of ethical human data collection, professional conduct and ethical academic writing skills (as established by the Modern Language Association)

Romance Languages (Language, Literature and Culture)

Program Information

The Language, Literature and Culture Department offers a Doctor of Philosophy degree in romance languages with a specialization in French and francophone studies.

Degrees Offered

Degrees Offered with a Major in Romance Languages

- Doctor of Philosophy
 - without a concentration
 - concentration in French and Francophone Studies

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

French and Francophone Studies Courses

See courses under French and Francophone Studies tab to the right.

Student Learning Outcomes

Romance languages & Literatures

SLO 1 Knowledge
Students will identify, define, and describe a specific area within their field of study), as agreed upon by the faculty of the department.

SLO 2 Skills
Literary/Cultural Studies: Students will analyze and interpret literary and cultural products and apply results to broader context and engage in academic discourse via writing and oral presentation. Linguistics:

Students will analyze and interpret language and language-related data apply results to broader context and engage in academic discourse via writing and oral presentation.

SLO 3 Professional Behavior

Students will describe and apply ethical human data collection, professional conduct and ethical academic writing skills.

Economics Department

Chair: R. D. Blair

Graduate Coordinator: S. M. Slutsky

The department offers the Master of Arts (thesis and non-thesis option) and Doctor of Philosophy degrees in economics with specializations in econometrics, economic theory, industrial organization, international economics, monetary economics, and public finance. Complete descriptions of the minimum requirements for the M.A. and Ph.D. degrees are provided on the Graduate Degrees (p. 778) Page of this catalog.

For more information, please visit <https://economics.clas.ufl.edu/>.

Majors

- Economics (p. 225)

Faculty

Professor

- Blair, Roger D.
- Dinopoulos, Elias
- Romano, Richard E.
- Rush, Mark
- Slutsky, Steven M.

Assistant Professor

- Adams, Jonathan
- Ainsworth, Robert M.
- Bet, Carlos German
- Fang, Min
- Heins, Gunnar
- Kostyshak, Scott G.
- Mercadal, Ignacia
- Peluffo, Maria Cecilia
- Rojas Barros, Eugenio Ignacio

Eminent Scholar

- Sappington, David

Lecturer

- Turner, Douglas C.

Research Assistant Professor

- Sandoval Gutierrez, Hector Hugo

Senior Lecturer

- Knight, David T.
- Phillips, Michelle A.

Affiliated Faculty

- Serra, Renata
Master Lecturer

Economics

Program Information

The Economics Department offers the Master of Arts degree and the Doctor of Philosophy degree in economics.

M.A. requirements: A minimum of 36 credits of course work is required for the M.A. with and without thesis. A maximum of six credits of the research course ECO 6971 Research for Master's Thesis (1-15 cr.) may be included for a master's degree with thesis. The following core courses are required: ECO 7408 Mathematical Methods and Applications to Economics (1-2 cr.) and ECO 7404 Game Theory for Economists (1-2 cr.) or equivalent, ECO 7415 Statistical Methods in Economics (3 cr.) or equivalent, ECO 7115 Microeconomic Theory I (3 cr.), and ECO 7206 Macroeconomic Theory I (3 cr.).

Ph.D. requirements: Admission requirements for the Ph.D. include:

1. a minimum grade point average of 3.0,
2. an acceptable score on the GRE, and
3. for nonnative speakers of English, an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program.

All core courses must be completed in the first year. In addition, students must complete courses in three fields of specializations and pass qualifying examinations in two of those fields. Additional information about degree requirements can be found by visiting the Graduate Degrees (p. 778) pages of this catalog.

Combination degree program: The department offers a combination Bachelor of Arts/Master of Arts degree program. This program allows qualified students to earn both a bachelor's degree and a master's degree, with a savings of 12 credits.

Degrees Offered

Degrees Offered with a Major in Economics

- Doctor of Philosophy
- Master of Arts
 - without a concentration
 - concentration in Econometric and Data Analysis
 - concentration in Financial Economics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Economics Departmental Courses

Code	Title	Credits
ECO 5114	Microeconomic Analysis	4
ECO 5207	Macroeconomic Analysis	4
ECO 5216	Monetary Economics	4
ECO 5426	Econometric Analysis 1	4
ECO 5427	Econometric Analysis 2	4
ECO 5435	Economic Data Analysis	4
ECO 5464	Game Theory and Industrial Organization	4
ECO 5715	Open Economy Macroeconomics	2
ECO 5745	Global Trade and Policy	3
ECO 6409	Game Theory Applied to Business Decisions	2
ECO 6716	International Macroeconomics	3
ECO 6906	Individual Work in Economics	1-4
ECO 6910	Supervised Research	1-5
ECO 6936	Special Topics	1-4
ECO 6957	International Studies in Economics	1-4
ECO 6971	Research for Master's Thesis	1-15
ECO 6977	Financial Economics Capstone	3
ECO 7113	Information Economics	1-2
ECO 7115	Microeconomic Theory 1	3
ECO 7116	Microeconomic Theory 2	3
ECO 7120	General Equilibrium and Welfare Economics	1-2
ECO 7206	Macroeconomic Theory I	3
ECO 7207	Macroeconomic Theory II	3
ECO 7297	Applied Macroeconomics I	3
ECO 7298	Applied Macroeconomics II	3
ECO 7404	Game Theory for Economists	1-2
ECO 7408	Mathematical Methods and Applications to Economics	1-2
ECO 7415	Statistical Methods in Economics	3
ECO 7423	Econometric Methods I	3
ECO 7424	Econometric Models and Methods	3
ECO 7452	Best Empirical Practices in Economics	1-2
ECO 7458	Econometric Methods II	3
ECO 7525	Welfare Economics and The Second Best	1-2
ECO 7534	Empirical Public Economics I	1-2
ECO 7535	Empirical Public Economics II	1-2
ECO 7536	Theoretical Public Economics	1-2
ECO 7706	Theory of International Trade	3
ECO 7707	International Economic Relations	3
ECO 7925	Research Skills Workshop	3
ECO 7938	Advanced Economics Seminar	1-4
ECO 7979	Advanced Research	1-12
ECO 7980	Research for Doctoral Dissertation	1-15
ECP 5702	Managerial Economics	2
ECP 5705	Economics of Business Decisions	3
ECP 6035	Cost-Benefit Analysis	4
ECP 6455	Antitrust Economics	4
ECP 6708	Cases in Competitive Strategy	2
ECP 7408	Empirical Industrial Organization	3
ECP 7409	Empirical Industrial Organization II	3
HSA 6436	Health Economics	3

Student Learning Outcomes

Economics (PHD)

SLO 1 Knowledge

Manage the technical tools (theory, methodology, statistical analyses, and reporting norms) essential to the departmental area of study

SLO 2 Skills

Interpret with technical tools to create new knowledge through original research

SLO 3 Professional Behavior

Communicate specialized information from a field of expertise verbally and in writing

SLO 4 Professional Behavior

Communicate specialized information from a field of expertise verbally at an educated layman or university undergraduate student level

Economics (MA)

SLO 1 Knowledge

Manage the technical tools (theory, methodology, statistical analyses, and reporting norms) essential to the departmental area of study

SLO 2 Skills

Utilize technical tools to apply knowledge in the area of study

SLO 3 Professional Behavior

Communicate specialized information from a field of expertise

English Department

Chair: S. I. Dobrin

Graduate Coordinator: J. Schorb

The Department of English offers a MFA degree in creative writing and a PhD degree in English. The PhD program accepts both students who have completed an MA degree and those who have completed only a BA. Complete descriptions of the minimum requirements for the MFA and PhD degrees are provided in the Graduate Degrees (p. 778) section of this catalog. For more information about our programs, please follow the hyperlinks below or visit our website: <https://english.ufl.edu/graduate-programs/>.

Majors

- Creative Writing (p. 227)
- English (p. 227)

Faculty

Professor

- Bryant, Marsha C.
- Burt, Richard
- Dobrin, Sidney Irwin
- Gilbert, Pamela K.
- Grass, Sean
- Hedrick, Tace Megan
- Hegeman, Susan Elizabeth
- Hofmann, Michael H.
- Kidd, Kenneth B.
- Logan, William
- Mlinko, Ange
- Ray, Robert B.
- Reid, Mark Allen

- Rudnytsky, Peter L.
- Schueller, Malini Johar
- Smith, Stephanie Ann
- Wegner, Phillip E.

Associate Professor

- Akpan, Celestine L.
- Amoko, Apollo Obonyo
- Gonzales, Laura
- Harpold, Terry Alan
- Maioli Dos Santos, Roger
- Mowchun, Trevor Jory
- Rosenberg, Leah Reade
- Sanchez, Raul
- Schorb, Jodi Rene
- Ulanowicz, Anastasia Maria

Assistant Professor

- Bianchi, Pietro
- Del Hierro, Victor
- Galvan, Margaret
- Mollenthel, Julia Margaret

Distinguished Professor

- Leavitt, David A.

Affiliated Faculty

- Caponegro, Ramona A.
Associate Librarian
- Caponegro, Ramona A.
Courtsey Assistant
- Mennel, Barbara Caroline
Professor

Creative Writing

Program Information

The Department of English offers the Master of Fine Arts degree in creative writing. Complete descriptions of the minimum requirements for the M.F.A. are provided in the Graduate Degrees (p. 778) section of this catalog. Full information concerning courses of study is available from the graduate coordinator or by visiting <https://mfa.english.ufl.edu/>.

Degrees Offered

Degrees Offered with a Major in Creative Writing

- Master of Fine Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

English Departmental Courses

Code	Title	Credits
AML 6017	Studies in American Literature Before 1900	3
AML 6027	Studies in 20th-Century American Literature	3
CRW 6130	Fiction Writing	3
CRW 6166	Studies in Literary Form	3
CRW 6331	Verse Writing	3
CRW 6906	Individual Work	1-3
ENC 5236	Advanced Business Writing for Accounting	4
ENC 6428	Digital English	3
ENC 7760	From Paper to Publication: The Peer-Reviewed Journal Article in English Studies and Related Fields	3
ENG 6016	Psychological Approaches to Literature	3
ENG 6075	Literary Theory: Issues	3
ENG 6077	Literary Theory: Forms	3
ENG 6137	The Language of Film	3
ENG 6138	Studies in the Movies	3
ENG 6824	Proseminar in Graduate Studies in English: Research, Writing, and the Profession	3
ENG 6906	Individual Work	1-3
ENG 6910	Supervised Research	1-5
ENG 6932	Film and Video Production	3
ENG 6971	Research for Master's Thesis	1-15
ENG 7960	Prospectus and Dissertation in the Humanities	3
ENG 7979	Advanced Research	1-12
ENG 7980	Research for Doctoral Dissertation	1-15
ENL 6246	Studies in Romantic Literature	3
ENL 6256	Studies in Victorian Literature	3
ENL 6276	Studies in 20th-Century British Literature	3
LAE 6940	Supervised Teaching	1-5
LAE 6947	Writing Theories & Practices	3
LIT 6047	Studies in Drama	3
LIT 6236	Postcolonial Studies	3
LIT 6357	African-Amer. or African Diaspora Lit./Cultures	3
LIT 6358	Theoretical Approaches to Black Cultural Studies	3
LIT 6855	Issues in Cultural Studies	3
LIT 6856	Cultural Studies: Interventions	3
LIT 6934	Variable Topics	1-5

English

Program Information

The Department of English offers a MFA in Creative Writing and a PhD degree in English with the specializations listed below. Complete descriptions of the minimum requirements for the MFA and PhD degrees are provided in the Graduate Degrees (p. 778) section of this catalog. Specific areas of specialization for the PhD include American, African-American, and British literature; American studies; critical theory and cultural studies; film and media studies; feminisms, genders and sexualities; postcolonial studies; composition and rhetoric; comics and visual rhetoric; and children's literature.

New graduate students should have completed an undergraduate English major of at least 24 semester hours. The PhD program accepts students

with BA and MA degrees. Full information concerning courses of study is available from the graduate coordinator.

Degrees Offered

Degrees Offered with a Major in English

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

English Departmental Courses

Code	Title	Credits
AML 6017	Studies in American Literature Before 1900	3
AML 6027	Studies in 20th-Century American Literature	3
CRW 6130	Fiction Writing	3
CRW 6166	Studies in Literary Form	3
CRW 6331	Verse Writing	3
CRW 6906	Individual Work	1-3
ENC 5236	Advanced Business Writing for Accounting	4
ENC 6428	Digital English	3
ENC 7760	From Paper to Publication: The Peer-Reviewed Journal Article in English Studies and Related Fields	3
ENG 6016	Psychological Approaches to Literature	3
ENG 6075	Literary Theory: Issues	3
ENG 6077	Literary Theory: Forms	3
ENG 6137	The Language of Film	3
ENG 6138	Studies in the Movies	3
ENG 6824	Proseminar in Graduate Studies in English: Research, Writing, and the Profession	3
ENG 6906	Individual Work	1-3
ENG 6910	Supervised Research	1-5
ENG 6932	Film and Video Production	3
ENG 6971	Research for Master's Thesis	1-15
ENG 7960	Prospectus and Dissertation in the Humanities	3
ENG 7979	Advanced Research	1-12
ENG 7980	Research for Doctoral Dissertation	1-15
ENL 6246	Studies in Romantic Literature	3
ENL 6256	Studies in Victorian Literature	3
ENL 6276	Studies in 20th-Century British Literature	3
LAE 6940	Supervised Teaching	1-5
LAE 6947	Writing Theories & Practices	3
LIT 6047	Studies in Drama	3
LIT 6236	Postcolonial Studies	3
LIT 6357	African-Amer. or African Diaspora Lit./Cultures	3
LIT 6358	Theoretical Approaches to Black Cultural Studies	3
LIT 6855	Issues in Cultural Studies	3
LIT 6856	Cultural Studies: Interventions	3
LIT 6934	Variable Topics	1-5

Student Learning Outcomes

English (PHD)

SLO 1: (Knowledge) Students identify and discuss a problem or gap in scholarship in their specialization.

SLO 2: (Skills) Students teach an entry-level college writing course and/or a lower-division course in their field in a professional manner, organizing and delivering content in a mode appropriate to audience.

SLO 3: (Professional Behavior) Students engage in professional research and writing activity at the PhD level, for example, conference-ready papers and/or materials appropriate for publication.

English (MA)

SLO 1 Knowledge
Students will identify and discuss a problem or gap in scholarship in their specialization

SLO 2 Skills
Students teach an entry-level college writing course and/or a lower-division course in their field in a professional manner, organizing and delivering content in a mode appropriate to audience

SLO 3 Professional Behavior
Students engage in professional research and writing activity at the MA level, for example, conference-ready papers

English (MFA)

SLO 1 Knowledge
Students write an extended draft of an original complete work in their genre.

SLO 2 Skills
Students learn to teach an entry-level creative writing course and/or an entry-level writing course in a professional manner, organizing and delivering content in a mode appropriate to audience

SLO 3 Professional Behavior
Students perform public readings of their original work

Gender, Sexuality, and Women's Studies Department

Director: B. Moradi

Graduate Coordinator: K. Broad

The Center for Gender, Sexualities, and Women's Studies Research offers the MA degree in Women's Studies, with thesis and non-thesis MA options, as well as two Graduate Certificate options. These options give students the opportunity to take advantage of scholarship in this dynamic field, and to become acquainted with different research perspectives and methodologies. Students pursuing interdisciplinary graduate work in the Center learn about feminist, intersectional, and other theoretical approaches and methodologies for examining the roles of gender, race/ethnicity, sexualities, and other sociocultural systems, and they learn about how to *transform* these systems.

The Center offers a regular colloquium series, frequently sponsors speakers, and distributes a newsletter each fall and spring. The Center in Ustler Hall houses archives, a small library, offices, and meeting space.

For more information about our program, please see the program page below or our website: <http://wst.ufl.edu/>.

Majors

- Women's Studies (p. 229)

Faculty

Women's Studies Program Information

The Women's Studies program is administered by the Center for Gender, Sexualities, and Women's Studies Research. The program offers both a Thesis and a Non-Thesis M.A., as well as a two graduate certificates.

The Center sponsors speakers and events, promotes interdisciplinary and multidisciplinary scholarship and community engagement, and distributes a newsletter each fall and spring.

Our MA program offers a vibrant and diverse faculty, flexible requirements, and excellent preparation for those wishing to go on for doctoral work or professional employment. Our areas of expertise include Black and Latinx feminisms; critical girlhood studies; critical health studies; feminist/ethnic studies; LGBTQ+ studies; feminist technoscience; gender, race, and sexualities; interdisciplinary history studies; Latinx, Afro-Latinx, Haitian, and Caribbean studies; media, cultural, and literary studies; migration studies; and transnational and postcolonial feminist analysis. We apply this expertise in the study of critical domains such as data science, health and medicine, history of women, crime and violence, sexual violence and exploitation, law and politics, leadership and business, literatures and cultures, media and art, work, migration, and social movement activism. In addition to our twelve core faculty members, we have over 100 affiliated faculty members who offer courses, serve on graduate committees, and collaborate in other ways with the Center.

We offer an excellent funding package to our MA students. This includes graduate assistantships with tuition remission, along with supplemental need-based scholarships. We also provide students with research and travel funds. We offer innovative teaching and research, both Thesis and Non-Thesis MAs, combination MA/JD option, and a wide range of specializations. Graduates of our program have gone on to a variety of PhD programs as well as employment in teaching and research, nongovernmental organizations, social services, advocacy, journalism and the media.

Gainesville, Florida is a great location for graduate studies. Gainesville is a medium-sized university town with a host of resources and welcoming climate. Our students come from around the country and internationally, and find UF and the wider community to provide a progressive, affordable, and culturally rich environment in which to live. Many of our students elect to carry out internships in local organizations that offer academic credit and valuable hands-on experience, preparing them for post-graduate employment and active participation as global citizens.

Master of Arts (thesis and non-thesis): The Center offers the Master of Arts (M.A.) thesis degree option, which requires the completion and defense of a thesis (30 credit hours), and the Master of Arts non-thesis degree option, which requires completion and defense of a project or paper (30 credit hours). All Master's students take a core curriculum of 12 graduate credits (4 courses). For the thesis M.A., the remaining 18 hours consist of 12 credits of approved electives and 6 thesis credits. It is strongly recommended that students take at least 3 additional credits

in research methods or skills as an elective. For the non-thesis M.A., 18 credits of approved electives are required.

Required courses for all MA students (12 credits):

Code	Title	Credits
WST 5933	Proseminar in Women's Studies	3
WST 6004	Feminist Methods in Research and Scholarship	3
WST 6508	Advanced Feminist Theory (or other approved 6000-level WST theory-designated course*)	3
WST 6935	Special Topics in Women's Studies (or other approved 6000-level WST Feminist Praxis/Public Scholarship-designated course**)	1-3

*Theory-designated courses include:

- WST 6935: Latinx Sexualities
- WST 6935: Race, Sex, Representation
- WST 6935: Global Women of Color
- WST 6908: Advanced Feminist theory
- WST 6348: Ecofeminism
- Approved courses offered each semester will be posted on the program's website

** Feminist Praxis/Public Scholarship-designated courses include:

- WST 6935: Social Justice Praxis
- WST 6596: Intersectional Activisms
- WST 6935: Critical Girlhood Studies
- WST 6935: Queer & Trans Movements
- WST 6935: Jobs, Gender & Justice
- WST 6935: Reproductive Health and Justice
- Approved courses offered each semester will be posted on the program's website

In addition to the required courses above, thesis and non-thesis options require the following:

Thesis

- 12 approved credits at 5000-level or higher
- 6 credits of WST 6971 Research for Master's Thesis (1-15 cr.) (3 of which must be taken in the final graduating term)
- (12 required courses + 12 electives + 6 MA research hours = 30 credits total for MA Thesis)

Non-thesis

- 18 approved credits at 5000-level or higher
- at least 9 of these credits must be WST classes
- (12 required courses + 18 electives = 30 credits total for MA Non-thesis)

BA/ MA Program: UF offers a number of Bachelor's/Master's programs for superior students. The university created combination degree programs to provide academically talented students an opportunity to complete both a bachelor's and a master's degree in a shorter period of time. The program allows you to double-count graduate courses toward both degrees, thus reducing the time it would normally take to graduate by a semester or more. The combination-degree program

reduces the cost of both degrees and enhances your marketability for career advancement.

M.A./J.D. Joint Degree: The faculties of the Levin College of Law and Women's Studies in the College of Liberal Arts and Sciences have approved a joint degree program culminating in both a J.D. degree, awarded by the College of Law, and an M.A. degree (thesis or non-thesis), awarded by the College of Liberal Arts and Sciences. Under this joint degree program, a student can obtain both degrees in approximately one year less than it would take to obtain both degrees if pursued consecutively. A student must satisfy the curriculum requirements for each degree before either degree is awarded. At least 12 credits must be taken in each program. The graduate program in Women's Studies will accept 12 credits of appropriate professional courses toward the M.A. degree. The 12 credits selected from the professional curriculum must be approved by the Graduate Coordinator upon the recommendation of the student's graduate supervisory committee. Reciprocally, the law school will accept 12 credits of appropriate Women's Studies courses toward the satisfaction of the J.D. degree. Admission to the second program is required no later than the end of the third consecutive semester after beginning one degree of the joint degree program. A summer term is counted as a single semester.

Concurrent Degrees: University of Florida provides a concurrent degree program allowing for simultaneous study on an individualized basis that leads to two master's degrees in two different graduate programs. Such a program is initiated by the student and requires prior approval of each academic unit and the Graduate School. If the student is approved to pursue two master's degrees, up to 9 credits of course work from one degree program may be applied toward the second master's degree, thereby allowing both degrees to be completed in less time. The forms required for approval of the concurrent program and petition for acceptance of nine credits of coursework in a second master's program may be found at <http://graduateschool.ufl.edu/media/graduate-school/pdf-files/concurrent.pdf>

PhD/MA Degrees: University of Florida provides a non-traditional degree option that allows those already in a PhD program at UF to apply to a MA program also. Up to nine credits from the doctoral degree program may be counted toward the master's degree program. The forms required for approval of such a degree arrangement are available here: <http://graduateschool.ufl.edu/media/graduate-school/pdf-files/nontraditional-20210826.pdf>

Certificates (M.A. or Ph.D. level): Two graduate certificates in Women's Studies for master's and doctoral students are offered in conjunction with degree programs in other academic units. The Graduate Certificate in Women's Studies and the Graduate Certificate in Gender and Development require specific sets of course work, designed to give students a thorough grounding in the discipline. The Graduate Certificate in Women's Studies offers students a general overview of the field. The Graduate Certificate in Gender and Development allows students to focus on issues related to gender, economic development, and globalization.

Graduate courses in women's studies are also available from the following academic units or programs:

- Agricultural and Life Sciences
- Anthropology
- Counselor Education
- English
- History

- Journalism and Communication
- Languages, Literatures, and Cultures
- Latin American Studies
- Linguistics
- Medicine
- Philosophy
- Psychology
- Religion
- Sociology
- Teaching and Learning

For more information, please see our website: <http://web.wst.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Women's Studies

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Center for Gender, Sexualities, and Women's Studies Research Courses

Code	Title	Credits
WST 5933	Proseminar in Women's Studies	3
WST 6004	Feminist Methods in Research and Scholarship	3
WST 6024	Girlhood Studies	3
WST 6245	Women and Therapy	3
WST 6329	History of Women's Medicine	3
WST 6348	Ecofeminism	3
WST 6406	Advanced Black Feminisms: Frameworks, Methods, Futures	3
WST 6508	Advanced Feminist Theory	3
WST 6596	Intersectional Activism	3
WST 6905	Independent Study	1-3
WST 6935	Special Topics in Women's Studies	1-3
WST 6936	Feminist Challenges to Disciplinary Paradigms	3
WST 6946	Internship in Applied Women's Studies and Gender Research	1-3
WST 6957	International Studies in Women's Studies and Gender Research	1-6
WST 6971	Research for Master's Thesis	1-15

Student Learning Outcomes

Women's Studies (MA)

SLO 1 Knowledge

Students identify, define and describe gender in culture and society. Students recognize multi-cultural and transnational currents of feminist thought.

SLO 2 Skills

Students apply critical thinking, research, and writing skills in all of their courses and other graduate work;

communication skills in and out of the classroom as active participants in their own education; and meet deadlines and fulfill academic commitments.

SLO 3 Professional Behavior

Students apply professional behavior, meeting expectations in the academic community and beyond. They fulfill work obligations in a thoughtful and timely way, and display collegiality and sensitivity to faculty and other students in the program. They participate collaboratively and contribute to the life of the CWSGR.

Geography Department

Chair: J. Southworth

Graduate Coordinator: C. Simmons

The Department of Geography offers the Master of Arts, Master of Science, and Doctor of Philosophy degrees. Complete descriptions of the minimum requirements for these degrees are provided in the General Information section of this catalog.

The focus of the Department is in human-environment interactions, with “environment” interpreted very broadly. The Department provides four main areas of specialization for graduate research:

- economic and cultural geography;
- resource management and land use and land cover change;
- medical geography; and
- physical geography.

Economic and cultural geography concerns such topics as spatial economic theory and; housing and care of the elderly. Resource management and land-use and land-cover change focus on agricultural change and resource conservation and development in the tropics and subtropics, and rural and urban land use and land cover change in tropical and temperate regions. Africa and Latin America are the primary areas of regional emphasis outside of the U.S. Physical geography in the Department concentrates on climatology, fluvial geomorphology, and hydrology. Medical geography studies the geographic aspects of human health including disease ecology and transmission and healthcare issues. The Department’s extensive geographic information system, remote sensing, and computer cartography teaching and research facilities contribute to and support all of the areas of research. Faculty from the Department are also major participants in the Emerging Pathogens Institute, Florida Climate Institute, Land Use and Environmental Change Institute (L.U.E.C.I.), and the Water Institute. Prospective students should examine the research interests of the Graduate Faculty to obtain a more detailed sense of the Department’s specialties (see the departmental website: www.geog.ufl.edu (<http://www.geog.ufl.edu>)).

To ensure the incorporation of relevant interdisciplinary perspectives in each student’s program, the Department maintains close ties with other departments in Liberal Arts and Sciences, and with programs in African studies, Latin American studies, the School of Natural Resources and Environment, the Institute on Aging, urban and regional planning, tropical agriculture, tropical ecology, water resources, the Warrington College of Business Administration, the College of Agricultural and Life Sciences, College of Public Health and Health Professions, and the Hydrological Sciences Academic Cluster. Certificates in certain of these fields may

be obtained in addition to graduate degrees in geography. Geography administers the Graduate Certificate in Applied Atmospheric Sciences.

A graduate student should preferably have an undergraduate major in geography, but applicants with degrees in one of the social or physical sciences are accepted into the Department’s graduate program.

Deficiencies in undergraduate work in geography must be corrected concurrently with registration in graduate level courses. All students in the graduate program are required to take courses in contemporary geographic thought and geographic research skills.

The Department offers a combination bachelor’s/master’s degree program. Contact the graduate coordinator for information.

For more information, please visit <https://geog.ufl.edu/>.

Majors

- Geography (p. 232)

Faculty

Professor

- Blackburn, Jason K.
- Matyas, Corene J.
- Mossa, Joann
- Ryan, Sadie Jane
- Simmons, Cynthia S.
- Southworth, Jane
- Walker, Robert T.

Associate Professor

- Child, Brian Anthony
- Hu, Yujie
- Mao, Liang
- Walther, Olivier Jean
- Wiig, Alan Grannis

Assistant Professor

- Ash, Kevin D.
- Engstrom, Johanna Cecilia
- Keellings, David James
- Mullens, Esther D.
- Norris, Michael H.
- Serafin, Katherine
- Wen, Yixin
- Wright, Willie
- Yang, Di

Other

- Sounny-Slitine, Moulay M.

Senior Lecturer

- Hamerlinck, Gabriela

Affiliated Faculty

- Noss, Andrew Jay
Other
- Swisher, Marilyn E.
Professor

Geography

Program Information

The Department of Geography offers the Master of Arts, Master of Science, and Doctor of Philosophy degrees. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees Section (p. 778) of this catalog.

Degrees Offered

Degrees Offered with a Major in Geography

- Doctor of Philosophy
 - without a concentration
 - concentration in Climate Science
 - concentration in Geographic Information Systems
 - *optional second concentration in Climate Science*
 - *optional second concentration in Hydrologic Sciences*
 - concentration in Hydrologic Sciences
 - *optional second concentration in Climate Science*
 - concentration in Tropical Conservation and Development
 - *optional second concentration in Climate Science*
 - concentration in Wetland Sciences
 - *optional second concentration in Climate Science*
- Master of Arts
 - without a concentration
 - concentration in Applications of Geographic Technologies
 - *optional second concentration in Climate Science*
 - concentration in Climate Science
 - concentration in Geographic Information Systems
 - *optional second concentration in Climate Science*
 - concentration in Tropical Conservation and Development
 - *optional second concentration in Climate Science*
 - concentration in Wetland Sciences
 - *optional second concentration in Climate Science*
- Master of Science
 - without a concentration
 - concentration in Applications of Geographic Technologies
 - *optional second concentration in Climate Science*
 - concentration in Climate Science
 - concentration in Geographic Information Systems
 - *optional second concentration in Climate Science*
 - concentration in Hydrologic Sciences
 - *optional second concentration in Climate Science*
 - concentration in Tropical Conservation and Development
 - *optional second concentration in Climate Science*
 - concentration in Wetland Sciences
 - *optional second concentration in Climate Science*

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Geography Courses

Code	Title	Credits
GEA 6419	Seminar: South America	3
GEA 6466	Seminar on Geography of Amazonia	3
GEO 5305	Environmental Biogeography	3
GEO 5920	Geography Colloquium	1
GEO 6118	Contemporary Geographic Thought and Research	3
GEO 6119	Proposal Writing in Geography	3
GEO 6160	Introduction to Quantitative Methods for Geographers	3
GEO 6161	Intermediate Quantitative Methods for Geographers	3
GEO 6166	Advanced Quantitative Methods for Spatial Analysis	3
GEO 6255	Climatology	3
GEO 6282	Fluvial Morphology	3
GEO 6348	Floods Seminar	3
GEO 6375	Land Change Science Seminar	3
GEO 6451	Medical Geography	3
GEO 6455	Advanced Study Design in Medical Geography	3
GEO 6905	Individual Work	1-5
GEO 6921	How to Survive and Thrive in Academia	1
GEO 6931	Seminar in Cultural and Political Ecology	3
GEO 6938	Selected Topics in Geography	1-5
GEO 6971	Research for Master's Thesis	1-15
GEO 7979	Advanced Research	1-12
GEO 7980	Research for Doctoral Dissertation	1-15
GEY 6341	Shelter and Care Options for U.S. Elderly	3
GIS 5008C	Maps and Graphs	4
GIS 5028C	Advanced Aerial Photo Interpretation	3
GIS 5038C	Remote Sensing	4
GIS 5107C	Geographic Information Systems in Research	4
GIS 6104	Spatial Networks	3
GIS 6117	Applied Geostats	3
GIS 6425C	GIS Models for Public Health	3
MET 5504	Weather and Forecasting	3
MET 6530	Hurricanes	3
MET 6565	Seminar in Atmospheric Teleconnections	3
MET 6752	Spatial Analysis of Atmospheric Data using GIS	3

Geography Departmental Courses

Code	Title	Credits
GEA 6419	Seminar: South America	3
GEA 6466	Seminar on Geography of Amazonia	3
GEO 5305	Environmental Biogeography	3
GEO 5349	Weather, Climate, and Society	3
GEO 5920	Geography Colloquium	1
GEO 6065C	Terrorism and Space Seminar	3
GEO 6118	Contemporary Geographic Thought and Research	3
GEO 6119	Proposal Writing in Geography	3
GEO 6160	Introduction to Quantitative Methods for Geographers	3

GEO 6161	Intermediate Quantitative Methods for Geographers	3
GEO 6166	Advanced Quantitative Methods for Spatial Analysis	3
GEO 6168	Spatial Econometrics and Modeling	3
GEO 6255	Climatology	3
GEO 6282	Fluvial Morphology	3
GEO 6325	Wildlife Economy and Policy The Governance and Economics of Wildlife on Working Landscapes	3
GEO 6335	Managing for a Changing Climate	3
GEO 6346	Climate Change and Health	3
GEO 6348	Floods Seminar	3
GEO 6374	Community Conservation Governance: Theory and Practice	3
GEO 6375	Land Change Science Seminar	3
GEO 6408	Parks and People	3
GEO 6451	Medical Geography	3
GEO 6455	Advanced Study Design in Medical Geography	3
GEO 6706	Transportation and Urban Accessibility	3
GEO 6905	Individual Work	1-5
GEO 6921	How to Survive and Thrive in Academia	1
GEO 6931	Seminar in Cultural and Political Ecology	3
GEO 6938	Selected Topics in Geography	1-5
GEO 6971	Research for Master's Thesis	1-15
GEO 7979	Advanced Research	1-12
GEO 7980	Research for Doctoral Dissertation	1-15
GEY 6341	Shelter and Care Options for U.S. Elderly	3
GIS 5008C	Maps and Graphs	4
GIS 5028C	Advanced Aerial Photo Interpretation	3
GIS 5038C	Remote Sensing	4
GIS 5107C	Geographic Information Systems in Research	4
GIS 5505	Population GIS	3
GIS 6104	Spatial Networks	3
GIS 6106C	GeoAI - Geographic Artificial Intelligence	3
GIS 6117	Applied Geostats	3
GIS 6125C	Geocomputation using R Programming	3
GIS 6325	GIS Analysis of Hazard Vulnerability	3
GIS 6425C	GIS Models for Public Health	3
GIS 6456C	Applications in GIS for Zoonoses and Disease Ecology	3
MET 5504	Weather and Forecasting	3
MET 6530	Hurricanes	3
MET 6565	Seminar in Atmospheric Teleconnections	3
MET 6752	Spatial Analysis of Atmospheric Data using GIS	3

Students will exhibit professional behavior and ethical practice during the conduct of their research

Geography (MA)

SLO 1 Knowledge

Students will describe, identify, and discuss both orally and in writing the subject matter related to their discipline

SLO 2 Skills

Students will identify, examine and explain the emerging science in their discipline

SLO 3 Professional Behavior

Students will exhibit professional behavior and ethical practice during the conduct of their research

Geography (MS)

SLO 1 Knowledge

Students will describe, identify, and discuss both orally and in writing the subject matter related to their discipline

SLO 2 Skills

Students will identify, examine and explain the emerging science in their discipline

SLO 3 Professional Behavior

Students will exhibit professional behavior and ethical practice during the conduct of their research

Geological Sciences Department

Chair: D.A. Foster

Graduate Coordinator: R.M. Russo

The Department of Geological Sciences is composed of a group of internationally recognized faculty, graduate students, and dedicated support staff. Faculty and students in the Department of Geological Sciences are involved in exciting and groundbreaking research projects throughout the world and in Florida. The Department houses world-class analytical and computing facilities for research and teaching.

The Department has identified six primary areas of emphasis in its research and teaching programs: environmental geology and hydrology, paleoclimatology, tectonophysics, geochemistry and mineralogy/petrology, marine and coastal geology, and paleomagnetism. The Department has collaborative, interdisciplinary programs of study and research with the Florida Museum of Natural History, the Center for Wetlands Research, the Land Use and Environmental Change Institute (L.U.E.C.I.), the Florida Climate Institute, and the University of Florida Water Institute.

For information on our degree programs, current departmental activities, faculty, and research centers, please see the program page below and <http://geology.ufl.edu>.

Majors

- Geology (p. 234)

Student Learning Outcomes

Geography (PHD)

SLO 1 Knowledge

Students will describe, identify, and discuss both orally and in writing the subject matter related to their discipline.

SLO 2 Skills

Students will identify, examine and explain the emerging science in their discipline.

SLO 3 Professional Behavior

Faculty

Professor

- Adams, Peter N.
- Brenner, Mark
- Forte, Alessandro Marco
- Foster, David A.
- Jaeger, John M.
- Jones, Douglas S.
- Martin, Ellen Eckels
- Martin, Jonathan Bowman
- Meert, Joseph G.
- Zimmerman, Andrew R.

Associate Professor

- Dumitru, Oana-Alexandra
- Lorenzo-Trueba, Jorge
- Russo, Raymond Michael
- Williams, Amy Jo

Assistant Professor

- Dannberg, Juliane
- Ding, Shuo
- Elardo, Stephen M.
- Hatfield, Robert George
- MacKie, Emma Johanne
- Sprain, Courtney Jean
- Yoon, Seonkyoo

Other

- Vogl, James J.

Scientist

- Gassmoeller, Rene

Distinguished Professor

- Bianchi, Thomas S.

Associate In

- Kamenov, George Dimitrov

Senior Lecturer

- Marshall, Anita Marie

Research Scientist

- Yasar, Ismail Dogancan

Master Lecturer

- Smith, Matthew C.

Affiliated Faculty

- Bloch, Jonathan I.
Curator

- Kowalewski, Michal
Curator
- Mossa, Joann
Professor

Geology

Program Information

The Department of Geological Sciences offers programs leading to the Master of Science (thesis), the Master of Science in Teaching (non-thesis), and the Doctor of Philosophy degrees in geology. Minimum requirements for these degrees are described in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

For admission to graduate status in the Department of Geological Sciences, a student must have a baccalaureate degree with a major in geology or a related field or its equivalent. Deficiencies in undergraduate preparation can be corrected by completing the undergraduate courses without credit while enrolled as a graduate student.

Applicants should take the GRE general test. The scores of this examination must be reported to the Department of Geological Sciences. Three letters of recommendation are also required for admission to the doctoral program and for financial aid applications at any level.

A minimum of 32 semester hours of graduate level courses are required for the Master of Science in geology. At least 24 hours must be in organized graduate-level geology courses (excluding research, teaching, special projects, etc.). Six hours of thesis research credit are required. All master's degrees are terminal; a separate and new application for admission to the doctoral program is required.

For the Master of Science in Teaching degree, a minimum of 36 semester hours are required; including at least 24 hours in organized graduate-level geology courses, 2 in Seminar (6931) and 6 hours of Internship in College Teaching (6943). Master's Research (6971) can not be used toward the degree. At least one course in each of the following: Social Foundations of Education, Psychological Foundations of Education, and Community College curriculum are required. These courses may be used to comprise a minor in Education (6 hours will count toward the total of 24 geology courses). The remaining hours must be in approved electives. Passage of a final oral examination that covers the field of Geology and the students minor is required of all candidates. No thesis is required.

90 semester hours of graduate-level class work are required for the Ph.D., including organized course work, individual work, supervised research and teaching, advanced research, dissertation, special projects, or courses in a related field.

The Department offers a combination bachelor's/master's degree program. Contact the graduate coordinator for information.

For more information, please see the program page below and our department website: <http://geology.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Geology

- Doctor of Philosophy
 - without a concentration
 - concentration in Climate Science
 - concentration in Hydrologic Sciences

- *optional second concentration in Climate Science*
- concentration in Tropical Conservation and Development
 - *optional second concentration in Climate Science*
- concentration in Wetland Sciences
 - *optional second concentration in Climate Science*
- Master of Science
 - without a concentration
 - concentration in Climate Science
 - concentration in Hydrologic Sciences
 - *optional second concentration in Climate Science*
 - concentration in Tropical Conservation and Development
 - *optional second concentration in Climate Science*
 - concentration in Wetland Sciences
 - *optional second concentration in Climate Science*
- Master of Science in Teaching
 - without a concentration
 - concentration in Climate Science
 - concentration in Tropical Conservation and Development
 - *optional second concentration in Climate Science*
 - concentration in Wetland Sciences
 - *optional second concentration in Climate Science*

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Geology Program Courses

Code	Title	Credits
BOT 5305	Paleobotany	3
GLY 5156	Geologic Evolution of North America	3
GLY 5246	Geochemistry	3
GLY 5245	Hydrogeochemistry	3
GLY 5247	Surface and Ground Water Interactions	3
GLY 5255	Organic Geochemistry and Geobiology	3
GLY 5328	Advanced Igneous Petrology	3
GLY 5455	Introduction to Geophysics and Tectonics	3
GLY 5466	Seismology and Earth Structure	3
GLY 5468	Terrestrial Gravity and Magnetism	3
GLY 5558C	Sedimentology	3
GLY 5576	Continental Margin Stratigraphy	3
GLY 5705	Geomorphology	3
GLY 5736	Marine Geology	3
GLY 5786L	Topics in Field Geology	2
GLY 5827	Ground Water Geology	3
GLY 6075	Global Climate Change: Past, Present, and Future	3
GLY 6297	Topics in Geochemistry	3
GLY 6425	Tectonics	3
GLY 6519	Stratigraphy and Timescales	3
GLY 6826	Hydrogeologic Modeling	3
GLY 6862	Quantitative Methods in Earth Sciences	3
GLY 6905	Individual Work	1-4
GLY 6931	Seminar	1
GLY 6932	Special Topics in Geology	1-3
GLY 6971	Research for Master's Thesis	1-15
GLY 7979	Advanced Research	1-12
GLY 7980	Research for Doctoral Dissertation	1-15

Geological Sciences Departmental Courses

Code	Title	Credits
BOT 5305	Paleobotany	3
GLY 5044	Cosmochemistry	3
GLY 5062C	Analytical Methods in Earth and Environmental Sciences	1-3
GLY 5156	Geologic Evolution of North America	3
GLY 5245	Hydrogeochemistry	3
GLY 5246	Geochemistry	3
GLY 5247	Surface and Ground Water Interactions	3
GLY 5255	Organic Geochemistry and Geobiology	3
GLY 5328	Advanced Igneous Petrology	3
GLY 5455	Introduction to Geophysics and Tectonics	3
GLY 5466	Seismology and Earth Structure	3
GLY 5468	Terrestrial Gravity and Magnetism	3
GLY 5558C	Sedimentology	3
GLY 5576	Continental Margin Stratigraphy	3
GLY 5705	Geomorphology	3
GLY 5736	Marine Geology	3
GLY 5786L	Topics in Field Geology	2
GLY 5827	Ground Water Geology	3
GLY 6046	Survey of Geobiology and Astrobiology	3
GLY 6075	Global Climate Change: Past, Present, and Future	3
GLY 6095	Survival Skills for Academic Careers in Earth and Planetary Sciences	3
GLY 6256	Chemical Biomarkers in Aquatic Ecosystems	3
GLY 6297	Topics in Geochemistry	3
GLY 6425	Tectonics	3
GLY 6519	Stratigraphy and Timescales	3
GLY 6738	Estuarine Systems	3
GLY 6826	Hydrogeologic Modeling	3
GLY 6862	Quantitative Methods in Earth Sciences	3
GLY 6905	Individual Work	1-4
GLY 6931	Seminar	1
GLY 6932	Special Topics in Geology	1-3
GLY 6971	Research for Master's Thesis	1-15
GLY 7979	Advanced Research	1-12
GLY 7980	Research for Doctoral Dissertation	1-15
PCB 5307C	Limnology	4

Student Learning Outcomes

Geology (PHD)

SLO 1 Knowledge

Students will articulate orally and in writing the results and applications of their research and scholarship, using the basic concepts, theories, and observational findings related to Earth materials and processes, as they pertain to the student's research

SLO 2 Skills

Students will analyze data in the published literature; synthesize analog and digital datasets to produce original geologic maps and/or datasets; apply the scientific method to analysis of published and self-generated data

SLO 3 Professional Behavior

Students will conduct research in an ethical and responsible manner

Geology (MS)

SLO 1 Knowledge

Students will articulate orally and in writing the results and applications of their research and scholarship, using the basic concepts, theories, and observational findings related to Earth materials and processes, as they pertain to the student's research.

SLO 2 Skills

Students will analyze data in the published literature; synthesize analog and digital datasets to produce original geologic maps and/or datasets; apply the scientific method to analysis of published and self-generated data.

SLO 3 Professional Behavior

Students will conduct research in an ethical and responsible manner.

Geology (MST)

SLO 1 Knowledge

Students articulate orally and in writing the results and applications of their scholarship, demonstrating a proficiency in the basic concepts, theories, and observational findings related to Earth materials and processes, as they pertain to educational standards established at the state or national level.

SLO 2 Skills

Students will create, select and implement: (1) specific learning goals, (2) appropriate pedagogy and instructional materials and (3) evaluation strategies aligned with goals, using knowledge of subject matter, learners and classroom management.

SLO 3 Professional Behavior

Students will conduct research and teach in an ethical and responsible manner

History Department

Chair: J. Sensbach

Graduate Coordinator: M. Hart

The Department of History offers the following graduate degrees: Master of Arts with fields of specialization in African, European, Latin American, and United States history, and the Doctor of Philosophy with fields of specialization in African, European, Latin American, and United States history. We offer minor concentrations in the thematic fields of Atlantic, Gender, Legal, Religious, and World History. Students interested in transnational and comparative work may also create their own dual major. In addition to materials required by the Graduate School for admission, applicants must send directly to the History Department the following evidence of aptitude and interest:

- Three recommendations, from persons competent to evaluate your potential for graduate work;
- a 3- to 5-page essay identifying your career goals and particular areas of interest;
- a sample of your written work in history.

Interested students should consult the department web page for more information.

For more information, please visit <https://history.ufl.edu/>.

Majors

- History (p. 237)

Faculty

Professor

- Adams, Sean P.
- Adler, Jeffrey S.
- Aleksiun Madrzak, Natalia D.
- Curta, Florin
- Dale, Elizabeth Ruth
- Goda, Norman Jacob
- Guerra, Lillian
- Hart, Mitchell B.
- Hunt, Nancy Rose
- Larmer, Miles
- Ortiz, Paul Andrew
- Sensbach, Jon F.
- Silkenat, David Andrew
- Spillane, Joseph F.

Associate Professor

- Bernstein, Seth Franklin
- Glotzer, Paige
- Harland-Jacobs, Jessica Leigh
- Jacobs, Matthew Fay
- Kroen, Sheryl T.
- Matytsin, Anton Mikhailovich
- Vrana, Heather A.
- Wise, Benjamin Evan

Assistant Professor

- Billups, William Robert
- Bretones Lane, Fernanda
- Chang, Sandy Feng-Shan
- Cole, Alyssa Patryce
- Deardorff, Max Thomas
- Gerien-Chen, James Jin
- Janzen, Philip Bernard

Lecturer

- Goodwin, Christopher Thomas

Distinguished Professor

- Davis, Jack Emerson

Master Lecturer

- Noll, Steven G.

Affiliated Faculty

- Canton, David
Associate Professor
- Caputo, Nina

Associate Professor

- Leedy, Todd H.
Other
- Smocovitis, Vassiliki B.
Professor

History

Program Information

The Department of History offers the following graduate degrees: Master of Arts degree with fields of specialization in African, European, Latin American, and United States history and the Doctor of Philosophy degree with fields of specialization in African, European, Latin American, and United States history, or with a dual major which allows students to combine two minor fields to create their own major fields. We offer minor concentrations in the thematic fields of Atlantic, Gender, Legal, Religious, and World History.

Master of Arts: This degree serves to prepare students for admission to a Ph.D. program, for a teaching career in high school or community colleges, or for a career in government or business.

Fields of specialization:

- African (East Africa, Southern Africa, West Africa)
- European (medieval, early modern, or modern)
- Latin American (colonial Latin America, post-Colonial Latin America, Brazil, and the Caribbean or Spanish America)
- United States history (early America, 19th century, 20th century)

Thesis option requirements:

- A minimum of 30 credit hours
- At least 15 graduate-level regular course credit hours in your major field. In European, you must take at least two seminars in your area of specialization. In U.S. history, you must take the 19th-century America readings seminar, either the 20th-century or early America readings seminar, and at least one research seminar. In Latin American and African history, you must take the relevant readings seminars in your area of specialization, one other readings seminar, and at least one research seminar.
- At least 6 graduate-level regular course credit hours outside the major field (but in the Department of History). We recommend that you invest these regular course hours in readings seminars.
- Take 3 hours of historiography (HIS 6061 Introduction to Historiography (3 cr.)) by the fourth semester of graduate study.
- Take 3 regular course credit hours from outside the Department. These should be graduate-level hours, but undergraduate 3000 or 4000 level hours may be taken subject to approval by your adviser.
- Complete a master's thesis of original historical research. The semester you graduate, you must be registered for a minimum of 3 thesis research hours (HIS 6971 Research for Master's Thesis (1-15 cr.)) in the fall or spring terms or 2 in a summer term. Your thesis should demonstrate your ability to handle the primary-source material of your field, and a working knowledge of the secondary literature; and should demonstrate your ability to present research results in a coherent, well-written study. The student must complete the thesis and make it available to readers 2 weeks before the oral examination, complete the application for the degree at the Office of the University Registrar before the deadline, and take the examination.

- Each student must pass a final comprehensive oral examination at the end of the program.

Non-thesis option requirements:

- A minimum of 30 credit hours.
- At least 15 graduate-level regular course credit hours inside your major field. In European, you must take at least two seminars in your area of specialization. In U.S. history, you must take the 19th-century American readings seminar, either the 20th-century or the early America readings seminar, and at least one research seminar. In Latin American or African history, you must take the relevant readings seminars in your area of specialization, one other readings seminar, and at least one research seminar.
- At least 6 graduate-level regular course credit hours outside your major field (but in the Department of History). We recommend that you invest these regular course hours in readings seminars.
- Take 3 hours of historiography (HIS 6061 Introduction to Historiography (3 cr.)) by your fourth semester of graduate study.
- Take 3 regular course credit hours from outside the Department; these should be graduate-level hours, but undergraduate 3000 or 4000 level hours may be taken subject to approval by your adviser.
- Complete a research seminar and/or a non-thesis project in history. Your primary goal in either is to complete an article-length essay (approximately 35 to 40 pages) of publishable or near-publishable quality. The essay should be based largely on primary sources.
- You must pass a final comprehensive oral and written examination conducted by your supervisory committee.

Supervisory committee for the M.A.: The committee normally consists of the chair and two other members of the graduate faculty. Additional members may be added if desirable. The committee assists in planning and supervising the student's program and conducts the final examination. The chair is also the thesis director if that option is chosen.

Duration: The M.A. program can be completed in 3 semesters of full-time registration but may take longer. The Department believes that normally no more than 4 semesters of full-time registration should be spent on the degree. These semesters need not be consecutive. The Board of Education has established 60 credit hours as a maximum for the master's degree. Up to 6 credits of graduate-level courses taken at another school with a grade of B or better may be transferred into the master's program if approved by the Graduate School.

Bachelor's/master's program: The Department offers a combination 4/1 degree program that enables outstanding undergraduates to obtain both the B.A. and M.A. degrees in history after successful completion of 150 credit hours. The program is designed for the students who wish to continue their education in history past the bachelor's level but do not intend to pursue a doctorate in history, or for students who wish to expand their training in a specific field before moving on to a doctoral program. The department offers a 4/1 degree program in the standard M.A. fields of study as well as oral history. Please see the Department website for more information. Students in this program are not eligible for departmentally controlled financial aid.

Doctor of Philosophy requirements:

- Professional mastery of your major field, or major fields for students pursuing a dual degree.
- Professional competence in a minor field, which may be drawn from the approved major fields of specialization for the doctorate (African,

European, Latin American, or U.S. history), from approved minor fields (Atlantic history, gender, legal history), or may be self designed as a thematic research or teaching field. It must include at least 3 hours outside the historical area that defines your major field. Note: Students pursuing a dual major do not take a department minor field.

- At least 3 regular course credit hours from outside the Department; these should be graduate-level hours, but undergraduate 3000 or 4000 level hours may be taken subject to approval by your adviser.
- Pass a set of written and oral qualifying examinations testing competence in major and additional fields and your knowledge of the nature of history and the historian's task.
- A dissertation of original historical research for which credit is given in HIS 7980 Research for Doctoral Dissertation (1-15 cr.).

History/law joint degree program: The Department of History and the College of Law offer a program in legal history leading to either the M.A. or a Ph.D. degree in history and the J.D. in law. Because the faculties of history and law stress interdisciplinary training, students admitted to the joint degree program will be allowed to count a significant number of hours toward both degrees. Applicants must be accepted by both the Graduate School and the College of Law. Normally, students will complete the course and examination requirements of both degrees in 4 years. Students may begin their first year of work in either history or law, but they must complete the first year of law school within 1 year and they must do so within the first 2 years after admission to the joint degree program. For further information write to the:

Legal History Coordinator
Department of History
University of Florida
Box 117320
Gainesville, FL 32611-7320.

Degrees Offered

Degrees Offered with a Major in History

- Doctor of Philosophy
 - without a concentration
 - concentration in Historic Preservation
 - concentration in Women's/Gender Studies
- Master of Arts
 - without a concentration
 - concentration in Historic Preservation
 - concentration in Jewish Studies

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

History Departmental Courses

Code	Title	Credits
AFH 5934	Topics in African History	3
AFH 6259	Seminar in Modern Africa	3
AFH 6805	Theo/Met African Hist	3
AFH 6934	Africa	3
AFH 6936	Readings in African History	3
AMH 5405	The South to 1860	3
AMH 5930	Topics in United States History	3
AMH 6198	Early American Society	3
AMH 6199	Nineteenth Century America	3

AMH 6290	Modern America	3
AMH 6465	Seminar in U.S. Urban History	3
AMH 6516	Seminar in American Foreign Relations and Expansion	3
AMH 6557	Seminar in Constitutional or Legal History of the United States	3
EUH 5195	The Archaeology of the Middle Ages	3
EUH 5934	Topics in European History	3
EUH 6126	Readings in Medieval History	3
EUH 6174	Conversion in the Middle Ages	3
EUH 6289	Readings, Modern Europe	3
EUH 6469	Modern German History	3
HIS 5485	Special Studies in the History of Science	3
HIS 5939	Second-Year Research Seminar	3
HIS 6061	Introduction to Historiography	3
HIS 6416	Problems in Comparative Legal History	3
HIS 6488	Readings in the History of Science	1-4
HIS 6905	Individual Study	1-3
HIS 6910	Supervised Research	1-5
HIS 6940	Supervised Teaching	1-5
HIS 6943	Internship in Historical Applications	2-4
HIS 6957	Nonthesis Project in History	1-3
HIS 6971	Research for Master's Thesis	1-15
HIS 7979	Advanced Research	1-12
HIS 7980	Research for Doctoral Dissertation	1-15
LAH 5438	Modern Mexico	3
LAH 5476	Caribbean History to 1800: Slavery, Colonization, and International Conflict	3
LAH 5607	History of Amazonia	3
LAH 5637	Brazil Since 1750	3
LAH 5933	Topics in Caribbean History	3
LAH 5934	Topics in Latin American History	3
LAH 6934	Seminar in Colonial Spanish America	3
LAH 6936	Seminar in History of Brazil	3
LAH 6938	Seminar in Modern Spanish America	3
WOH 5932	Topics in World History	3

Student Learning Outcomes

history (PHD)

SLO 1 Knowledge

Students will identify, define, and describe major issues in the history of their fields of study as well as mastery of the relevant body of historiography

SLO 2 Skills

Students will design and teach courses as teaching assistants or primary instructors

SLO 3 Professional Behavior

Students will contribute to the international community of historians in their field through the publication of their research, and through presentations at seminars, workshops and conferences

SLO 4 Skills and Content Knowledge

Students will apply and demonstrate the methods and practices of historical research and writing

History (MA)

SLO 1 Knowledge

Students will identify, define, and describe major issues in the history of their fields of study as well as mastery of the relevant body of historiography

SLO 2 Professional Behavior
Students write journal quality papers

SLO 3 Skills
Students will describe, define and apply methods and practices of historical research and writing

Interdisciplinary Department

Majors

- Genetics and Genomics (CLAS) (p. 240)

Faculty

Professor

- Burris, Thomas P.
- Rathinasabapathi, Balasubramani

Affiliated Faculty

- Abisambra, Jose Francisco
Associate Professor
- Allen, William L.
Associate Professor
- Atkinson, Mark A.
Eminent Scholar
- Austin, James D.
Professor
- Baer, Charles
Professor
- Barbazuk, William Bradley
Professor
- Bloom, David C.
Professor
- Bloom, Linda B.
Professor
- Bonning, Bryony
Eminent Scholar
- Braun, Edward Louis
Professor
- Bungert, Jorg
Professor
- Byrne, Barry John
Professor
- Cavallari, Larisa Humma
Professor
- Chevrette, Marc G.
Assistant Professor
- Choe, Keith P.
Associate Professor
- Cohn, Martin J.
Professor
- Corti, Manuela
Associate Professor
- De Crecy, Valerie Anne

- Professor
- Denslow, Nancy D.
Professor
- Dinglasan, Rhoel David
Professor
- Driscoll, Daniel J.
Professor
- Duarte, Julio David
Associate Professor
- Farrer, Matthew James
Professor
- Ferl, Robert J.
Distinguished Professor
- Folta, Kevin M.
Professor
- Foster, Jamie S.
Professor
- Foster, Thomas C.
Professor
- Gulig, Paul A.
Professor
- Guralnick, Robert Penn
Curator
- Hansen, Peter J.
Distinguished Professor
- Harfe, Brian
Professor
- Hauser, Bernard A.
Associate Professor
- Hoffman, Brad E.
Associate Professor
- Kasahara, Hideko
Courtesy Associate Professor
- Kawahara, Akito
Curator
- Kaye, Frederic Joseph
Professor
- Kirst, Matias
Distinguished Professor
- Kladde, Michael P.
Professor
- Li, Yuqing
Professor
- Liao, Daiqing
Associate Professor
- Lu, Jianrong J.
Associate Professor
- Maden, Malcolm
Professor
- March, Keith L.
Professor
- Mathews, Carol Anne
Professor
- Maupin, Julie A.
Professor
- Mavian, Carla Nartuhi

- Assistant Professor
- Mccarty, Donald R.
Professor
- McIntyre, Lauren M.
Professor
- Menezes, Amor
Associate Professor
- Mergia, Ayalew
Professor
- Merritt, Matthew E.
Professor
- Moroz, Leonid Leonidovich
Distinguished Professor
- Mulligan, Connie Jo
Professor
- Oppenheimer, David G.
Associate Professor
- Paul, Annalisa
Research Professor
- Peter, Gary Frank
Professor
- Ranum, Laura Page
Distinguished Professor
- Reed, David Lee
Curator
- Renne, Rolf Friedrich
Professor
- Resnick, James Lewis
Professor
- Ryan, Joseph Francis
Associate Professor
- Salemi, Marco
Professor
- Sayour, Elias
Professor
- Schatz, Desmond A.
Professor
- Scott, Edward W.
Professor
- Seaver, Elaine C.
Professor
- Soltis, Douglas Edward
Distinguished Professor
- Soltis, Pamela S.
Distinguished Professor
- Song, Sihong
Professor
- Swanson, Maurice S.
Professor
- Traktuev, Dmitry Olegovich
Research Associate Professor
- Triplett, Eric
Professor
- Vaillancourt, David E.
Professor
- Vallejos, Carlos E.

- Professor
- Vermerris, Willem
Professor
- Vulpe, Christopher Dillon
Professor
- Wallace, Margaret R.
Professor
- Wang, Eric Tzy-Shi
Professor
- Wang, Jianping
Professor
- Wayne, Marta L.
Professor
- Wu, Lizi
Professor
- Xie, Mingyi
Associate Professor
- Zhou, Lei
Professor
- Zolotukhin, Serge
Professor

Genetics and Genomics (CLAS)

Program Information

Program Director: T. Burris

Program Coordinator: C. Mulligan

The University of Florida Genetics Institute is a multi-college, multi-faceted research center which offers the a degree program leading to the Ph.D. in Genetics and Genomics. Minimum requirements for this degree are available in the Graduate Degrees (p. 778) section of this catalog.

What defines the Genetics & Genomics Graduate Program is the philosophy that good geneticists are integrative geneticists, who incorporate many different subfields of genetics into their work. Accordingly, faculty interests and graduate research opportunities include a wide range of areas: advances in gene therapy, understanding the maintenance of genetic variation, understanding plant immune responses, developing improved algorithms for identifying regulatory motifs in DNA sequences, and the challenges of bioethics to strategies for controlling malaria. Due to the fundamental nature of genetics in the life sciences, our training program is distributed across several colleges at UF, including but not limited to the College of Medicine (<https://graduate.education.med.ufl.edu/>), the College of Liberal Arts and Sciences (<https://clas.ufl.edu/>), the College of Agricultural and the Life Sciences (<https://cals.ufl.edu/>), and the Florida Museum of Natural History.

Graduate Program Overview

First Year:

Code	Title	Credits
ANG 7979	Advanced Research	1-12
BCH 6415	Advanced Molecular and Cell Biology	3
GMS 6221	Ethics in Genetics	1
GMS 6231	Genomics and Bioinformatics	3

GMS 6290	Genetics/Genomics Program Graduate Seminar (begins in the first semester and continues throughout students' graduate careers)	1
GMS 7877	Responsible Conduct of Biomedical Research	2
PCB 5065	Advanced Genetics	4
PHC 6052	Introduction to Biostatistical Methods	3

The first year core training is the research rotation program, in which students "rotate" through three labs in a minimum of two colleges. Rotations are critical to selecting a graduate advisor: they provide a hands-on opportunity to participate in the research being conducted in a lab, and a mutual opportunity to evaluate fit between advisor and prospective student.

Second Year:

- Individual program of courses and requirements is developed in consultation with major professor and dissertation committee

Admission Standards: Prospective students should have strong backgrounds in biology and other hard sciences. Exceptional students with other backgrounds will also be considered. The research statement required as part of the application has a particularly important part in the admissions decision. Each applicant must describe their research interests so that Graduate Faculty can evaluate knowledge of the discipline, fit to the program, and ability to articulate and motivate an interesting research problem. The required Letters of Recommendation are also extremely important in helping identify applicants with exceptional aptitude for genetics, and with research experience and promise.

Contact the Genetics and Genomics Graduate Program by email, UFGI-Info@ad.ufl.edu or by phone, 352-273-8124.

For more information, visit our website: <http://www.ufgi.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Genetics and Genomics

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Domestic Animal Genomics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Genetics and Genomics (CLAS) Courses

Code	Title	Credits
AGR 6322	Advanced Plant Breeding	3
ANG 6532	Molecular Genetics of Disease	3
ANG 7979	Advanced Research	1-12
ANG 7980	Research for Doctoral Dissertation	1-15
BCH 6415	Advanced Molecular and Cell Biology	3
BCH 7410	Advanced Gene Regulation	1
CAP 5510	Bioinformatics	3
CIS 6930	Special Topics in CIS	3
COT 5405	Analysis of Algorithms	3
GMS 6012	Human Genetics	1

GMS 6013	Developmental Genetics	1
GMS 6014	Applications of Bioinformatics to Genetics	1
GMS 6920	Genetics Journal Colloquy	1
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15
HOS 6201	Breeding Perennial Cultivars	3
PCB 5065	Advanced Genetics	4
PCB 5615	Molecular Evolution and Systematics	4
PCB 6528	Plant Cell and Developmental Biology	3
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15
STA 5325	Fundamentals of Probability	3
STA 5328	Fundamentals of Statistical Theory	3
STA 6166	Statistical Methods in Research I	3
STA 6167	Statistical Methods in Research II	3
STA 6208	Basic Design and Analysis of Experiments	3
STA 6329	Matrix Algebra and Statistical Computing	3
STA 6934	Special Topics in Statistics	1-4
STA 7979	Advanced Research	1-12
STA 7980	Research for Doctoral Dissertation	1-15
ZOO 6927	Special Topics in Zoology	1-4
ZOO 7979	Advanced Research	1-12
ZOO 7980	Research for Doctoral Dissertation	1-15

Faculty

Professor

- Burris, Thomas P.
- Rathinasabapathi, Balasubramani

Affiliated Faculty

- Abisambra, Jose Francisco
Associate Professor
- Allen, William L.
Associate Professor
- Atkinson, Mark A.
Eminent Scholar
- Austin, James D.
Professor
- Baer, Charles
Professor
- Barbazuk, William Bradley
Professor
- Bloom, David C.
Professor
- Bloom, Linda B.
Professor
- Bonning, Bryony
Eminent Scholar
- Braun, Edward Louis
Professor
- Bungert, Jorg
Professor
- Byrne, Barry John
Professor
- Cavallari, Larisa Humma
Professor
- Chevette, Marc G.

Assistant Professor

- Choe, Keith P.
Associate Professor
- Cohn, Martin J.
Professor
- Corti, Manuela
Associate Professor
- De Crecy, Valerie Anne
Professor
- Denslow, Nancy D.
Professor
- Dinglasan, Rhoel David
Professor
- Driscoll, Daniel J.
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- Foster, Jamie S.
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- Foster, Thomas C.
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- Gulig, Paul A.
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- Guralnick, Robert Penn
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- Hansen, Peter J.
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- Hauser, Bernard A.
Associate Professor
- Hoffman, Brad E.
Associate Professor
- Kasahara, Hideko
Courtesy Associate Professor
- Kawahara, Akito
Curator
- Kaye, Frederic Joseph
Professor
- Kirst, Matias
Distinguished Professor
- Kladde, Michael P.
Professor
- Li, Yuqing
Professor
- Liao, Daiqing
Associate Professor
- Lu, Jianrong J.
Associate Professor
- Maden, Malcolm

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- Mathews, Carol Anne
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- Maupin, Julie A.
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- Mavian, Carla Nartuhi
Assistant Professor
- Mccarty, Donald R.
Professor
- McIntyre, Lauren M.
Professor
- Menezes, Amor
Associate Professor
- Mergia, Ayalew
Professor
- Merritt, Matthew E.
Professor
- Moroz, Leonid Leonidovich
Distinguished Professor
- Mulligan, Connie Jo
Professor
- Oppenheimer, David G.
Associate Professor
- Paul, Annalisa
Research Professor
- Peter, Gary Frank
Professor
- Ranum, Laura Page
Distinguished Professor
- Reed, David Lee
Curator
- Renne, Rolf Friedrich
Professor
- Resnick, James Lewis
Professor
- Ryan, Joseph Francis
Associate Professor
- Salemi, Marco
Professor
- Sayour, Elias
Professor
- Schatz, Desmond A.
Professor
- Scott, Edward W.
Professor
- Seaver, Elaine C.
Professor
- Soltis, Douglas Edward
Distinguished Professor
- Soltis, Pamela S.
Distinguished Professor
- Song, Sihong
Professor
- Swanson, Maurice S.

Professor

- Traktuev, Dmitry Olegovich
Research Associate Professor
- Triplett, Eric
Professor
- Vaillancourt, David E.
Professor
- Vallejos, Carlos E.
Professor
- Vermerris, Willem
Professor
- Vulpe, Christopher Dillon
Professor
- Wallace, Margaret R.
Professor
- Wang, Eric Tzy-Shi
Professor
- Wang, Jianping
Professor
- Wayne, Marta L.
Professor
- Wu, Lizi
Professor
- Xie, Mingyi
Associate Professor
- Zhou, Lei
Professor
- Zolotukhin, Serge
Professor

Linguistics Department

Chair: G.A. Broadwell

Graduate Coordinator: B. Henderson

The Linguistics Department offers graduate programs leading to the M.A. and Ph.D. degrees with specializations in

- The core areas of linguistics (phonetics, phonology, morphology, syntax, semantics, pragmatics)
- Language documentation
- Sociolinguistics and language change
- Discourse analysis
- TESL
- Second language acquisition
- Psycholinguistics
- Neurolinguistics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog. For detailed information on the program, please visit the link below. For further information on the program, including financial aid, please visit <http://lin.ufl.edu>.

Faculty

Professor

- Kaan, Edith
- Wayland, Ratree

Associate Professor

- Henderson, Brent Mykel
- Wiltshire, Caroline R.
- Wulff, Stefanie

Assistant Professor

- Burukina, Irina
- Liu, Ying
- Moeller, Sarah R.
- Rossi, Eleonora
- Tripp, Alayo

Clinical Professor

- Golombek, Paula R.

Senior Lecturer

- Butler, Emily Rine
- Garner, Jamie R.

Affiliated Faculty

- Aaron, Jessica Elana
Associate Professor
- Antes, Theresa A.
Associate Professor
- Blondeau, Helene
Professor
- Broadwell, George Aaron
Professor
- Essegbey, James
Professor
- Haddad, Youssef A.
Professor
- Hebblethwaite, Benjamin John
Professor
- Lord-Ward, Gillian E.
Professor
- McLaughlin, Fiona
Professor
- Pham, Andrea Hoa
Professor
- Pharies, David A.
Professor
- Valdes Kroff, Jorge Rodrigo
Associate Professor

Majors

- Linguistics (p. 244)

Linguistics

Program Information

The Linguistics Department offers graduate programs leading to the M.A. and Ph.D. degrees with specializations in

- The core areas of linguistics (phonetics, phonology, morphology, syntax, semantics, pragmatics)
- Language documentation
- Sociolinguistics and language change
- Discourse analysis
- TESL
- Second language acquisition
- Psycholinguistics
- Neurolinguistics

For detailed information on the program, including financial aid, please visit the website <http://lin.ufl.edu>.

The Certificate in Second Language Acquisition and Teaching is offered to University of Florida graduate degree-seeking students in linguistics and related disciplines.

As part of its service to the University community, Linguistics also offers English as a Second Language training for international applicants and admitted students. These programs, the English Language Institute (ELI), Academic Written English (AWE), and Academic Spoken English (ASE), are described in the Student Services (p. 940) section of this catalog. This information, along with links to the application form, are available at <http://lin.ufl.edu>.

Applicants who lack a background in linguistics should develop basic competency in the core areas before commencing graduate work. These deficiencies can be met by taking LIN 3010 Introduction to Linguistics (3 cr.), LIN 3201 The Sounds of Human Language (3 cr.), and LIN 3460 The Structure of Human Language (3 cr.) or the equivalent.

The department also offers a combination degree program available to Linguistics majors that enables strong students to obtain a BA and an MA in five years. Students must apply for the program by February 15th of their junior year and should consult with the department undergraduate and graduate coordinators before applying. More details and an application form can be found here: <https://lin.ufl.edu/undergraduate/combination-ba-ma-degree/>

Degrees Offered

Degrees Offered with a Major in Linguistics

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Linguistics Departmental Courses

Code	Title	Credits
EAP 5835	Academic Spoken English I	3
EAP 5836	Academic Spoken English II	2-3

LIN 5075	Intro to Corpus Linguistics	3
LIN 5741	Applied English Grammar	3
LIN 5770	Introduction to Computational Linguistics	3
LIN 6007	Statistics for Linguists	3
LIN 6084	Introduction to Graduate Research	3
LIN 6138	Introduction to Data-driven Learning	3
LIN 6165	Field Methods	3
LIN 6208	Phonetics for Linguists	3
LIN 6226	Advanced Phonetics	3
LIN 6323	Phonology 1	3
LIN 6341	Phonology 2	3
LIN 6402	Morphology 1	3
LIN 6410	Morphology 2	3
LIN 6501	Syntax 1	3
LIN 6520	Syntax 2	3
LIN 6571	Structure of Specific Language	3
LIN 6601	Sociolinguistics	3
LIN 6707	Psycholinguistics	3
LIN 6708C	Methods in Psycholinguistics	3
LIN 6720	Second Language Acquisition	3
LIN 6765	Methods in Language Documentation	3
LIN 6796	Cognitive Neuroscience of Language	3
LIN 6804	Semantics I	3
LIN 6826	Introduction to Formal Pragmatics	3
LIN 6856	Semantics II	3
LIN 6905	Individual Study	1-4
LIN 6910	Supervised Research	1-5
LIN 6932	Special Topics	3
LIN 6940	Supervised Teaching	1-5
LIN 6971	Research for Master's Thesis	1-15
LIN 7725	Topics in Second Language Acquisition	3
LIN 7885	Discourse Analysis and Pragmatics	3
LIN 7979	Advanced Research	1-12
LIN 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Linguistics (PHD)

SLO 1 Knowledge

Student defines, describes, and uses terminology and basic concept from the core areas of linguistics

SLO 2 Skills

Student critically analyzes and interprets language-related data and theories

SLO 3 Skills

Student designs and conducts a language-related program of inquiry producing original research

SLO 4 Professional Behavior

Student engages in ethical human data collection, appropriate professional conduct, and ethical academic writing practices (as established by Linguistic Society of America Ethics Statement)

Linguistics (MA)

SLO 1 Knowledge

Student defines, describes, and uses terminology and basic concept from the core areas of linguistics

SLO 2 Skills

Student critically analyzes and interprets language-related data and theories

SLO 3 Professional Behavior

Student engages in ethical human data collection, appropriate professional conduct, and ethical academic writing practices (as established by Linguistic Society of America Ethics Statement)

Mathematics Department

Chair: L. Rong

Graduate Coordinator: M. Jury

The Department of Mathematics offers the Master of Science (thesis or non-thesis) and the Doctor of Philosophy degrees. The non-thesis Master of Arts in Teaching and Master of Science in Teaching are also offered. Minimum requirements for these degrees are described in the Graduate Degrees (p. 778) section of this catalog.

Areas of specialization for graduate research include algebra, number theory, analysis, geometry, topology, logic and set theory, differential equations, dynamical systems, probability theory, optimization, combinatorial theory, biomathematics, and imaging. Faculty and graduate students in mathematics interact with counterparts in biology, biostatistics, computer science, industrial and systems engineering, philosophy, statistics, and the Emerging Pathogens Institute. The department houses the Center for Applied Mathematics and participates in the Center for Applied Optimization.

Aside from the regularly scheduled courses, the department offers a variety of seminars and special topics courses which engage faculty and graduate students at the frontiers of research.

For more information, please see the program page below or our website: <http://www.math.ufl.edu>.

Majors

- Mathematics (p. 245)

Faculty

Professor

- Alladi, Krishnaswami
- Berkovich, Alexander
- Bona, Miklos
- Bubenik, Peter
- Garvan, Francis G.
- Glover, Joseph
- Jury, Michael Thomas
- Knudson, Kevin P.
- Martcheva, Maia
- McCullough, Scott A.
- Pilyugin, Sergei S.
- Robinson, Paul L.
- Rong, Libin
- Shabanov, Sergei
- Sin, Peter K.
- Singer, Burton H.
- Turull, Alexandre

- Vatter, Vincent
- Vince, Andrew J.
- Zapletal, Jindrich

Associate Professor

- Bartosova, Dana
- Crew, Richard Malcolm
- Di Cerbo, Luca Fabrizio
- Groisser, David Joel
- Hamaker, Zachary
- Keating, Kevin P.
- Ngonghala, Calistus
- Pollock, Sara N.
- Tucker-Drob, Robin
- Yu, Cheng
- Zhang, Lei

Assistant Professor

- Adams, Henry
- Booher, Jeremy
- Evert, Eric M.
- Hafuta, Yeor
- Jiang, Nan
- Marsiglietti, Arnaud
- Park, Youngmin
- Wagner, Hubert
- Wang, Chunmei
- Wheeler, Tracy Stepien

Distinguished Professor

- Dranishnikov, Alexander Nikolae
- Hager, William Ward

Affiliated Faculty

- Laubenbacher, Reinhard Christian
Professor
- Moore, Helen
Associate Professor

Mathematics

Program Information

The Department of Mathematics offers the degrees of Doctor of Philosophy, Master of Science, and the Master of Arts in Teaching and Master of Science in Teaching, each with a major in mathematics. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees (p. 778) section of this catalog.

The Department has an accelerated bachelor's/master's program designed for superior undergraduate students who have the ability to pursue such a plan of study leading to the Master of Science degree. The main feature of the program is that up to 12 semester hours of approved graduate level mathematics courses may be used as dual credit for both the undergraduate and the graduate degree. All other requirements for both the bachelor's degree and the master's degree must be met.

For admission requirements for this program, see the undergraduate coordinator.

There are opportunities for concentrated study in a number of specific areas of pure and applied mathematics at both the master's and doctoral levels. The faculty directs studies and research in algebra, number theory, analysis, geometry, topology, logic and set theory, differential equations, dynamical systems, probability theory, optimization, combinatorial theory, biomathematics, and imaging.

In addition to the requirements of the Graduate School, the minimum prerequisite for admission to the program of graduate studies in mathematics is the completion, with an average grade of B or better, of at least 24 credits of undergraduate mathematics, including a full year of calculus and three semesters of appropriate work beyond the calculus. The most appropriate courses for this purpose are advanced calculus, linear algebra and abstract algebra. Students lacking part of the requirements will be required to make up the deficiency early in their graduate work.

Prerequisites to individual courses should be determined before registration by consultation with the instructor concerned. Some of the courses listed are offered only as needed. Since times of offering courses are estimated a year in advance, certain changes may be made if needs are known by the Department.

Students pursuing the master's degree in mathematics must pass two comprehensive written examinations, one in algebra and one in analysis or prepare and provide an oral defense of a thesis on original research conducted under the supervision of a faculty adviser. Students pursuing the Master of Arts in Teaching or the Master of Science in Teaching degree must prepare a teaching portfolio and pass an oral examination. Each of these programs normally requires two years for completion.

The requirements for a doctoral degree include 36 hours of 6000-level course work in mathematics; no hours of teaching, colloquium, dissertation, or individual work will count toward this requirement. To become a candidate for the doctoral degree, the student must pass a comprehensive preliminary examination with written and oral components administered by the Department. The doctoral student must also pass a reading knowledge examination in one of the following foreign languages: French, German, or Russian. The dissertation is an important requirement for the doctoral degree in mathematics. The topic for the dissertation may be chosen from a number of areas of current research in pure and applied mathematics.

Details concerning all requirements for graduate degrees in mathematics may be obtained by writing the Mathematics Department Graduate Selection Committee or consulting the Department website, <http://www.math.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Mathematics

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
- Master of Arts in Teaching
- Master of Science
- Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Mathematics Courses

Code	Title	Credits
MAA 5104	Advanced Calculus for Engineers and Physical Scientists I	3
MAA 5105	Advanced Calculus for Engineers and Physical Scientists II	3
MAA 5228	Modern Analysis I	3
MAA 5229	Modern Analysis II	3
MAA 5404	Introduction to Complex Variables for Engineers and Physical Scientists	3
MAA 6406	Complex Analysis I	3
MAA 6407	Complex Analysis II	3
MAA 6616	Analysis I	3
MAA 6617	Analysis II	3
MAA 7526	Advanced Topics in Functional Analysis I	3
MAA 7527	Advanced Topics in Functional Analysis II	3
MAD 6206	Combinatorial Theory I	3
MAD 6207	Combinatorial Theory II	3
MAD 6406	Numerical Linear Algebra	3
MAD 6407	Numerical Analysis	3
MAD 7396	Topics in Combinatorial Theory I	3
MAD 7397	Topics in Combinatorial Theory II	3
MAE 6940	Supervised Teaching	1-5
MAE 6943	Internship in College Teaching	3
MAP 5304	Intermediate Differential Equations for Engineers and Physical Scientists	3
MAP 5345	Introduction to Partial Differential Equations	3
MAP 5489	Modeling in Mathematical Biology	3
MAP 6208	Numerical Optimization	3
MAP 6327	Applied Differential Equations I	3
MAP 6356	Partial Differential Equations I	3
MAP 6357	Partial Differential Equations II	3
MAP 6375	Numerical Partial Differential Equations	3
MAP 6376	Finite Element Method	3
MAP 6467	Stochastic Differential Equations and Filtering Theory I	3
MAP 6468	Stochastic Differential Equations and Filtering Theory II	3
MAP 6472	Probability and Potential Theory I	3
MAP 6473	Probability and Potential Theory II	3
MAP 6487	Biomathematics Seminar I	3
MAP 6488	Biomathematics Seminar II	3
MAP 6505	Mathematical Methods of Physics and Engineering	3
MAP 6506	Mathematical Methods of Physics and Engineering II	3
MAP 6941	Internship in Applied Mathematics	1-5
MAP 7436	Seminar in Applied Mathematics I	3
MAP 7437	Seminar in Applied Mathematics II	3
MAS 5311	Introductory Algebra I	3
MAS 5312	Introductory Algebra II	3
MAS 6331	Algebra I	3
MAS 6332	Algebra II	3
MAS 7215	Theory of Numbers I	3
MAS 7216	Theory of Numbers II	3
MAS 7396	Advanced Topics in Algebra I	3
MAS 7397	Topics in Algebra II	3

MAT 6905	Individual Work	3	MAP 6488	Biomathematics Seminar II	3
MAT 6910	Supervised Research	1-5	MAP 6505	Mathematical Methods of Physics and Engineering	3
MAT 6932	Special Topics in Mathematics	3	MAP 6506	Mathematical Methods of Physics and Engineering II	3
MAT 6971	Research for Master's Thesis	1-15	MAP 6941	Internship in Applied Mathematics	1-5
MAT 7979	Advanced Research	1-12	MAP 7436	Seminar in Applied Mathematics I	3
MAT 7980	Research for Doctoral Dissertation	1-15	MAP 7437	Seminar in Applied Mathematics II	3
MHF 5107	Introduction to Set Theory	3	MAS 5311	Introductory Algebra I	3
MHF 5207	Foundations of Mathematics	3	MAS 5312	Introductory Algebra II	3
MHF 6306	Mathematical Logic I	3	MAS 6331	Algebra I	3
MTG 5316	Introduction to Topology I	3	MAS 6332	Algebra II	3
MTG 5317	Introduction to Topology II	3	MAS 7215	Theory of Numbers I	3
MTG 6256	Differential Geometry I	3	MAS 7216	Theory of Numbers II	3
MTG 6257	Differential Geometry II	3	MAS 7396	Advanced Topics in Algebra I	3
MTG 6346	Topology I	3	MAS 7397	Topics in Algebra II	3
MTG 6347	Topology II	3	MAT 6905	Individual Work	3
MTG 6401	Ergodic Theory and Dynamical Systems I	3	MAT 6910	Supervised Research	1-5
MTG 6402	Ergodic Theory and Dynamical Systems II	3	MAT 6932	Special Topics in Mathematics	3
MTG 7396	Advanced Topics in Topology I	3	MAT 6971	Research for Master's Thesis	1-15

Mathematics Departmental Courses

Code	Title	Credits	
MAA 5104	Advanced Calculus for Engineers and Physical Scientists I	3	
MAA 5105	Advanced Calculus for Engineers and Physical Scientists II	3	
MAA 5228	Modern Analysis I	3	
MAA 5229	Modern Analysis II	3	
MAA 5404	Introduction to Complex Variables for Engineers and Physical Scientists	3	
MAA 6406	Complex Analysis I	3	
MAA 6407	Complex Analysis II	3	
MAA 6616	Analysis I	3	
MAA 6617	Analysis II	3	
MAA 7526	Advanced Topics in Functional Analysis I	3	
MAA 7527	Advanced Topics in Functional Analysis II	3	
MAD 6206	Combinatorial Theory I	3	
MAD 6207	Combinatorial Theory II	3	
MAD 6406	Numerical Linear Algebra	3	
MAD 6407	Numerical Analysis	3	
MAD 7396	Topics in Combinatorial Theory I	3	
MAD 7397	Topics in Combinatorial Theory II	3	
MAE 6940	Supervised Teaching	1-5	
MAE 6943	Internship in College Teaching	3	
MAP 5304	Intermediate Differential Equations for Engineers and Physical Scientists	3	
MAP 5345	Introduction to Partial Differential Equations	3	
MAP 5489	Modeling in Mathematical Biology	3	
MAP 6208	Numerical Optimization	3	
MAP 6213	Variational Analysis	3	
MAP 6327	Applied Differential Equations I	3	
MAP 6356	Partial Differential Equations I	3	
MAP 6357	Partial Differential Equations II	3	
MAP 6375	Numerical Partial Differential Equations	3	
MAP 6376	Finite Element Method	3	
MAP 6467	Stochastic Differential Equations and Filtering Theory I	3	
MAP 6468	Stochastic Differential Equations and Filtering Theory II	3	
MAP 6472	Probability and Potential Theory I	3	
MAP 6473	Probability and Potential Theory II	3	
MAP 6487	Biomathematics Seminar I	3	

Student Learning Outcomes

mathematics (PHD)

- SLO 1 Knowledge**
Describes and explains advanced knowledge of at least one chosen specialty and conducts research in it.
- SLO 2 Skills**
Communicates mathematical thinking through clear and compelling arguments to faculty, peers and others.
- SLO 3 Professional Behavior**
Teaches mathematical courses in a professional manner, assessing the appropriate level of presentation for the students, creating an atmosphere conducive to learning, and supporting student-teacher interactions for active learning

Mathematics (MAT)

- SLO 1 Knowledge**
Demonstrates content knowledge relevant to mathematics teaching
- SLO 2 Skills**
Communicates mathematics effectively through prior organization of material, effective use of the blackboard or other presentation media,

compelling choice of illustrative examples, and emphasis on methods of solving problems rather than on presenting solutions

SLO 3 Professional Behavior

Prepares for lessons; arrives on time; conducts themselves appropriately

Mathematics (MS)

SLO 1 Knowledge

Depth: Either solves problems in two areas from algebra/analysis/applied/topology or conducts research in mathematics at the master's level

SLO 2 Skills

Writes extended mathematical prose to the precision required by the discipline and supports mathematical arguments with logical reasoning

SLO 3 Professional Behavior

Teaches mathematical courses in a professional manner, assessing the appropriate level of presentation for the students, creating an atmosphere conducive to learning, and supporting student-teacher interactions for active learning

Mathematics (MST)

SLO 1 Knowledge

Describes and explains content knowledge relevant to mathematics and teaching

SLO 2 Skills

Communicates mathematics effectively through prior organization of material, effective use of the blackboard or other presentation media, compelling choice of illustrative examples, and emphasis on methods of solving problems rather than on presenting solutions

SLO 3 Professional Behavior

Prepares for lessons; arrives on time; conducts themselves appropriately

Philosophy Department

Chair: J. Palmer

Graduate Coordinator: S. Duncan

The Philosophy Department offers the Master of Arts and the Doctor of Philosophy degrees. General requirements for these degrees are described in the Graduate Degrees (p. 778) section of this catalog, and program-specific requirements are provided on the Philosophy Program page.

The Department is dedicated both to pursuing high quality research and providing a rigorous education to its graduate students, whether pursuing just the M.A. or the Ph.D. Faculty provide philosophical expertise in a wide variety of areas, including ancient philosophy, modern philosophy, ethical theory, political theory, ethics of technology, bioethics, philosophy of education, metaphysics, epistemology, philosophy of mind, philosophy of logic, philosophy of science, philosophy of social science, philosophy of language, argument theory and Continental philosophy. For a full and updated list of areas of research see the pages of individual faculty (<http://www.phil.ufl.edu/people.html?cat=faculty>).

The M.A. program is suitable for those planning or considering a Ph.D. in Philosophy, for those who hope to gain an advanced degree prior to pursuing professional degrees in such fields as law and medicine, and for those who are considering advanced work in related fields such as

linguistics, classical studies, religious studies, psychology, and political science.

The Ph.D. program is suitable for those planning to pursue an academic career, including both those focused more on research and those focused more on teaching. Graduates should expect to be trained in doing high quality research in philosophy, to be mentored in the practice of teaching, and to have opportunities for teaching in a broader array of contexts that should serve well the ability to teach courses in writing and the humanities more generally.

For more information, please see the program page as well as our website at <http://phil.ufl.edu>.

Majors

- Philosophy (p. 249)

Faculty

Professor

- Buckner, Cameron Joseph
- Palmer, John Anderson
- Ray, Gregory Brian

Associate Professor

- Ahlberg, Jaime
- Dorst, Christopher
- Purves, Duncan W.
- Witmer, Gene

Assistant Professor

- Beddor, Robert
- Gardner, Molly Elizabeth
- Goldhaber, Charles Abraham
- Grant, David Michael
- Robitzsch, Jan Maximilian
- Ross, Amber M.

Other

- Grant, Lyndal Jennifer
- Rothschild, Nathan

Lecturer

- Borges, Rodrigo
- Pismenny, Arina
- Rick, Jonathan D.

Affiliated Faculty

- McPherson, David Lee
Professor

Philosophy

Program Information

The Department of Philosophy offers graduate degree programs leading to the M.A. and the Ph.D. degrees in Philosophy.

Graduate students enjoy a supportive community. Teaching assistants are provided with shared office space, and most graduate students participate in organizing a yearly conference, the Southeast Graduate Philosophy conference (for more information, see <http://www.phil.ufl.edu/seg> (<http://www.phil.ufl.edu/seg/>)).

Admission to either program requires either a bachelor's degree in philosophy or sufficient course work in philosophy as determined by the department. Applicants to either program are evaluated on the basis of their academic record, GRE scores, three letters of recommendation, a statement of purpose, and a writing sample. Students admitted into the Ph.D. program who do not already have an M.A. in Philosophy must complete the coursework requirements for the M.A. as part of their first two years of full-time enrollment in the Ph.D. program.

General Program Information

All graduate students must take in their first fall semester of enrollment the Graduate Proseminar (PHI 5935 Proseminar (3 cr.)), an intensive workshop requiring regular writing and presentation of philosophical papers; they must also take in that first year the foundational course on Graduate Logic (PHI 5135 Graduate Logic (3 cr.)). These two critical courses help ensure success in the core curriculum, which is designed to provide a thorough grounding in the three main divisions of philosophical work: history, value theory, and the various areas known together as M&E ("metaphysics and epistemology").

Additional core courses include surveys in ancient philosophy (PHP 5005 Ancient Philosophy I (3 cr.) and PHP 5015 Ancient Philosophy II (3 cr.)), in modern philosophy (PHH 5405 Modern Philosophy I (3 cr.) and PHH 5406 Modern Philosophy II (3 cr.)), ethical theory (PHI 5665 Ethical Theory (3 cr.)), epistemology (PHI 5365 Epistemology (3 cr.)) and foundations of analytic philosophy (PHP 5785 Foundations of Analytic Philosophy (3 cr.)).

M.A. Program Information

The M.A. degree requires 36 hours of coursework, which can be completed in two years by registering for 9 credits each fall and spring semester. Distribution requirements mandate a selection of core courses and 6000-level seminars, while electives make up 6 hours of coursework. Requirements include an oral Final Exam administered by a group of faculty selected by the Graduate Studies Committee.

Ph.D. Program Information

The Ph.D. requires 90 credit hours, which may include 36 used for the M.A., additional courses at the 6000-level, 3 proposal research hours, 12 doctoral research hours, and the successful completion and defense of a dissertation. In completing the Ph.D. advanced students will normally have an opportunity to teach their own undergraduate courses under the supervision of faculty as well as to work as a Teaching Assistant in many other courses.

Funding

Funding for graduate students is provided primarily by Teaching Assistantships. Newer teaching assistants assist with lower level courses (such as Introduction to Philosophy and Contemporary Moral

Issues) and more experienced teaching assistants may assist with more advanced courses. M.A. students who have demonstrated exceptional teaching capabilities may have the chance to teach their own course during the summer after they have completed all course requirements for the degree. Advanced Ph.D. students more regularly get these opportunities, during the fall and spring semesters as well as the summer.

Some funding for supporting graduate student travel to conferences is available.

Further Information

For more information about the department in general, see its website at <http://phil.ufl.edu>.

More details about the M.A. and Ph.D. programs, their requirements, policies, and procedures, may be found at <http://phil.ufl.edu/grad/grad-program.html>.

Prospective students can find detailed information on the admissions process at <http://phil.ufl.edu/grad.html?page=prospective>.

Questions and requests for help can be directed to the Graduate Coordinator, who may be reached at gradcoord@phil.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Philosophy

- Doctor of Philosophy
 - without a concentration
 - concentration in Ethics of Technology
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Philosophy Courses

Code	Title	Credits
PHH 5405	Modern Philosophy I	3
PHH 5406	Modern Philosophy II	3
PHH 5605	Studies in Continental Philosophy	3
PHH 6105	Seminar in Ancient Philosophy	3
PHH 6425	Seminar in Modern Philosophy	3
PHI 5135	Graduate Logic	3
PHI 5225	Philosophy of Language	3
PHI 5325	Philosophy of Mind	3
PHI 5365	Epistemology	3
PHI 5405	Philosophy of Science	3
PHI 5425	Philosophy of Social Science	3
PHI 5505	Metaphysics	3
PHI 5665	Ethical Theory	3
PHI 5905	Individual Work	1-6
PHI 5934	Topics in Philosophy	3
PHI 5935	Proseminar	3
PHI 6105	Seminar in Logic	3
PHI 6226	Seminar in Philosophy of Language	3
PHI 6306	Seminar in Epistemology	3
PHI 6326	Seminar in Philosophy of Mind	3
PHI 6406	Seminar in Philosophy of Science	3

PHI 6506	Seminar in Metaphysics	3
PHI 6667	Seminar in Ethics	3
PHI 6905	Individual Work	1-9
PHI 6910	Supervised Research	1-5
PHI 6934	Special Topics	1-4
PHI 6940	Supervised Teaching	1-5
PHI 7979	Advanced Research	1-6
PHI 7980	Research for Doctoral Dissertation	1-15
PHP 5005	Ancient Philosophy I	3
PHP 5015	Ancient Philosophy II	3
PHP 5785	Foundations of Analytic Philosophy	3
PHP 6415	Seminar in Kant	3
PHP 6795	Seminar in Analytic Philosophy	3
PHP 6930	Seminar in School or Thinker	3

Philosophy Departmental Courses

Code	Title	Credits
PHH 5405	Modern Philosophy I	3
PHH 5406	Modern Philosophy II	3
PHH 5605	Studies in Continental Philosophy	3
PHH 6105	Seminar in Ancient Philosophy	3
PHH 6425	Seminar in Modern Philosophy	3
PHI 5135	Graduate Logic	3
PHI 5225	Philosophy of Language	3
PHI 5325	Philosophy of Mind	3
PHI 5365	Epistemology	3
PHI 5405	Philosophy of Science	3
PHI 5425	Philosophy of Social Science	3
PHI 5505	Metaphysics	3
PHI 5665	Ethical Theory	3
PHI 5696	Ethics and Emerging Technology	3
PHI 5905	Individual Work	1-6
PHI 5934	Topics in Philosophy	3
PHI 5935	Proseminar	3
PHI 6105	Seminar in Logic	3
PHI 6226	Seminar in Philosophy of Language	3
PHI 6306	Seminar in Epistemology	3
PHI 6326	Seminar in Philosophy of Mind	3
PHI 6406	Seminar in Philosophy of Science	3
PHI 6506	Seminar in Metaphysics	3
PHI 6639	Topics in Ethics of Technology	3
PHI 6667	Seminar in Ethics	3
PHI 6698	Bioethics and Biotechnology	3
PHI 6699	Ethics, AI, and Data	3
PHI 6905	Individual Work	1-9
PHI 6910	Supervised Research	1-5
PHI 6934	Special Topics	1-4
PHI 6940	Supervised Teaching	1-5
PHI 7979	Advanced Research	1-6
PHI 7980	Research for Doctoral Dissertation	1-15
PHP 5005	Ancient Philosophy I	3
PHP 5015	Ancient Philosophy II	3
PHP 5785	Foundations of Analytic Philosophy	3
PHP 6415	Seminar in Kant	3
PHP 6795	Seminar in Analytic Philosophy	3
PHP 6930	Seminar in School or Thinker	3

Acquire specialist knowledge of one or more recognized major subfields in philosophy, understood to include the following areas, divided into the three broad categories of history, theoretical philosophy, and matters of value: history (ancient, medieval, modern, 19th century, 20th century); theoretical (metaphysics, epistemology, philosophy of science, philosophy of mind, philosophy of language); value (normative ethics, meta-ethics, aesthetics, political)

SLO 2 Original Advanced Research

Pursue an original and sustained line of philosophical research that results in a contribution to the body of philosophical knowledge

SLO 3 Professional Presentation

Produce original research and prepare it in a way that makes it adequate for presentation at a professional conference

SLO 4 Professional-level Course Design and Teaching

Design, teach, and manage an undergraduate course in philosophy entirely on one's own

SLO 5

Participate in such professional activities as (i) publishing in a professional journal; (ii) presenting work at a conference; (iii) commenting on someone else's work at a conference; (iv) refereeing submissions for a professional conference; (v) helping with the organization of a conference, including referee work, invitations for speakers, and the like.

Philosophy (MA)

SLO 1 Core Competence

Identify, describe and explain key aspects of ancient Greek philosophy, the modern era (1600-1900), and core areas of contemporary philosophy

SLO 2 Formal Logic

Employ and understand the tools of contemporary formal logic, including first-order predicate calculus and a substantial portion of meta-logical theory

SLO 3 Research Skills

Read and comprehend contemporary philosophical work, present such work to others, analyze and critically evaluate the arguments therein, and formulate one's own position clearly and defend it in the context of philosophical discussion

SLO 4 Teaching Skills

Present philosophical material in a lucid and concise fashion to audiences of varying backgrounds, lead discussions of philosophical material in a way that encourages clear and original thinking about the issues, and assess undergraduate work in philosophy classes, including grading written work for clarity of expression, comprehension of material, and cogency of argument

Physics Department

Chair: K. Ingersent

Graduate Coordinator: X. Zhang

The Department of Physics offers the Master of Science (thesis or non-thesis) and the Doctor of Philosophy degrees. The non-thesis Master of Science in Teaching is also offered. General requirements for these degrees are described in the Graduate Degrees (p. 778) section of this catalog. Program specific requirements are listed under Physics

Student Learning Outcomes

Philosophy (PHD)

SLO 1 Specialist Knowledge

(p. 252) and can be found on our website (<http://www.phys.ufl.edu/academics/graduate/degrees.shtml/>).

Areas of specialization for graduate research include astrophysics and cosmology, atomic and molecular physics, biological physics, chemical physics, condensed matter physics (theory and experiment), nuclear physics, particle physics (theory and experiment), statistical physics, and low temperature physics.

Special interdisciplinary research programs include the Institute for Fundamental Theory (carried out jointly with the Department of Mathematics), the Institute for Theoretical and Computational Studies in Molecular and Materials Science (also known as the Quantum Theory Project or QTP, carried out jointly with Chemistry, Materials Science and Engineering, and Computer and Information Science and Engineering Departments), the Institute of High Energy and Particle Astrophysics, and Microfabritech (jointly with the College of Engineering). The Center for Condensed Matter Sciences provides opportunities for investigations in a diverse range of subjects and fields, including the Microkelvin Research Laboratory. The University of Florida operates the National High Magnetic Field Laboratory jointly with Florida State University and Los Alamos National Laboratory.

For more information, please see the program page below, and visit our website: <http://www.phys.ufl.edu>.

Majors

- Physics (p. 252)

Faculty

Professor

- Biswas, Amlan
- Hagen, Stephen James
- Hershfield, Selman Philip
- Ingersent, James K.
- Klimenko, Serguei Grigorievich
- Korytov, Andrey
- Lee, Yoonseok
- Maslov, Dmitrii
- Meisel, Mark W.
- Mueller, Guido
- Muttalib, Khandker A.
- Ray, Heather
- Rinzler, Andrew Gabriel
- Stanton, Christopher Jay
- Stewart, Gregory R.
- Takano, Yasumasa
- Woodard, Richard P.
- Yelton, John M.
- Zhang, Xiaoguang

Associate Professor

- Bartos, Imre
- Blecha, Laura E.
- Fulda, Paul James
- Furic, Ivan Kresimir

- Hamlin, James Jeffrey
- Saab, Tarek
- Wang, Yuxuan

Assistant Professor

- Andrews, Jeffrey J.
- Birzu Chu, Gabriel
- Chang, Philip
- Dror, Asaf Jeff
- Houtz, Rachel
- Jia, Chunjing
- Laroche, Dominique
- Pedrozo Penafiel, Edwin Eduardo
- Takahashi, Yuta
- Xu, Siyao
- Xue, BingKan
- Xue, Wei
- Yu, Jiabin
- Zhang, Xiao-Xiao

Assistant Scientist

- Gazizulin, Rasul

Distinguished Professor

- Hirschfeld, Peter J.
- Mitselmakher, Guenakh
- Sullivan, Neil S.
- Tanner, David B.

Research Professor

- Konigsberg, Jacobo
- Will, Clifford Martin

Courtesy Professor

- Eikenberry, Stephen Scott

Associate Scientist

- Steinke, Lucia

Affiliated Faculty

- Bhaduri-McIntosh, Sumita Professor
- Feng, Philip Professor
- Hennig, Richard Professor
- Mareci, Thomas H. Professor
- Narayanan, Desika T. Associate Professor
- Rakov, Vladimir Aleksandrovich Distinguished Professor
- Roitberg, Adrian E. Professor

- Shabanov, Sergei
Professor

Physics

Program Information

The Department of Physics is dedicated to advancing the forefronts of knowledge in both pure and applied physics, thus providing an exciting intellectual climate for our graduate students. Our research activities include astrophysics (particle astrophysics, cosmology and gravitation), condensed matter and materials physics (experimental, theoretical and computational), low temperature physics, elementary particle physics (experimental and theoretical) and biological physics. With such diversity in research offerings you will have an opportunity to pursue research in most areas of contemporary physics. In spite of the size of our Department, we are committed to designing a program of graduate study that is tailored to your experience and interests. Our Graduate Coordinator sees that each of our graduate students receives personal attention and advice as they progress toward their advanced degree.

Graduate Program Overview

Preliminary Examination

- Covers undergraduate subject matter
- Given twice a year; two years to complete

Graduate Core Courses

- Two semesters of quantum mechanics
- Two semesters of electromagnetism
- One semester of classical mechanics
- One semester of statistical mechanics
- Waivers given for equivalent
- Work at other institutions
- Completed in first or second years

Distribution Requirement

- Advanced course work in three subfields
- Usually completed by the end of the second year

Highlights

- Involvement in research in first summer (or sooner)!
- Diversity of research interdisciplinary options!
- Individualized program designed to meet the unique background of each student!

For more information, please see our website: <http://www.physics.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Physics

- Doctor of Philosophy
 - without a concentration
 - concentration in Imaging Science and Technology
- Master of Science
- Master of Science in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Physics Courses

Code	Title	Credits
PHY 5905	Individual Work	1-4
PHY 6246	Classical Mechanics	3
PHY 6346	Electromagnetic Theory I	3
PHY 6347	Electromagnetic Theory II	3
PHY 6536	Statistical Mechanics I	3
PHY 6555C	Cryogenics	4
PHY 6645	Quantum Mechanics I	3
PHY 6646	Quantum Mechanics II	3
PHY 6648	Quantum Field Theory I	3
PHY 6905	Individual Work	1-4
PHY 6910	Supervised Research	1-5
PHY 6920	Departmental Colloquium	1
PHY 6932	Seminar in Molecular and Computational Physics	1
PHY 6943	Internship in College Teaching	2-4
PHY 6971	Research for Master's Thesis	1-15
PHY 7097	Advanced Topics in Theoretical Physics	3
PHY 7669	Quantum Field Theory II	3
PHY 7979	Advanced Research	1-12
PHY 7980	Research for Doctoral Dissertation	1-15
PHZ 5155C	Physical Modeling and Simulation	3
PHZ 5354	Introduction to Particle Physics	3
PHZ 6355	Elementary Particle Physics I	3
PHZ 6358	Standard Model of Elementary Particles I	3
PHZ 6391	Seminar in Astrophysics	1
PHZ 6392	Seminar in Particle Physics	1
PHZ 6426	Solid State I	3
PHZ 6493	Seminar in Condensed Matter Physics	1
PHZ 6607	Special and General Relativity	3
PHZ 7357	Elementary Particle Physics II	3
PHZ 7359	Standard Model of Elementary Particles II	3
PHZ 7427	Solid State II	3
PHZ 7428	Modern Condensed Matter Physics	3
PHZ 7429	Phases of Condensed Matter	3
PHZ 7608	Special and General Relativity II	3

Physics Departmental Courses

Code	Title	Credits
PHY 5905	Individual Work	1-4
PHY 6246	Classical Mechanics	3
PHY 6346	Electromagnetic Theory I	3
PHY 6347	Electromagnetic Theory II	3
PHY 6536	Statistical Mechanics I	3
PHY 6555C	Cryogenics	4
PHY 6645	Quantum Mechanics I	3
PHY 6646	Quantum Mechanics II	3
PHY 6648	Quantum Field Theory I	3
PHY 6905	Individual Work	1-4
PHY 6910	Supervised Research	1-5
PHY 6920	Departmental Colloquium	1
PHY 6932	Seminar in Molecular and Computational Physics	1
PHY 6943	Internship in College Teaching	2-4
PHY 6971	Research for Master's Thesis	1-15
PHY 7097	Advanced Topics in Theoretical Physics	3
PHY 7669	Quantum Field Theory II	3
PHY 7979	Advanced Research	1-12

PHY 7980	Research for Doctoral Dissertation	1-15
PHZ 5155C	Physical Modeling and Simulation	3
PHZ 5354	Introduction to Particle Physics	3
PHZ 6355	Elementary Particle Physics I	3
PHZ 6358	Standard Model of Elementary Particles I	3
PHZ 6391	Seminar in Astrophysics	1
PHZ 6392	Seminar in Particle Physics	1
PHZ 6426	Solid State I	3
PHZ 6493	Seminar in Condensed Matter Physics	1
PHZ 6607	Special and General Relativity	3
PHZ 7357	Elementary Particle Physics II	3
PHZ 7359	Standard Model of Elementary Particles II	3
PHZ 7427	Solid State II	3
PHZ 7428	Modern Condensed Matter Physics	3
PHZ 7429	Phases of Condensed Matter	3
PHZ 7608	Special and General Relativity II	3

Student Learning Outcomes

physics

SLO 1 Knowledge

Students who graduate with a PhD in physics from our university are expected to have a very solid and broad understanding of all fundamental aspects of the physical sciences. They are expected to be able to apply their knowledge as well as logical thinking, analysis, and higher level mathematical concepts to many problems and issues well beyond physics.

SLO 2 Knowledge

Graduate students in our PhD program are expected to delve deeply into one or two specific research projects such that they are seen as world-leaders in this particular research area when they graduate. At the same time, they are expected to have a fairly broad knowledge in a variety of sub-field in physics.

SLO 3 Skills

Students are able to dissect complex systems or problems, discuss and analyze them.

SLO 4 Skills

Students publish articles in high impact journals in their specific area of work and present their results at national and international conferences.

SLO 5 Professional Behavior

Students will demonstrate ethical behavior, cultural sensitivity, and professional conduct, and will be able to communicate their work orally as well as in writing.

Plant Molecular and Cellular Biology Department

Plant Molecular and Cellular Biology (PMB) currently has 45 faculty members in the program. They are based in the departments of Agronomy (<http://agronomy.ifas.ufl.edu/>), Biology (<https://biology.ufl.edu/>), Environmental Horticulture (<https://hort.ifas.ufl.edu/>), Forest Resources and Conservation (<http://sfrc.ufl.edu/>), Horticultural Sciences (<https://hos.ifas.ufl.edu/>), Microbiology and Cell Science (<http://microcell.ufl.edu/>), Molecular Genetics and Microbiology (<http://mgm.ufl.edu/>), and Plant Pathology (<https://plantpath.ifas.ufl.edu/>) within the colleges of Agriculture and Life Sciences (<https://>

cals.ufl.edu/), Medicine (<https://med.ufl.edu/>), and Liberal Arts and Sciences (<http://web.clas.ufl.edu/>).

Majors

- Plant Molecular and Cellular Biology (CLAS) (p. 254)

Faculty

Affiliated Faculty

- Altpeter, Fredy
Professor
- Barbazuk, William Bradley
Professor
- Basset, Gilles J.
Associate Professor
- Ferl, Robert J.
Distinguished Professor
- Fernandez Garcia, Jessie
Assistant Professor
- Folimonova, Svetlana Yuryevna
Professor
- Folta, Kevin M.
Professor
- Gabriel, Dean W.
Professor
- Hanson, Andrew D.
Eminent Scholar
- Jones, Jeffrey B.
Distinguished Professor
- Kim, Jeongim J.
Associate Professor
- Kirst, Matias
Distinguished Professor
- Koch, Karen E.
Professor
- Levy, Amit
Associate Professor
- Liu, Tie
Assistant Professor
- Martins, Samuel J.
Assistant Professor
- Mccarty, Donald R.
Professor
- McIntyre, Lauren M.
Professor
- Mou, Zhonglin
Professor
- Munoz Del Valle, Patricio Ricardo
Associate Professor
- Nadakuduti, Satya Swathi
Assistant Professor
- Padilla, Kevin Begcy
Assistant Professor
- Paul, Annalisa
Research Professor
- Peter, Gary Frank
Professor

- Rathinasabapathi, Balasubramani
Professor
- Ribeiro De Resende, Marcio Fernando
Associate Professor
- Rollins, Jeffrey A.
Professor
- Soltis, Douglas Edward
Distinguished Professor
- Soltis, Pamela S.
Distinguished Professor
- Song, Wen-Yuan
Associate Professor
- Suzuki, Masaharu
Research Associate Professor
- Tieman, Denise M.
Research Associate Professor
- Vallejos, Carlos E.
Professor
- Vermerris, Willem
Professor
- VOINICIUC, CATALIN
Associate Professor
- Wang, Jianping
Professor
- Wang, Nian
Eminent Scholar
- Wang, Ying
Associate Professor
- Zhao, Meixia
Assistant Professor

Plant Molecular and Cellular Biology (CLAS)

Program Information

Director: Dr. Svetlana Folimonova
Graduate Coordinator: Dr. Gilles Basset
Program Coordinator: Eliana Kampf

Plant Molecular and Cellular Biology (PCMB) is an interdisciplinary and interdepartmental graduate degree program that emphasizes understanding the molecular and cellular mechanisms that mediate plant development, adaptation, and evolution. Students can pursue an M.S. or a Ph.D. degree through the PCMB program. All students complete core courses in Advanced Genetics, Plant Molecular Biology and Genomics, Plant Cellular and Developmental Biology, and Plant Biochemistry. In addition to the core classes, students can select from a variety of courses in biochemistry, molecular biology, physiology, breeding, genetics, evolution, microbiology, and plant pathology.

New students are exposed to a variety of faculty and experimental systems while they rotate through several laboratories during their first two semesters before selecting an adviser and dissertation research area. Both M.S. and Ph.D. students take four required courses:

PCB 5065 Advanced Genetics (4 cr.), PCB 5530 Plant Molecular Biology and Genomics (3 cr.), PCB 6528 Plant Cell and Developmental Biology (3 cr.) and BOT 6935 Special Topics (1-4 cr.), as well as journal colloquium

classes (PCB 7922 Journal Colloquy in Plant Molecular and Cellular Biology (1 cr.)). Additional elective courses are taken after approval by the student's supervisory committee. For additional information see <http://pmcb.ifas.ufl.edu>.

Successful candidates should have a strong interest in plant molecular and cellular mechanisms controlling development, metabolism, adaptation, and evolution. Applicants typically have a B.S. or M.S. in the agricultural, forestry, biological or chemical sciences.

Degrees Offered

Degrees Offered with a Major in Plant Molecular and Cellular Biology

- Doctor of Philosophy
 - without a concentration
 - concentration in Toxicology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Plant Molecular and Cellular Biology Courses

Code	Title	Credits
BOT 6935	Special Topics	1-4
PCB 5065	Advanced Genetics	4
PCB 5530	Plant Molecular Biology and Genomics	3
PCB 6528	Plant Cell and Developmental Biology	3
PCB 6910	Supervised Research	1-5
PCB 6937	Special Topics in Plant Molecular and Cellular Biology	1-4
PCB 6971	Research for Master's Thesis	1-15
PCB 7922	Journal Colloquy in Plant Molecular and Cellular Biology	1
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Plant molecular & Cellular biology (phd)

SLO 1 Knowledge
Describe and explain fundamental theories and concepts in plant biochemistry, cell and developmental biology, genetics and genomics, molecular biology and general plant biology.

SLO 2 Knowledge
Use critical thinking to evaluate research design and experiments.

SLO 3 Skills
Critically evaluate the primary scientific literature.

SLO 4 Skills
Complete plant biology research of sufficient quality to be published in peer-reviewed journals.

SLO 5 Skills
Communicate effectively using scientific writing and oral presentation skills.

SLO 6 Professional Behavior

Effectively work in teams with peers interacting honestly, ethically and with cultural sensitivity

Plant Molecular & Cellular Biology (MS)

SLO 1 Knowledge

Describe and explain fundamental theories and concepts in plant biochemistry, cell and developmental biology, genetics and genomics, molecular biology and general plant biology

SLO 2 Knowledge

Use critical thinking to evaluate research design and experiments

SLO 3 Skills

Critically evaluate the primary scientific literature

SLO 4 Skills

Develop practical experimental research skills

SLO 5 Skills

Communicate effectively using scientific writing and oral presentation skills

SLO 6 Professional Behavior

Effectively work in teams with peers interacting honestly, ethically and with cultural sensitivity

Political Science Department

Chair: D. Smith

Graduate Coordinator: M. Martinez

The Department of Political Science currently offers two graduate degrees: Master of Arts (thesis or non-thesis option) and Doctor of Philosophy. The political science–international relations program currently offers the Master of Arts (thesis or non-thesis option). Requirements for these degrees are given in the Graduate Degrees Section (p. 778) of this catalog. For further information, please contact the Political Science Department (<https://polisci.ufl.edu/>) or follow the hyperlinks below to more information about the specific programs offered.

Majors

- Political Science (p. 255)
- Political Science - International Relations (p. 258)

Faculty

Professor

- Anderson, Leslie Elin
- Arfi, Badredine
- Austin, Sharon Denise
- Conley, Richard Steven
- Craig, Stephen C.
- Kreppel, Amie D.
- Martinez, Michael D.
- McDonald, Michael
- Moraski, Bryon J.
- O'Dwyer, Conor
- O'Neill, Daniel
- Siroky, Lenka Bustikova

- Siroky, David S.
- Smith, Benjamin B.
- Smith, Daniel A.
- Villalon, Leonardo Alfonso

Associate Professor

- Elischer, Sebastian
- Hozic, Aida A.
- Kerr, Nicholas Nathan
- Oren, Ido
- Rosenberg, Andrew Samuel
- Rosenson, Beth Ann
- Selden, Zachary Alan
- Sohn, Patricia Janice
- Wang, Zhiyuan

Assistant Professor

- Alarian, Hannah M.
- Goldberg, Lindsey A.
- Janusz, Andrew James
- Liou, Stacey Michelle
- Macdonald, David T.
- Perez Munoz, Cristian David
- Reller, Cassidy S.
- Restrepo Sanin, Juliana
- Truscott, Jake Stanton
- Uttermark, Matthew J.

Eminent Scholar

- Bernhard, Michael H.

Distinguished Professor

- Thiele, Leslie Paul

Senior Lecturer

- McDonald, Suzanne M.
- Suarez Carrasquillo, Carlos Alberto

Affiliated Faculty

- Johns, Tracy Lynn
Lecturer
- Kaufman, Zachary
Professor

Political Science

Program Information

The Department of Political Science currently offers two graduate degrees: Master of Arts (thesis or non-thesis option) and Doctor of Philosophy. The political science–international relations program currently offers the Master of Arts (thesis or non-thesis option). Requirements for these degrees are given in the Graduate Degrees Section (p. 778) of this catalog. For further information about international relations, please contact the Political Science Department

(<https://polisci.ufl.edu/>) or visit their departmental page in this catalog (p. 255).

Admission to graduate study in the Department of Political Science normally requires the completion of an undergraduate major in political science or its equivalent. Students without this preparation may be required to make up deficiencies early in their graduate work. The core sequence begins in the fall term, providing basic knowledge that students need in later semesters. In evaluating candidates for admission, the Department considers

- Prior academic achievement
- GRE scores
- Letters of recommendation from three faculty members or others familiar with the academic potential or work habits of the applicant
- A statement of purpose that conveys intellectual ambitions, indicates how the program of study satisfies the student's interests and goals, and tells how the student would contribute to the program.

Fields of specialization offered by the Department include American government and politics, comparative politics, international relations, public policy, political theory, political behavior, and political methodology.

Master of Arts: The M.A. curricula are designed to serve students who want to pursue goals of an advanced general education, to gain skills and knowledge suitable for various types of public or private employment, or to prepare for further work at the doctoral level. M.A. students are required to complete POS 6736 The Conduct of Inquiry (3 cr.) and either POS 6737 Political Data Analysis (3 cr.) or STA 6126 Statistical Methods in Social Research I (3 cr.). Students may complete their M.A. degrees with or without writing a thesis. Students pursuing the thesis option must complete 30 hours of graduate course work. The thesis is expected to be of length and quality comparable to papers presented at professional academic conferences or published in academic journals. Students pursuing the non-thesis option must complete 36 semester hours of graduate course work and defend two qualifying papers. For both M.A. options, course work in political science, exclusive of core courses, must include a minimum of two graduate-level courses in one field of political science.

The M.A. degree may be taken in conjunction with the following certificate programs:

- Political campaigning
- Public affairs

Students in these certificate programs pursue the non-thesis option.

Public affairs: This program trains students for leadership positions in state, local, and national governments as well as for careers in nonprofit organizations by providing students with knowledge and skills in the areas of organization behavior, public budgeting and finances, public management, policy analysis, program evaluation, and computer applications. The curriculum consists of seminars in political science, public administration, public policy, process, state and local politics, and research methods. Supervised internships in selected agencies in Florida are arranged by the Department of Political Science as an integral part of the training program. This specialization requires 39 hours of course work plus satisfactory completion of a 3-hour internship at the discretion of the Department. Students must also defend a final management-policy paper that incorporates analytical and substantive expertise. Graduates of the program serve in a variety of professional positions, including city managers, heads of municipal departments, directors of nonprofit

organizations, analysts for the state legislature, and budget analysts for the federal government. In addition to the M.A. degree in political science, students receive the Certificate in Public Affairs.

Political campaigning: The program is designed to provide students with the basic political skills, insights, and experience that are critical for success in the rapidly changing profession of politics and political consulting. The program combines an awareness of the academic literature on mass and elite behavior with exposure to the increasingly sophisticated techniques used by campaigns. Students take a total of 39 hours from four major areas:

- Courses required of all M.A. students
- Courses oriented to practical aspects of political campaigning and governmental affairs (lobbying), including a 3-credit campaign-related internship
- Courses placing campaigns and elections in the broader context of American politics
- Related courses offered by the College of Journalism and Communications

Entry-level jobs have included such positions as legislative aide, campaign (or deputy campaign) manager, polling analyst, state party political coordinator, general campaign consultant, and media relations. With additional experience, some former students have gone on to become state legislator (and later, member of the U.S. House of Representatives), deputy chief of staff to the governor of Florida, partner in a major Washington area polling firm, assistant to the Minister of Justice and Attorney General of Canada, and head lobbyist for a nationwide restaurant chain. In addition to the M.A. degree in political science, students receive the Certificate in Political Campaigning.

Law/Public Affairs joint degree program: This program culminates in the Master of Arts in political science and Juris Doctor degrees. A joint degree program culminating in the Master of Arts in political science international relations and Juris Doctor degrees is also available. The joint program enables students to earn both the J.D. and the M.A. in less time than would be required to earn both degrees consecutively. Full-time students who make satisfactory progress can usually earn both degrees in 4 years. Candidates for the joint degree program must meet the entrance requirements for, and be admitted to, both the College of Law and the Department of Political Science. These requirements include both the LSAT and the GRE. Students are encouraged to announce their intent of seeking a joint degree as soon as possible. The Department of Political Science will allow 12 hours of appropriate law school courses to be credited toward the M.A. degree. The 12 credits selected from the law curriculum must be approved by the Political Science graduate coordinator on the recommendation of the student's supervisory committee. The College of Law will permit 12 hours of credit earned in political science graduate courses to be credited toward the J.D. degree. Students in the joint degree program are permitted, but not required, to pursue a companion certificate program in public affairs or political campaigning.

Combination bachelor's/master's degree program: This combination program is designed for superior students who have the ability to pursue an accelerated program leading to the Bachelor of Arts and the Master of Arts degrees in political science or political science international relations.

Up to 12 semester hours of approved graduate-level political science courses may be used as credit for both the undergraduate and graduate degree. Applicants to the program must present

- Acceptable scores on the verbal, quantitative, and analytical writing portions of the GRE
- Completion of at least 24 semester hours at the University of Florida (including at least 12 semester hours of political science) with a GPA of 3.7 or higher
- Letters of recommendation from two faculty members in the Department of Political Science

The combination program is not recommended for students considering a Ph.D. program in political science at UF but is appropriate for those considering one of the M.A. degree plus certificate programs described above. Further information concerning this program is available from the departmental undergraduate and graduate coordinators.

Doctor of Philosophy: The Ph.D. program emphasizes preparation for academic careers through seminars, independent work with faculty, and professional development experiences including graduate paper readings, placement workshops, and a distinguished lecture series. The Ph.D. prepares students for teaching and research in either an academic or governmental environment and opens doors to other career opportunities in both the private and public sectors. The Ph.D. program emphasizes the development of strong analytic skills and sophisticated research methods. As resources permit, the Department provides students with funding for travel expenses to scholarly meetings and professional (methodological) training support. As part of the preparation for careers in academia, doctoral students are also generally expected to contribute to the teaching mission of the Department. All Ph.D. students must complete the following:

- POS 6736 The Conduct of Inquiry (3 cr.)
- POS 6716 Scope and Epistemologies of Political Science (3 cr.)
- POS 6737 Political Data Analysis (3 cr.)
- POT 6505 Politics and Theory (3 cr.)
- Course work in a major and two minor fields of study
- Qualifying examinations in a major field and one minor field
- A dissertation

Fields of study open to Ph.D. students include comparative politics, American politics, public policy, international relations, political behavior, political theory, and political methodology. Applications are particularly welcome from students whose intellectual interests traverse these fields, including those with interests in religion and politics, state political institutions and policy, environmental politics, and minority and ethnic politics.

University of Florida Ph.D. students benefit from associations with faculty in numerous other departments and centers. The Centers for Latin American Studies, African Studies, and European Studies complement department faculty strengths in comparative politics and international relations. Students in the public policy concentration benefit from substantive expertise of faculty in the Institute for Child Health Policy and the Shimberg Center for Housing Studies. Several faculty in the College of Journalism and Communications have interests in media and politics.

For more information, please see our website: <http://polisci.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Political Science

- Doctor of Philosophy
 - without a concentration
 - concentration in Educational Policy
 - concentration in Tropical Conservation and Development
- Master of Arts
 - without a concentration
 - concentration in Political Campaigning
 - concentration in Public Affairs
 - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Political Science Departmental Courses

Code	Title	Credits
CPO 5935	Advanced Topics in Comparative Politics	3
CPO 6077	Social Movements in Comparative Perspective	3
CPO 6091	Introduction to Comparative Political Analysis	3
CPO 6096	Comparative Qualitative and Mixed Methods	3
CPO 6107	West European Politics	3
CPO 6206	Seminar in African Politics	3
CPO 6307	Latin American Politics I	3
CPO 6407	Modern Middle East Politics	3
CPO 6719	Comparative Gender Politics	3
CPO 6728	Ethnicity and Nationalism	3
CPO 6732	Democratization and Regime Transition	3
CPO 6736	Post-Communist politics	3
CPO 6756	Comparative Elections and Party Systems	3
CPO 6757	The European Union In Comparative Perspective	3
CPO 7415	Topics in Israeli Politics	3
INR 6039	International Political Economy	3
INR 6208	Advanced International Relations Theory	3
INR 6305	Politics of American Foreign Policy Making	3
INR 6337	Survey of International Security	3
INR 6409	The Politics of International Law	3
INR 6507	International Organization	3
INR 6605	Feminist International Relations	3
INR 6607	International Relations Theory	3
INR 6938	Seminar in Culture and World Politics	3
PAD 6108	Public Administration Theory	3
PAD 6227	Public Budgeting and Finance	3
PAD 6434	Leadership and Ethics in Public Agencies	3
PAD 6946	Internship in Government	3
POS 5935	Advanced Topics in Political Science	3
POS 6015	Professional Development in Political Science	0
POS 6045	Seminar in American Politics	3
POS 6127	State Government and Politics	3
POS 6146	Urban Politics	3
POS 6157	Community Analysis	3

POS 6196	Patrons, Clients, Corruption, and Accountability	3
POS 6207	Political Behavior	3
POS 6259	Political Participation	3
POS 6274	Political Campaigning	3
POS 6278	Advanced Campaign Strategy	3
POS 6279	The Politics of Direct Democracy	3
POS 6292	Religion and Politics	3
POS 6336	Case Study, Culture, and Politics	3
POS 6427	Legislative Process	3
POS 6455	Political Parties and Interest Groups	3
POS 6465	Interest Groups & Lobbying	3
POS 6476	Bureaucratic Politics in the U.S.	3
POS 6707	Qualitative Research Methods for Political Science	3
POS 6716	Scope and Epistemologies of Political Science	3
POS 6736	The Conduct of Inquiry	3
POS 6737	Political Data Analysis	3
POS 6747	Topics in Political Research Methodology	3
POS 6757	Survey Research	3
POS 6766	Election Data Science	3
POS 6909	Individual Work	1-4
POS 6910	Supervised Research	1-5
POS 6933	Special Topics	1-3
POS 6940	Supervised Teaching	1-5
POS 6971	Research for Master's Thesis	1-15
POS 7979	Advanced Research	1-12
POS 7980	Research for Doctoral Dissertation	1-15
POT 6016	Ancient Political Thought	3
POT 6056	Modern Political Thought	3
POT 6067	Contemporary Political Theory	3
POT 6306	Liberalism and Its Critics	3
POT 6315	Democratic Theory	3
POT 6505	Politics and Theory	3
PUP 6006	Policy Evaluation	3
PUP 6007	Policy Process	3
PUP 6009	Public Policy Analysis	3
PUP 6315	Race, Gender, and Politics	3

Student Learning Outcomes

Political science (PHD)

SLO 1 Knowledge

Identify, describe and explain the central elements of the scope, the epistemologies & methodologies of political science. Fluency in the core literature of political theory

SLO 2 Knowledge

Correctly and effectively utilize quantitative analysis up to OLS regression analysis

SLO 3 Knowledge

Synthesize and explain comprehensively two fields in political science and synthesize core attributes of a third field

SLO 4 Skills

Conduct qualitative and/or quantitative research to address substantive and theoretical questions in political science, constituting an original contribution of knowledge and understanding to the field

SLO 5 Professional Behavior

Display ethics, collegiality, cultural sensitivity and academic honesty

SLO 6 Professional Behavior

Present original research at professional conferences and workshops. Attend and critique scholarly presentations during regular departmental workshops and speakers' series

Political Science (MA)

SLO 1 Knowledge

Articulate knowledge and comprehension of theories of political science, including the historical evolution of the field, and the primary debates in the field, along with the core literature in at least two of the following subfields: Comparative Politics, International Relations, American Politics, and/or Political Theory

SLO 2 Knowledge

Identify, interpret, and appraise research in international relations

SLO 3 Skills (thesis option)

Design and conduct quantitative and/or qualitative research to address theoretical and empirical questions in American Politics, Comparative Politics or Political Theory

SLO 4 Skills (exam option)

Summarize, compare, and enumerate the current state of the field of American Politics, Comparative Politics or Political theory providing recommendations for future research directions

SLO 5 Professional Behavior

Display academic honesty, ethics, collegiality, and cultural sensitivity

SLO 6 Professional Behavior

Attend and critique scholarly presentations during regular departmental workshops and speakers' series

Political Science - International Relations

Program Information

The Department of Political Science currently offers two graduate degrees: Master of Arts (thesis or non-thesis option) and Doctor of Philosophy. The political science–international relations program currently offers the Master of Arts (thesis or non-thesis option). Requirements for these degrees are given in the Graduate Degrees Section (p. 778) of this catalog. For further information, please contact the Political Science Department (<https://polisci.ufl.edu/>) directly or visit their departmental catalog page (p. 255).

Admission to graduate study in the Department of Political Science normally requires the completion of an undergraduate major in political science or its equivalent. Students without this preparation may be required to make up deficiencies early in their graduate work. The core sequence begins in the fall term, providing basic knowledge that students need in later semesters. In evaluating candidates for admission, the Department considers

- Prior academic achievement
- GRE scores
- Letters of recommendation from three faculty members or others familiar with the academic potential or work habits of the applicant

- A statement of purpose that conveys intellectual ambitions, indicates how the program of study satisfies the student's interests and goals, and tells how the student would contribute to the program.

Political science–international relations: The M.A. degree in political science–international relations is designed to provide professional education to those whose primary interest is a career in foreign relations. In this program, students must complete course work in the core of international relations theory and in two or more of the four major subfields of international relations, international political economy, international security, foreign policy, and international organization. The M.A. is a 36-hour degree, requiring successful completion of a 6-credit political science core sequence, 15 credits of departmental or extra-department electives, and a 15-credit international relations major. Students may pursue either a thesis option or take a comprehensive examination at the end of the program.

Law/Public Affairs joint degree program: This program culminates in the Master of Arts in political science and Juris Doctor degrees. A joint degree program culminating in the Master of Arts in political science international relations and Juris Doctor degrees is also available. The joint program enables students to earn both the J.D. and the M.A. in less time than would be required to earn both degrees consecutively. Full-time students who make satisfactory progress can usually earn both degrees in 4 years. Candidates for the joint degree program must meet the entrance requirements for, and be admitted to, both the College of Law and the Department of Political Science. These requirements include both the LSAT and the GRE. Students are encouraged to announce their intent of seeking a joint degree as soon as possible. The Department of Political Science will allow 12 hours of appropriate law school courses to be credited toward the M.A. degree. The 12 credits selected from the law curriculum must be approved by the Political Science graduate coordinator on the recommendation of the student's supervisory committee. The College of Law will permit 12 hours of credit earned in political science graduate courses to be credited toward the J.D. degree. Students in the joint degree program are permitted, but not required, to pursue a companion certificate program in public affairs, or political campaigning.

Degrees Offered

Degrees Offered with a Major in Political Science - International Relations

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Political Science Departmental Courses

Code	Title	Credits
CPO 5935	Advanced Topics in Comparative Politics	3
CPO 6077	Social Movements in Comparative Perspective	3
CPO 6091	Introduction to Comparative Political Analysis	3
CPO 6096	Comparative Qualitative and Mixed Methods	3
CPO 6107	West European Politics	3
CPO 6206	Seminar in African Politics	3
CPO 6307	Latin American Politics I	3
CPO 6407	Modern Middle East Politics	3

CPO 6719	Comparative Gender Politics	3
CPO 6728	Ethnicity and Nationalism	3
CPO 6732	Democratization and Regime Transition	3
CPO 6736	Post-Communist politics	3
CPO 6756	Comparative Elections and Party Systems	3
CPO 6757	The European Union In Comparative Perspective	3
CPO 7415	Topics in Israeli Politics	3
INR 6039	International Political Economy	3
INR 6208	Advanced International Relations Theory	3
INR 6305	Politics of American Foreign Policy Making	3
INR 6337	Survey of International Security	3
INR 6409	The Politics of International Law	3
INR 6507	International Organization	3
INR 6605	Feminist International Relations	3
INR 6607	International Relations Theory	3
INR 6938	Seminar in Culture and World Politics	3
PAD 6108	Public Administration Theory	3
PAD 6227	Public Budgeting and Finance	3
PAD 6434	Leadership and Ethics in Public Agencies	3
PAD 6946	Internship in Government	3
POS 5935	Advanced Topics in Political Science	3
POS 6015	Professional Development in Political Science	0
POS 6045	Seminar in American Politics	3
POS 6127	State Government and Politics	3
POS 6146	Urban Politics	3
POS 6157	Community Analysis	3
POS 6196	Patrons, Clients, Corruption, and Accountability	3
POS 6207	Political Behavior	3
POS 6259	Political Participation	3
POS 6274	Political Campaigning	3
POS 6278	Advanced Campaign Strategy	3
POS 6279	The Politics of Direct Democracy	3
POS 6292	Religion and Politics	3
POS 6336	Case Study, Culture, and Politics	3
POS 6427	Legislative Process	3
POS 6455	Political Parties and Interest Groups	3
POS 6465	Interest Groups & Lobbying	3
POS 6476	Bureaucratic Politics in the U.S.	3
POS 6707	Qualitative Research Methods for Political Science	3
POS 6716	Scope and Epistemologies of Political Science	3
POS 6736	The Conduct of Inquiry	3
POS 6737	Political Data Analysis	3
POS 6747	Topics in Political Research Methodology	3
POS 6757	Survey Research	3
POS 6766	Election Data Science	3
POS 6909	Individual Work	1-4
POS 6910	Supervised Research	1-5
POS 6933	Special Topics	1-3
POS 6940	Supervised Teaching	1-5
POS 6971	Research for Master's Thesis	1-15
POS 7979	Advanced Research	1-12
POS 7980	Research for Doctoral Dissertation	1-15
POT 6016	Ancient Political Thought	3
POT 6056	Modern Political Thought	3
POT 6067	Contemporary Political Theory	3
POT 6306	Liberalism and Its Critics	3
POT 6315	Democratic Theory	3

POT 6505	Politics and Theory	3
PUP 6006	Policy Evaluation	3
PUP 6007	Policy Process	3
PUP 6009	Public Policy Analysis	3
PUP 6315	Race, Gender, and Politics	3

Psychology Department

Chair: J.A. Graber

Graduate Coordinator: D.P. Devine

The Department of Psychology offers the Master of Science and the Doctor of Philosophy degrees. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees (p. 778) section of this catalog. Students are not accepted for a terminal master's degree.

For more information, please see the program page below and our website: <http://www.psych.ufl.edu>.

Majors

- Counseling Psychology (p. 261)
- Psychology (CLAS) (p. 262)

Faculty

Professor

- Bluck, Susan Barbara
- Dallery, Jesse
- De Leon, Iser G.
- Devine, Darragh P.
- Duffy, Ryan Daniel
- Ebner, Natalie Christina
- Graber, Julia A.
- Knackstedt, Lori
- Marsiske, Michael
- Moradi, Banafsheh
- Scott, Lisa
- Shepperd, James A.
- Vollmer, Timothy Raymond
- Webster, Gregory Daniel

Associate Professor

- Abreu, Roberto L.
- Gravina, Nicole Elena
- Kertes, Darlene
- Podlesnik, Christopher
- Ratliff, Katherine
- Rodriguez, Lindsey M.
- Schwendt, Marek
- Smith, Colin T.

Assistant Professor

- Chen, Shanting
- Coles, Nicholas Alvaro
- Jimenez-Gomez, Corina Ines

- Kim, Taewon
- Kvam, Peter
- Odegard, Brian
- Shigemoto, Yuki
- Weisberg, Steven M.
- Westgate, Erin
- Zhou, Anne Q.

Distinguished Professor

- Keil, Andreas

Research Assistant Professor

- Ibanez, Vivian

Senior Lecturer

- Cahill, Brian

Affiliated Faculty

- Evans, Bianca Danyell
Other
- Janus, Christopher George
Research Associate Professor
- Lewis, John B.
Assistant Professor
- Maynard-Pemba, Natasha Antoinette
Clinical Associate Professor
- McNamara, Joseph P.
Clinical Associate Professor
- Nixon, Sara J.
Professor
- Peters, Kerri Patricia
Clinical Assistant Professor
- Setlow, Barry
Professor

Courses

Psychology Department Courses

Code	Title	Credits
DEP 6057	Advanced Developmental Psychology I	3
DEP 6058	Advanced Developmental Psychology II	3
DEP 6059	Seminar: Special Topics in Developmental Psychology	1-3
DEP 6099	Survey of Developmental Psychology	2-3
DEP 6406	Advanced Adulthood and Aging	3
DEP 6409	Seminar: Adult Development and Aging	3
DEP 6799	Current Research Methods in Developmental Psychology	3
EAB 6099	Survey of Behavior Analysis	2-3
EAB 6118	Theoretical Foundations of Behavior Analysis	3
EAB 6707	Applied Behavior I	3
EAB 6712	Experimental Psychopathology	3
EAB 6716	Behavior Analysis in Developmental Disabilities	3
EAB 6719	Seminar: Strategies and Tactics of Human Behavioral Research	3

EAB 6744	Behavioral Approaches to Performance Management and Supervision	3
EAB 6750	Quantitative Methods	3
EAB 6780	Ethics and Professional Issues	1-3
EAB 6937C	Seminar: Special Topics in Experimental Analysis of Behavior	1-4
EAB 6939	Seminar: Special Topics in Applied Behavior Analysis	1-3
EAB 7089	Advanced Seminar: Experimental Analysis of Behavior	3
EAB 7090	Verbal Behavior	3
EXP 6667	Methods and Research in Cognitive Neuroscience	3
EXP 6939	Seminar: Current Issues in Cognition and Sensory Processes	3
GEY 6905	Independent Study in Gerontology	1-3
PCO 6057	Psychology of Counseling I	3
PCO 6169	Diagnosis and Treatment Planning	3
PCO 6278	Diversity and Multiculturalism in Counseling Psychology	3
PCO 6316C	Psychological Assessment I	3
PCO 6317C	Psychological Assessment II	3
PCO 6931	History and Contemporary Issues in Counseling Psychology	3
PCO 6939	Seminar: Current Topics in Counseling Psychology	3
PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7537	Vocational Psychology	3
PCO 7944	Practicum in Counseling Psychology	1
PCO 7945	Advanced Practicum in Counseling Psychology	1
PCO 7949	Internship in Counseling Psychology	1
PSB 6076	Nobel Prizewinners in Neuroscience	1
PSB 6087	Behavioral and Cognitive Neuroscience I	3
PSB 6088	Behavioral and Cognitive Neuroscience II	3
PSB 6099	Survey of Physiological and Comparative Psychology	2-3
PSB 7249	Seminar in Neural Mechanisms and Behavior	3
PSY 6608	History of Psychology	2-3
PSY 6826	Psychology of Eating and Obesity	3
PSY 6905	Individual Work	1-3
PSY 6910	Supervised Research	1-5
PSY 6930	Topics in Psychology	1-3
PSY 6939	Seminar: The Teaching of Psychology	1-3
PSY 6940	Supervised Teaching	0-3
PSY 6971	Research for Master's Thesis	1-15
PSY 7979	Advanced Research	1-12
PSY 7980	Research for Doctoral Dissertation	1-15
SOP 6099	Survey of Social Psychology	2-3
SOP 6219C	Advanced Research Techniques in Social-Personality Psychology	3
SOP 6409	Seminar: Current Topics in Social-Personality Psychology	3
SOP 6419	Seminar: Attitudes and Social Cognition	3
SOP 6929	Colloquium on Research in Social-Personality Psychology	1-3

Counseling Psychology

Program Information

The Department of Psychology offers the Doctor of Philosophy degree in Counseling Psychology. Students typically complete Masters of Science degree in Psychology prior to the Doctorate in Counseling Psychology. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees (p. 778) section of this catalog. Students are not accepted for a terminal master's degree.

The Counseling Psychology Graduate Training Program at the University of Florida is one of five training programs offered in the Department of Psychology. The Program is accredited by the American Psychological Association. A predoctoral internship of one year is required. The Counseling Psychology Program at the University of Florida adheres to a generalist, scientist-practitioner training model that emphasizes education and training in the integration of theory, scientific thinking, assessment, research, and practice. This training model conceptualizes science and practice as inseparable and thus promotes practice that is science-based and science that is informed by practice. Furthermore, this training model promotes science and practice that consider individual, developmental, multicultural, and contextual perspectives and that emphasize human strengths with attention to aspects of psychopathology. A dedication to psychological science is essential.

Undergraduate preparation should include at least one course in experimental methods and one course in statistics. Other courses in psychology should include at least three or four of the following: cognition, developmental, learning, personality, physiological, sensory, and social. Applicants should have competitive GRE scores and GPA (3.5 or higher).

For more information, please see our website: <http://psych.ufl.edu/index.php/counselingpsychology> (<http://psych.ufl.edu/index.php/counselingpsychology/>).

Degrees Offered

Degrees Offered with a Major in Counseling Psychology

- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Psychology Departmental Courses

Code	Title	Credits
DEP 6057	Advanced Developmental Psychology I	3
DEP 6058	Advanced Developmental Psychology II	3
DEP 6059	Seminar: Special Topics in Developmental Psychology	1-3
DEP 6099	Survey of Developmental Psychology	2-3
DEP 6406	Advanced Adulthood and Aging	3
DEP 6409	Seminar: Adult Development and Aging	3
DEP 6799	Current Research Methods in Developmental Psychology	3
EAB 6099	Survey of Behavior Analysis	2-3
EAB 6118	Theoretical Foundations of Behavior Analysis	3
EAB 6707	Applied Behavior I	3

EAB 6712	Experimental Psychopathology	3
EAB 6716	Behavior Analysis in Developmental Disabilities	3
EAB 6719	Seminar: Strategies and Tactics of Human Behavioral Research	3
EAB 6744	Behavioral Approaches to Performance Management and Supervision	3
EAB 6750	Quantitative Methods	3
EAB 6780	Ethics and Professional Issues	1-3
EAB 6937C	Seminar: Special Topics in Experimental Analysis of Behavior	1-4
EAB 6939	Seminar: Special Topics in Applied Behavior Analysis	1-3
EAB 7089	Advanced Seminar: Experimental Analysis of Behavior	3
EAB 7090	Verbal Behavior	3
EXP 6667	Methods and Research in Cognitive Neuroscience	3
EXP 6939	Seminar: Current Issues in Cognition and Sensory Processes	3
GEY 6905	Independent Study in Gerontology	1-3
PCO 6057	Psychology of Counseling I	3
PCO 6169	Diagnosis and Treatment Planning	3
PCO 6278	Diversity and Multiculturalism in Counseling Psychology	3
PCO 6316C	Psychological Assessment I	3
PCO 6317C	Psychological Assessment II	3
PCO 6931	History and Contemporary Issues in Counseling Psychology	3
PCO 6939	Seminar: Current Topics in Counseling Psychology	3
PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7537	Vocational Psychology	3
PCO 7944	Practicum in Counseling Psychology	1
PCO 7945	Advanced Practicum in Counseling Psychology	1
PCO 7949	Internship in Counseling Psychology	1
PSB 6076	Nobel Prizewinners in Neuroscience	1
PSB 6087	Behavioral and Cognitive Neuroscience I	3
PSB 6088	Behavioral and Cognitive Neuroscience II	3
PSB 6099	Survey of Physiological and Comparative Psychology	2-3
PSB 7249	Seminar in Neural Mechanisms and Behavior	3
PSY 6608	History of Psychology	2-3
PSY 6826	Psychology of Eating and Obesity	3
PSY 6905	Individual Work	1-3
PSY 6910	Supervised Research	1-5
PSY 6930	Topics in Psychology	1-3
PSY 6939	Seminar: The Teaching of Psychology	1-3
PSY 6940	Supervised Teaching	0-3
PSY 6971	Research for Master's Thesis	1-15
PSY 7979	Advanced Research	1-12
PSY 7980	Research for Doctoral Dissertation	1-15
SOP 6099	Survey of Social Psychology	2-3
SOP 6219C	Advanced Research Techniques in Social-Personality Psychology	3
SOP 6409	Seminar: Current Topics in Social-Personality Psychology	3
SOP 6419	Seminar: Attitudes and Social Cognition	3

SOP 6929	Colloquium on Research in Social-Personality Psychology	1-3

Student Learning Outcomes

Counseling Psychology

SLO 1 Knowledge

Students will describe, identify, and examine subject matter in psychology and counseling psychology, including knowledge of diversity issues and multicultural perspectives.

SLO 2 Knowledge

Students will define and identify ethical principles applicable to the field of psychology.

SLO 3 Skills

Students will apply research and statistical skills relevant to their area of concentration.

SLO 4 Skills

Students will apply counseling and therapy skills in the delivery of counseling and therapy services.

SLO 5 Skills

Students will teach and transmit psychological knowledge in the classroom.

Psychology (CLAS)

Program Information

The Department of Psychology offers the Master of Science and the Doctor of Philosophy degrees. Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees (p. 778) section of this catalog. Students are not accepted for a terminal master's degree.

Doctoral areas of specialization include the research areas of developmental, behavior analysis, behavioral and cognitive neuroscience, social psychology, and counseling psychology. The training program in counseling psychology is accredited by the American Psychological Association. A predoctoral internship of one year is required for the counseling psychology program.

Undergraduate preparation should include at least one course in experimental methods and one course in statistics. Other courses in psychology should include at least three or four of the following: cognition, developmental, learning, personality, physiological, sensory, and social. Applicants should have competitive GRE scores and GPA (3.5 or higher).

Co-major: The Department offers a co-major program in conjunction with the College of Education leading to the Doctor of Philosophy degree in psychology and research and evaluation methodology.

For more information, please see our department website: <http://psych.ufl.edu>.

Degrees Offered

Degrees Offered with a Degree in Psychology

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Women's/Gender Studies
- Master of Arts
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Psychology Departmental Courses

Code	Title	Credits
DEP 6057	Advanced Developmental Psychology I	3
DEP 6058	Advanced Developmental Psychology II	3
DEP 6059	Seminar: Special Topics in Developmental Psychology	1-3
DEP 6099	Survey of Developmental Psychology	2-3
DEP 6406	Advanced Adulthood and Aging	3
DEP 6409	Seminar: Adult Development and Aging	3
DEP 6799	Current Research Methods in Developmental Psychology	3
EAB 6099	Survey of Behavior Analysis	2-3
EAB 6118	Theoretical Foundations of Behavior Analysis	3
EAB 6707	Applied Behavior I	3
EAB 6712	Experimental Psychopathology	3
EAB 6716	Behavior Analysis in Developmental Disabilities	3
EAB 6719	Seminar: Strategies and Tactics of Human Behavioral Research	3
EAB 6744	Behavioral Approaches to Performance Management and Supervision	3
EAB 6750	Quantitative Methods	3
EAB 6780	Ethics and Professional Issues	1-3
EAB 6937C	Seminar: Special Topics in Experimental Analysis of Behavior	1-4
EAB 6939	Seminar: Special Topics in Applied Behavior Analysis	1-3
EAB 7089	Advanced Seminar: Experimental Analysis of Behavior	3
EAB 7090	Verbal Behavior	3
EXP 6667	Methods and Research in Cognitive Neuroscience	3
EXP 6939	Seminar: Current Issues in Cognition and Sensory Processes	3
GEY 6905	Independent Study in Gerontology	1-3
PCO 6057	Psychology of Counseling I	3
PCO 6169	Diagnosis and Treatment Planning	3
PCO 6278	Diversity and Multiculturalism in Counseling Psychology	3
PCO 6316C	Psychological Assessment I	3
PCO 6317C	Psychological Assessment II	3
PCO 6931	History and Contemporary Issues in Counseling Psychology	3

PCO 6939	Seminar: Current Topics in Counseling Psychology	3
PCO 7217	Professional Ethics and Skills in Counseling Psychology	3
PCO 7537	Vocational Psychology	3
PCO 7944	Practicum in Counseling Psychology	1
PCO 7945	Advanced Practicum in Counseling Psychology	1
PCO 7949	Internship in Counseling Psychology	1
PSB 6076	Nobel Prizewinners in Neuroscience	1
PSB 6087	Behavioral and Cognitive Neuroscience I	3
PSB 6088	Behavioral and Cognitive Neuroscience II	3
PSB 6099	Survey of Physiological and Comparative Psychology	2-3
PSB 7249	Seminar in Neural Mechanisms and Behavior	3
PSY 6608	History of Psychology	2-3
PSY 6826	Psychology of Eating and Obesity	3
PSY 6905	Individual Work	1-3
PSY 6910	Supervised Research	1-5
PSY 6930	Topics in Psychology	1-3
PSY 6939	Seminar: The Teaching of Psychology	1-3
PSY 6940	Supervised Teaching	0-3
PSY 6971	Research for Master's Thesis	1-15
PSY 7979	Advanced Research	1-12
PSY 7980	Research for Doctoral Dissertation	1-15
SOP 6099	Survey of Social Psychology	2-3
SOP 6219C	Advanced Research Techniques in Social-Personality Psychology	3
SOP 6409	Seminar: Current Topics in Social-Personality Psychology	3
SOP 6419	Seminar: Attitudes and Social Cognition	3
SOP 6929	Colloquium on Research in Social-Personality Psychology	1-3

Student Learning Outcomes

Psychology (PHD)

SLO 1 Knowledge

Students will describe, identify, and examine subject matter in psychology and in their area of specialization.

SLO 2 Knowledge

Students will define and identify ethical principles applicable to their area of research

SLO 3 Skills

Students will apply research and statistical skills relevant to their area of concentration

SLO 4 Skills

Students will teach and transmit psychological knowledge in the classroom

Psychology (MA)

SLO 1 Knowledge

Students will define and identify ethical principles applicable to their area of research

SLO 2 Knowledge

Students will describe, identify, and examine subject matter in psychology and in their area of specialization

SLO 3 Skills

Students will apply research and statistical skills relevant to their area of concentration

SLO 4 Professional Behavior

Students will disseminate and present research through activities such as publications and conference presentations

Psychology (MS)

SLO 1 Knowledge

Students will describe, identify, and examine subject matter in psychology and in their area of specialization

SLO 2 Knowledge

Students will define and identify ethical principles applicable to their area of research

SLO 3 Skills

Students will apply research and statistical skills relevant to their area of concentration

Religion Department

Department Chair: M. Poceski

Graduate Coordinator: B. Taylor

The graduate program in the Department of Religion at the University of Florida is designed to prepare students for careers in academia, public service, non-governmental organizations, and various forms of advocacy work. Our five areas of study include Buddhist Traditions, Global Islam, Hindu Traditions, Religion in the Americas, and Religion and Nature. For additional information, please refer to the Graduate Student Manual.

The M.A. Program

The M.A. degree provides a broad background in the study of religious traditions and theoretical orientations in the discipline. An M.A. student can choose whether they will concentrate in one of the five areas of study. If they choose to do so, they need to take the courses recommended for that field of specialization. If they choose not to, they can pick courses from across the fields. Coursework usually culminates in a thesis and an oral examination.

The department also offers a combination program designed for superior students who have the ability to pursue an accelerated program leading to the Bachelor of Arts and the Master of Arts degree in Religion.

The Ph.D. Program

A student usually enters with a religion master's degree either from this or another institution. Those admitted with master's degrees in disciplines other than religion may petition to bypass the religion master's degree with additional religion coursework. All students are admitted into one of the areas of study and should fulfill the recommended coursework as outlined in the area descriptions. Students in all fields are encouraged to take courses in other departments to support work in their area of specialization.

Coursework

Graduate students in religion ordinarily take courses of different kinds and for different purposes. One aim is to develop familiarity with leading traditions of research and analysis in religious studies. Another is to prepare for PhD examinations. A third is to pursue specific interests relevant to the student's scholarly development, especially in relation to

the thesis or dissertation. A fourth is to prepare for careers outside of academia. Students are expected to consult their supervisory committee chair and the department's graduate coordinator in designing a course of study that satisfies these aims in the limited time available.

Every year, a Method and Theory departmental seminar is offered (Method & Theory I or II in alternate years). This course is required of all first and second-year graduate students. Its purpose is to help students develop awareness of various approaches to the study of religion, the history of these approaches, and their assumptions about understanding and explaining religious texts and behavior.

Every other year, an Interdisciplinary Seminar is offered. The purpose of this course is to bridge the department's separate areas of study through the examination of topics and themes broadly relevant to the field of religious studies. The content of this course changes each time it is offered, and all first and second-year graduate students are required to take this course when it is offered during their first two years of graduate study.

Specialized instruction within the areas of study is carried on primarily in courses detailed in the area descriptions. The department also offers graduate seminars in related areas outside the specific fields. In addition, students regularly participate in individual or small reading courses with a member of the faculty, the form and content of which are tailored to the student's particular needs and interests.

Almost all graduate students in religion take courses outside the department. Most students enroll in graduate seminars and reading courses in such departments and centers as African Studies, Anthropology, Botany, English, History, Jewish Studies, Latin American Studies, Philosophy, Political Science, Sociology, Women's Studies and Gender Research, Zoology, and from the interdisciplinary School of Natural Resources and the Environment.

While specific degree requirements and interests shape a candidate's program, most generally enroll in three courses, including both seminars and reading courses, during each of the semesters prior to the M.A. thesis or Ph.D. qualifying examinations.

Mentoring

All students are assigned a faculty mentor upon admission to the program based on expressions of faculty interest and the student's intended area of study. The mentor and graduate coordinator answer questions and provide support for the student in choosing courses and planning a program. By the end of the second semester, all master's degree students must designate their supervisory committee chair and one additional department committee member. By the end of the second semester, all doctoral students must designate their committee chair. By no later than the end of the fourth semester of study, all doctoral students must designate a four-member supervisory committee, including the chairperson and one UF faculty member from outside the department.

Majors

- Religion (p. 265)

Faculty

Professor

- Ostebo, Terje
- Peterson, Anna

- Poceski, Mario
- Taylor, Bron R.

Associate Professor

- Caputo, Nina
- Kawashima, Robert Saiji
- Koppel, Anita Anantharam

Assistant Professor

- Feller, Yaniv
- Gordan, Rachel
- Mian, Ali

Distinguished Professor

- Narayanan, Vasudha R.

Affiliated Faculty

- Wang, Richard G.
Professor

Religion

Program Information

Admission to this program has been suspended

The graduate program in the Department of Religion at the University of Florida is designed to prepare students for careers in academia, public service, non-governmental organizations, and various forms of advocacy work. Our five areas of study include:

- Buddhist Traditions,
- Global Islam,
- Hindu Traditions,
- Religion in the Americas and
- Religion and Nature.

For additional information, please refer to the Graduate Student Manual.

The M.A. Program - Admission to this program has been suspended

The M.A. degree provides a broad background in the study of religious traditions and theoretical orientations in the discipline. An M.A. student can choose whether they will concentrate in one of the five areas of study. If they choose to do so, they need to take the courses recommended for that field of specialization. If they choose not to, they can pick courses from across the fields. Course work usually culminates in a thesis and an oral examination.

The department also offers a combination program designed for superior students who have the ability to pursue an accelerated program leading to the Bachelor of Arts and the Master of Arts degree in Religion.

The Ph.D. Program - Admission to this program has been suspended

A student usually enters with a religion master's degree either from this or another institution. Those admitted with master's degrees in disciplines other than religion may petition to bypass the religion master's degree with additional religion course work. All students

are admitted into one of the areas of study and should fulfill the recommended course work as outlined in the area descriptions. Students in all fields are encouraged to take courses in other departments to support work in their area of specialization.

Course Work

Graduate students in religion ordinarily take courses of different kinds and for different purposes. One aim is to develop familiarity with leading traditions of research and analysis in religious studies. Another is to prepare for PhD examinations. A third is to pursue specific interests relevant to the student's scholarly development, especially in relation to the thesis or dissertation. A fourth is to prepare for careers outside of academia. Students are expected to consult their supervisory committee chair and the department's graduate coordinator in designing a course of study that satisfies these aims in the limited time available.

Every year a Method and Theory departmental seminar is offered (Method & Theory I or II in alternate years). This course is required of all first and second year graduate students. Its purpose is to help students develop awareness of various approaches to the study of religion, the history of these approaches, and their assumptions about understanding and explaining religious texts and behavior.

Every other year an Interdisciplinary Seminar is offered. The purpose of this course is bridge the department's separate areas of study through the examination of topics and themes broadly relevant to the field of religious studies. The content of this course changes each time it is offered and all first and second year graduate students are required to take this course when it is offered during their first two years of graduate study.

Specialized instruction within the areas of study is carried on primarily in courses detailed in the area descriptions. The department also offers graduate seminars in related areas outside the specific fields. In addition, students regularly participate in individual or small reading courses with a member of the faculty, the form and content of which are tailored to the student's particular needs and interests.

Almost all graduate students in religion take courses outside the department. Most enroll in graduate seminars and reading courses in such departments and centers as African Studies, Anthropology, Botany, English, History, Jewish Studies, Latin American Studies, Philosophy, Political Science, Sociology, Women's Studies and Gender Research, Zoology, and from the interdisciplinary School of Natural Resources and the Environment.

While specific degree requirements and interests shape a candidate's program, most generally enroll in three courses, including both seminars and reading courses, during each of the semesters prior to the M.A. thesis or Ph.D. qualifying examinations.

Mentoring

All students are assigned a faculty mentor upon admission to the program, based on expressions of faculty interest and the student's intended area of study. The mentor and graduate coordinator answer questions and provide support for the student in choosing courses and planning a program. By the end of the second semester all master's degree students must designate their supervisory committee chair and one additional department committee member. By the end of the second semester all doctoral students must designate their committee chair. By no later than the end of the fourth semester of study, all doctoral students

must designate a four member supervisory committee including the chairperson and one UF faculty member from outside the department.

Degrees Offered

Degrees Offered with a Major in Religion

Admission to these programs have been suspended

- Doctor of Philosophy
 - without a concentration
 - concentration in Tropical Conservation and Development
 - concentration in Women's/Gender Studies
- Master of Arts
 - without a concentration
 - concentration in Jewish Studies
 - concentration in Tropical Conservation and Development
 - concentration in Women's/Gender Studies

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Religion Departmental Courses

Code	Title	Credits
REL 6038	Religion and Fieldwork	3
REL 6347	American Buddhism	3
RLG 5143	Religion and Social Change	3
RLG 5195	Topics in Religion and Society	3
RLG 5199	Religion and Nature in North America	3
RLG 5297	Topics in Biblical Studies	3
RLG 5338	Topics in Asian Religions	3
RLG 5361	Global Islam	3
RLG 5365	Studies in Islam	3
RLG 5396	Religion and Animals	3
RLG 5495	Topics in Religious Thought	3
RLG 5695	Ethics after the Holocaust	3
RLG 5696	Topics in Jewish Thought	3
RLG 5906	Individual Work	1-5
RLG 5937	Topics in Religious Studies	3
RLG 6035	Method and Theory I	3
RLG 6036	Method and Theory II	3
RLG 6038	Religion and Fieldwork	3
RLG 6095	Utopias and Dystopias	3
RLG 6107	Core Seminar in Religion and Nature	3
RLG 6126	Religion in the Americas	3
RLG 6137	Religion in North America	3
RLG 6167	Radical Environmentalism	3
RLG 6183	Religion and Environmental Ethics	3
RLG 6185	Religion, Nature, and Society	3
RLG 6319	Interpreting Asian Religions	3
RLG 6385	Native Religions in the Americas	3
RLG 6387	Religions in Latin America	3
RLG 6709	Islam in Africa	3
RLG 6910	Supervised Research	1-5
RLG 6936	Seminar Relig Studies	3
RLG 6940	Supervised Teaching	1-5
RLG 6957	Overseas Studies in Religion	1-3
RLG 6971	Research for Master's Thesis	1-15
RLG 7979	Advanced Research	1-15

RLG 7980	Research for Doctoral Dissertation	1-15
SRK 6905	Individual Study in Sanskrit	1-4

Student Learning Outcomes

religion (PHD)

SLO 1 Knowledge

Students will identify, define, and describe classical and contemporary methods and theories in the study of religion and the sub-fields of religions of Asia, religions of the Americas, and religion and nature.

SLO 2 Knowledge

Students will translate one research language other than English as approved by their dissertation committees

SLO 3 Skills

Students will articulate orally and in writing the results, significance, and applications of their scholarship and research

SLO 4 Skills

Students will teach in their particular sub-fields, as well as in the broad field of comparative religions

SLO 5 Professional Behavior

Students will produce original research and scholarship that meet the professional standards of the field

Religion (MA)

SLO 1 Knowledge

Students will identify, define, and describe classical and contemporary methods and theories in the study of religion and the sub-fields of religions of Asia, religions of the Americas, and religion and nature

SLO 2 Skills

Students will teach in their particular sub-fields, as well as in the broad field of comparative religions

SLO 3 Professional Behavior

Students will produce research and scholarship that meet the professional standards of the field

Sociology and Criminology & Law Department

Chair: B. Zsembik

Graduate Coordinator: M. Ardel

The Department of Sociology and Criminology & Law offers several programs of graduate study leading to the Ph.D. in Sociology, the Ph.D. in Criminology, Law and Society, the MA in Sociology, the MA in Criminology, Law and Society, and a Joint MA in Criminology/JD degree. The department also partners with the School of Natural Resources and Environment Department to offer the Ph.D. or MA in Interdisciplinary Ecology. Advanced undergraduate majors may complete a combination BA/MA degree in Sociology or a combination BA/MA degree in Criminology, Law and Society.

Combination BA/MA Degree Program in Criminology & Law

Requirements and Recommendations

What is the Combination BA/MA Degree Program?

The BA/MA program provides academically talented students an opportunity to complete a bachelor's and a master's degree in a shorter period of time. The program allows students to explore graduate work in criminology before entering a graduate program. If the student then applies and is accepted into the graduate program (see application procedures for the graduate program), 12 hours of graduate coursework will double-count toward both the B.A. and the M.A., thus reducing the time it would normally take to complete both degrees. Please note, however, if a student is not serious about pursuing an M.A. in criminology, the program is not recommended.

Minimum Requirements for Competitive Admission

- at least a 3.5 overall UF GPA
- completion of CCJ 3024 Advanced Principles of Criminal Justice (3 cr.), CCJ 3701 Research Methods in Criminology (4 cr.), CCJ 4014 Criminological Theory (3 cr.), and CJL 3038 Law and Society (3 cr.) with an overall GPA of 3.5 and no grade lower than a B in any criminology course
- one letter of recommendation from a criminology faculty member
- a personal statement of purpose

Note: meeting these minimum requirements does not guarantee admission into the combination degree program.

How to Apply

Students may apply for the combination BAMA program anytime from their second year forward, but students will most likely apply during the second semester of their junior year. We require undergraduate students to submit all application materials by October 15 for admission to the spring semester and by March 15 for admission to the fall semester for full consideration. Undergraduate students in the BA/MA program must apply for admission into the graduate program just like any other graduate applicant to continue their graduate work.

The following steps should help in the application process:

1. Plan ahead when scheduling courses through the junior year (see sample schedule below). All four of the criminology required courses and all of the student's general education requirements should be completed by the end of the student's junior year.
2. At the beginning of the semester in which the student is applying to the program, the student should approach a criminology faculty member about writing a letter of recommendation. The student should also begin working on a personal statement of purpose. The following guidelines should help with writing the statement.
 - a. Length-2 to 4 pages
 - b. The statement should describe:
 - i. Applicant's reasons for undertaking graduate study in criminology
 - ii. Applicant's future career plans
 - iii. Planned area of concentration within criminology
3. By October 15th of the fall semester or March 15th of the spring semester the student must submit the following items to the Undergraduate Coordinator:
 - a. Personal statement of purpose
 - b. Letter of recommendation

- c. UF's combination BA/MA application form (<https://admissions.ufl.edu/pdf/combdegreerequest.pdf>)

Requirements Once Admitted into the Combination BA/MA Program

Once admitted into the BA/MA program, students complete 12 graduate credit hours for the combination degree before graduation. Six of the 12 credits must be the required CLS courses of Seminar in Criminological Theory (CCJ 6920 Seminar in Criminological Theory (3 cr.)) and Introduction to Quantitative Methods (CCJ 5934 Contemporary Issues in Criminology and Law (3 cr.)). The remaining 6 graduate credits are based on the student's interests. See a listing of graduate courses on our web site (<https://soccrim.clas.ufl.edu/graduate/criminology/>). Again, keep in mind that acceptance into the combination BA/MA program does not mean automatic admittance into the Master's program upon graduation. The student must still take the GRE and submit an admission application for graduate study in Criminology and Law.

Model Plan of Study for BA/MA Program

(assuming fall entry in senior year)

Course	Title	Credits
Sophomore		
Semester One		
CCJ 3024	Advanced Principles of Criminal Justice	3
Credits		3
Semester Two		
CJL 3038	Law and Society	3
Credits		3
Junior		
Semester One		
CCJ 3701	Research Methods in Criminology	4
or CCJ 4014	or Criminological Theory	
Crim 3000+ level		
Select one of the following:		3
CJL 2000	Law and the Legal Process	
CJL 4110	Criminal Law	
CJL 4410	Criminal Procedure	
CJL 4050	Juvenile Law	
Credits		7
Semester Two		
CCJ 3701	Research Methods in Criminology ¹	4
or CCJ 4014	or Criminological Theory	
Crim 3000+ level		
Credits		4
Senior		
Semester One		
CCJ 6920	Seminar in Criminological Theory	3
CCJ 5934	Contemporary Issues in Criminology and Law	3
Credits		6
Semester Two		
Crim 6000+ level		
Crim 6000+ level		
Credits		0
Total Credits		23

¹ Apply for acceptance into CLS M.A. program by March 15 for fall.

Contact Us

If you have questions about this combination degree program, contact the undergraduate coordinator.

Majors

- Criminology, Law and Society (p. 268)
- Sociology (p. 269)

Faculty

Affiliated Faculty

- Ardelt, Monika
Professor
- Borg, Marian J.
Associate Professor
- Broad-Wright, Kendal L.
Associate Professor
- Brown, Andrew D.
Assistant Professor
- Ceobanu, Alin-Mihai
Associate Professor
- Cogburn, Megan Dance
Assistant Professor
- Fagan, Abigail A.
Professor
- Gattone, Charles F.
Associate Professor
- Gibson, Chris L.
Professor
- Hanson, Rebecca Annice
Assistant Professor
- Joo, WonTak
Assistant Professor
- Kahler, Jessica Siders
Assistant Professor
- Koropecj-Cox, Tatyana M.
Associate Professor
- Lanza Kaduce, Lonn M.
Professor
- Levett, Lora M.
Associate Professor
- Liu, Lin
Assistant Professor
- Marsiglio, William
Professor
- Navot, Edo
Assistant Professor
- Overdevest, Christine A.
Associate Professor
- Peek, Charles W.
Associate Professor
- Perz, Stephen George
Professor
- Wilson, Jodi Lane
Professor
- Winstead, Kevin Christopher
Assistant Professor
- You, Myunghee
Assistant Professor

- Zsembik, Barbara Ann
Associate Professor

Criminology, Law and Society

Program Information

Requirements for the M.A. and Ph.D. degrees are given in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog. The graduate program in criminology and law has two areas of special emphasis: crime and justice, and law and society. The degree programs are research-based and prepare students to conduct original exploration into relevant problems, issues, and policies.

M.A. degree program: Admission to the master's degree program requires a bachelor's degree from a criminology/criminal justice or relevant social science or humanities program (political science, sociology, anthropology, psychology, philosophy, history, women's studies, etc.). Qualified students may enter the master's program as undergraduates through the combination B.A./M.A. program. Both M.A. options (thesis and non-thesis) require satisfactory completion of at least 36 credit hours.

Ph.D. degree program: The Doctor of Philosophy program includes a minimum of 90 semester hours of credit beyond the B.A. Students with a criminology or closely related M.A. received in the last 7 years from an accredited U.S. university may request that up to 30 hours credit from their M.A. work be counted toward this total. Those with an M.A. from this department may apply 36 hours. The Department requires Ph.D. students to complete at least 66 hours of course work (excluding research credits), including the M.A. hours. Qualifying examinations take place at the end of a student's course work.

Criminology, Law and Society/Law joint degree programs: The Department of Sociology and Criminology & Law (CLS) and the College of Law offer a joint degree program leading to an M.A. or a Ph.D. in Criminology, Law and Society and a J.D. in law. The joint degree programs enable students to earn both the degrees (the J.D. and the M.A. or the J.D. and the Ph.D.) in less time than would be required to earn both degrees consecutively. Students wishing to pursue the joint program must be admitted to both the Graduate School and the College of Law. These requirements include both the LSAT and GRE. Admission to one may precede the other. Students are encouraged to announce their intent to seek a joint degree as soon as possible. CLS allows 12 hours of appropriate law school courses to be credited toward the CLS degree. The 12 credits selected from the law curriculum must be approved by the graduate coordinator on the recommendation of the student's supervisory committee. The College of Law will permit 12 hours of credit earned in graduate courses to be credited toward the J.D.

Prospective students should examine the research interests of the Criminology Graduate Faculty to obtain a more detailed sense of faculty expertise and research areas, see the department website: <http://soccrim.clas.ufl.edu/graduate/>. Applications for admission and fellowship support are due January 15 of each year. Students planning to apply for admission should take the Graduate Record Examination at the earliest possible date.

Degrees Offered

Degrees Offered with a Major in Criminology, Law and Society

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Sociology and Criminology & Law Departmental Courses

Code	Title	Credits
CCJ 5934	Contemporary Issues in Criminology and Law	3
CCJ 6285	Criminal Justice Process	3
CCJ 6619	Crime and the Life Course	3
CCJ 6705	Research Methods in Crime, Law, and Justice	3
CCJ 6712	Study Design and Evaluation Research	3
CCJ 6905	Independent Study	1-3
CCJ 6910	Supervised Research	1-3
CCJ 6916	Applied CJ Research Project	1-12
CCJ 6920	Seminar in Criminological Theory	3
CCJ 6936	Proseminar in Crime, Law, and Justice	3
CCJ 6971	Research for Master's Thesis	1-9
CCJ 7742	Research Methods in Crime, Law, and Justice II	3
CCJ 7921	Professional Development in Criminology, Law, and Society	3
CCJ 7979	Advanced Research	1-12
CCJ 7980	Research for Doctoral Dissertation	1-15
CJJ 6020	Juvenile Justice	3
CJL 6039	Law and Society	3
CJL 6090	Law and Social Science	3

Student Learning Outcomes

Criminology, law & Society (PHD)

SLO 1 Knowledge

Identify, define and describe criminological and law and society theories and criminological and law and society research methods.

SLO 2 Knowledge

Identify, define and describe their primary track of interest (either Crime & Justice or Law & Society)

SLO 3 Professional Behavior

Prepare and produce documents professionally and ethically.

SLO 4 Professional Behavior

Practice the role of the professional criminologist.

SLO 5 Skills

Conduct independent empirical research with scientific integrity.

SLO 6 Skills

Apply substantive criminological and law and society knowledge in critical thinking, analysis, and communication.

Criminology, Law, & Society (MA)

SLO 1 Knowledge

Identify, define and describe criminological and law and society theories and criminological and law and society research methods.

SLO 2 Skills

Identify, define and describe their primary track of interest (either Crime & Justice or Law & Society)

SLO 3 Skills

Conduct independent empirical research with scientific integrity

SLO 4 Professional Behavior

Prepare and produce documents professionally and ethically

SLO 5 Professional Behavior

Practice role of professional criminologist

Sociology

Program Information

Sociologists conduct research to understand the social forces that shape all of our lives, often in hopes of improving everyday life and the life chances of each person. Graduate studies in sociology provide the people skills and technical skills to organize information, communicate analytical research to academic and lay audiences, and prepare well-reasoned and carefully-written reports and documents that contribute to societal well-being. Our award-winning and internationally-known faculty successfully mentor graduate students to complete their studies and become established in their professional academic and nonacademic careers.

We offer particular expertise in these areas: environment and resources, families, aging, gender, health, sexualities, life course, and race-ethnicity in US and global perspectives. There is also considerable expertise in: demography, social inequality, Latin American studies, Latino sociology, social psychology, deviance, and political sociology. We take great pride in the fact that our faculty are involved in interdisciplinary research projects that span nearly all of the University's colleges and academic programs, including: the School of Natural Resources and the Environment, the Water Institute, the Emerging Pathogens Institute, the Center for Latin American Studies, the Center for European Studies, the Center for Women's Studies and Gender Research, the Health Science Center, and the Jewish Studies Center. Wherever you go on campus, you will most likely find at least one Sociologist from our department making major contributions.

Minimum requirements for the M.A. and Ph.D. degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Admission to either Sociology graduate program requires a bachelor's degree in Sociology or related social science as approved by the Department. Current UF students may also enter the M.A. program through the combination B.A./M.A. program. The Sociology graduate programs look for mature students with outstanding potential and research interests that complement those of our faculty.

Prospective students should examine the research interests of the Sociology Graduate Faculty to obtain a more detailed sense of faculty expertise and research areas, see the department website: <http://soccrim.clas.ufl.edu/graduate/>. Applications for admission and fellowship support are due January 15 of each year. Students planning to

apply for admission should take the Graduate Record Examination at the earliest possible date.

Degrees Offered

Degrees Offered with a Major in Sociology

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Tropical Conservation and Development
 - with an additional concentration in Clinical and Translational Science
 - concentration in Women's/Gender Studies
 - with an additional concentration in Clinical and Translational Science
- Master of Arts
 - without a concentration
 - concentration in Tropical Conservation and Development

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Sociology Courses

Code	Title	Credits
SYA 6018	Classical Social Theories	3
SYA 6126	Contemporary Sociological Theory	3
SYA 6315	Qualitative Research Methods	3
SYA 6407	Quantitative Research Methods	3
SYA 6905	Individual Work	1-4
SYA 6910	Supervised Research	1-5
SYA 6942	Applied Social Research Project	3
SYA 6971	Research for Master's Thesis	1-15
SYA 7933	Special Study in Sociology	3
SYA 7979	Advanced Research	1-12
SYA 7980	Research for Doctoral Dissertation	1-15
SYD 6517	Seminar in Environment and Society	3
SYD 6518	Core Issues in Environmental and Resource Sociology	3
SYD 6706	Sociology of Race and Racism in the U.S.	3
SYD 6807	Sociology of Gender	3
SYO 6407	Health Disparities	3
SYO 6535	Social Inequality	3
SYP 6735	Sociology of Aging and the Life Course	3

Sociology and Criminology & Law Departmental Courses

Code	Title	Credits
CCJ 5934	Contemporary Issues in Criminology and Law	3
CCJ 6285	Criminal Justice Process	3
CCJ 6619	Crime and the Life Course	3
CCJ 6705	Research Methods in Crime, Law, and Justice	3
CCJ 6712	Study Design and Evaluation Research	3
CCJ 6905	Independent Study	1-3
CCJ 6910	Supervised Research	1-3
CCJ 6916	Applied CJ Research Project	1-12
CCJ 6920	Seminar in Criminological Theory	3
CCJ 6936	Proseminar in Crime, Law, and Justice	3
CCJ 6971	Research for Master's Thesis	1-9

CCJ 7742	Research Methods in Crime, Law, and Justice II	3
CCJ 7921	Professional Development in Criminology, Law, and Society	3
CCJ 7979	Advanced Research	1-12
CCJ 7980	Research for Doctoral Dissertation	1-15
CJJ 6020	Juvenile Justice	3
CJL 6039	Law and Society	3
CJL 6090	Law and Social Science	3

Student Learning Outcomes

Sociology (PHD)

SLO 1 Knowledge

Identify, define and describe sociological theories and sociological research methods

SLO 2 Knowledge

Define and describe one primary and one secondary specialty sub-field in sociology

SLO 3 Skills

Conduct independent empirical research with scientific integrity

SLO 4 Skills

Apply substantive sociological knowledge in critical thinking, analysis, and communication

SLO 5 Professional Behavior

Prepare and produce documents professionally and ethically

SLO 6 Professional Behavior

Practice the role of the professional sociologist

Sociology (MA)

SLO 1 Knowledge

Identify, define and describe sociological theories and sociological research methods

SLO 2 Knowledge

Define and describe one specialty sub-field in sociology

SLO 3 Skills

Conduct independent empirical research with scientific integrity

SLO 4 Skills

Demonstrate advanced competencies in applying substantive sociological knowledge in critical thinking, analysis, and communication

SLO 5 Professional Behavior

Prepare and produce documents professionally and ethically

SLO 6 Professional Behavior

Practice the role of the professional sociologist.

Spanish and Portuguese Studies Department

Chair: L. Álvarez Castro

Graduate Coordinator: J. Aaron

The Department of Spanish and Portuguese Studies offers a Master of Arts degree (M.A.) in Spanish (thesis and non-thesis options) and a Doctor of Philosophy degree (Ph.D.) in Romance Languages and Literatures, with a concentration in Spanish. Descriptions of the minimum requirements for both degrees are provided in the General Information section of this catalog. For specific information about the program, please visit the graduate section of the departmental webpage:

<http://www.spanishandportuguese.ufl.edu/spanish/graduate.html>

Candidates for graduate degrees (both M.A. and Ph.D.) in Spanish can choose between two specializations—literature/culture or linguistics. In conjunction with their master's or doctoral work, students may also earn a Certificate in Latin American Studies. Though a graduate degree is not offered in Portuguese, extensive course offerings at the graduate level permit students to develop a strong specialization in Portuguese language and Luso-Brazilian literature, film and culture.

The main prerequisite for admission to the M.A. program is an undergraduate major in Spanish, ideally including advanced courses in the proposed area of specialization. Applicants for the Ph.D. should hold an M.A. or equivalent degree in Spanish. At the discretion of the Graduate Studies Committee, candidates from related fields of study (History, Sociology...) may be offered a conditional admission into the Ph.D. program pending the passing of the M.A. Comprehensive Examination within the first year of study.

All M.A. and Ph.D. students in Spanish who are appointed as teaching assistants must take Romance Language Teaching Methods (FOL / FOL 6943 Romance Language Teaching Methods (3 cr.)). Besides, all M.A. and Ph.D. students specializing in literature and culture must take Introduction to Graduate Study and Research (SPW 6806 Introduction to Graduate Study and Research (3 cr.)). Other requirements vary with degree and specialization. For details, consult the graduate section of the departmental webpage (see above).

The Department is able to offer most students a teaching assistantship that provides a maintenance stipend and includes a tuition waiver. Contingent on positive performance in teaching and graduate work, M.A. students are guaranteed four semesters of support, and Ph.D. students are guaranteed eight semesters of support beyond the M.A. In addition, there are several fellowships, supplements and stipends for which students may apply, and summer teaching may be available.

Prospective students are encouraged to review the departmental webpage in order to familiarize themselves with the program and the application process. Only those applications including all required materials and submitted by the advertised deadlines will be considered. For any questions about the program or how to apply, please contact the graduate coordinator: grad-coord@spanish.ufl.edu.

Majors

- Romance Languages (Spanish and Portuguese Studies) (p. 271)
- Spanish (p. 273)

Faculty

Professor

- Alvarez-Castro, Luis
- Ginway, Mary E.

- Hind, Emily Ann
- Lord-Ward, Gillian E.

Associate Professor

- Aaron, Jessica Elana
- Pascual Cabo, Diego
- Sorbille, Martin E.
- Valdes Kroff, Jorge Rodrigo

Assistant Professor

- Britland, Joanne
- Suarez-Palma, Imanol
- Uparela Reyes, Paola Andrea

Lecturer

- Hansen, Quinn M.
- Oliveira, Mariana

Senior Lecturer

- Marull, Crystal Helene

Affiliated Faculty

- Antes, Theresa A.
Associate Professor
- Pharies, David A.
Professor

Romance Languages (Spanish and Portuguese Studies)

Program Information

The Department of Spanish and Portuguese Studies offers a graduate program leading to the degree of Ph.D. in Romance Languages and Literatures with a concentration in Spanish.

Students may choose a specialization in either literature/cultural studies or Hispanic linguistics. The program strives to achieve balance and depth. A minor is optional; it may be another Romance language or a different field related to the student's major (such as English, History, Latin American Studies, Philosophy, Portuguese/Brazilian Literature, or Women's Studies and Gender Research).

Ph.D. students determine their program of study in close consultation with their Supervisory Committee, which also prepares and administers the Qualifying Examination. Courses should be chosen to develop adequate background for teaching in the field as well as to prepare for more focused work in the area of the dissertation. In the literature/cultural studies track, all candidates must take two courses in literary theory, which will help them to achieve methodological coherence in their dissertations. In the language/linguistics track, students pursue course work in Spanish linguistics, including phonetics and phonology, morphology, syntax, sociolinguistics, historical linguistics and language acquisition. They complement these courses with work in the Linguistics Department. The Qualifying Examination normally covers the core areas listed above, the area of the anticipated dissertation, and any declared minor.

Most doctoral students will be given the opportunity to gain teaching experience through a teaching assistantship, dependent upon departmental need and availability of funds. Renewal of the assistantship is contingent upon satisfactory performance as a teaching assistant and as a graduate student.

For more information, go to: <http://spanishandportuguese.ufl.edu/graduate-programs> (<http://spanishandportuguese.ufl.edu/graduate-programs/>) or contact the Graduate Coordinator at grad-coord@spanish.ufl.edu

Degrees Offered

Degrees Offered with a Major in Romance Languages

- Doctor of Philosophy
 - concentration in Spanish

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Spanish and Portuguese Studies Departmental Courses

Code	Title	Credits
FOL 6326	Technology in Foreign Language Education	3
FOL 6943	Romance Language Teaching Methods	3
SPN 6060	Spanish for Functional Reading and Translation	3
SPN 6166	Teaching Spanish for the Professions	3
SPN 6425	Writing for the Profession	3
SPN 6480	Spanish Phonetics and Phonology	3
SPN 6702	Issues in Spanish Second Language Acquisition	3
SPN 6705	Foundations of Hispanic Linguistics	3
SPN 6735	Special Study in Spanish Linguistics	3
SPN 6785	Advanced Spanish Phonetics	3
SPN 6803	Introduction to Generative Syntax in Spanish	3
SPN 6804	Advanced Syntax of Spanish	3
SPN 6806	Psycholinguistics of Spanish Bilingualism	3
SPN 6827	Sociolinguistics of the Spanish-Speaking World	3
SPN 6835	Spanish and Spanish-American Dialectology	3
SPN 6845	History of the Spanish Language	3
SPN 6855	Spanish Syntax	3
SPN 6856	Spanish in Contact: Issues in Bilingualism	3
SPN 6900	Directed Readings in Spanish	3
SPN 6940	Supervised Teaching	0-5
SPN 6945	Practicum in Advanced College Teaching	2
SPW 6209	Colonial Spanish-American Literature	3
SPW 6216	Spanish Prose Fiction of the Golden Age	3
SPW 6269	Spanish Novel of the Nineteenth Century	3
SPW 6278	Postwar Spanish Fiction	3
SPW 6285	Contemporary Spanish-American Narrative I	3
SPW 6286	Contemporary Spanish-American Narrative II	3
SPW 6345	Twentieth-Century Spanish Poetry	3
SPW 6356	Spanish-American Poetry from Romanticism to Vanguardismo	3
SPW 6357	Contemporary Spanish-American Poetry	3
SPW 6366	Spanish-American Essay	3

SPW 6545	Spanish Romanticism	3
SPW 6606	Cervantes	3
SPW 6729	The Generation of 1898	3
SPW 6806	Introduction to Graduate Study and Research	3
SPW 6902	Special Study in Spanish or Spanish-American Literature	3
SPW 6905	Individual Work	1-3
SPW 6910	Supervised Research	1-5
SPW 6934	Seminar in Spanish American Literature and Culture	3
SPW 6938	Seminar in Spanish Literature and Culture	3
SPW 6945	Practicum Adv Col Tch	2
SPW 6971	Research for Master's Thesis	1-15
SPW 7979	Advanced Research	1-12
SPW 7980	Research for Doctoral Dissertation	1-15

Code	Title	Credits
POR 5132	Graduate Introduction to Portuguese and Brazilian Culture	3
POW 6276	Twentieth-Century Brazilian Novel	3
POW 6385	Brazilian Lyric	3
POW 6386	Brazilian Drama	3
POW 6905	Individual Work	1-3
POW 6930	Rotating Topics in Brazilian or Portuguese Literature	3

Spanish Courses

Code	Title	Credits
FOL 6326	Technology in Foreign Language Education	3
FOL 6943	Romance Language Teaching Methods	3
SPN 6060	Spanish for Functional Reading and Translation	3
SPN 6166	Teaching Spanish for the Professions	3
SPN 6425	Writing for the Profession	3
SPN 6480	Spanish Phonetics and Phonology	3
SPN 6702	Issues in Spanish Second Language Acquisition	3
SPN 6705	Foundations of Hispanic Linguistics	3
SPN 6735	Special Study in Spanish Linguistics	3
SPN 6785	Advanced Spanish Phonetics	3
SPN 6803	Introduction to Generative Syntax in Spanish	3
SPN 6804	Advanced Syntax of Spanish	3
SPN 6806	Psycholinguistics of Spanish Bilingualism	3
SPN 6827	Sociolinguistics of the Spanish-Speaking World	3
SPN 6835	Spanish and Spanish-American Dialectology	3
SPN 6845	History of the Spanish Language	3
SPN 6855	Spanish Syntax	3
SPN 6856	Spanish in Contact: Issues in Bilingualism	3
SPN 6900	Directed Readings in Spanish	3
SPN 6940	Supervised Teaching	0-5
SPN 6945	Practicum in Advanced College Teaching	2
SPW 6209	Colonial Spanish-American Literature	3
SPW 6216	Spanish Prose Fiction of the Golden Age	3
SPW 6269	Spanish Novel of the Nineteenth Century	3
SPW 6278	Postwar Spanish Fiction	3
SPW 6285	Contemporary Spanish-American Narrative I	3
SPW 6286	Contemporary Spanish-American Narrative II	3
SPW 6345	Twentieth-Century Spanish Poetry	3
SPW 6356	Spanish-American Poetry from Romanticism to Vanguardismo	3
SPW 6357	Contemporary Spanish-American Poetry	3

SPW 6366	Spanish-American Essay	3
SPW 6545	Spanish Romanticism	3
SPW 6606	Cervantes	3
SPW 6729	The Generation of 1898	3
SPW 6806	Introduction to Graduate Study and Research	3
SPW 6902	Special Study in Spanish or Spanish-American Literature	3
SPW 6905	Individual Work	1-3
SPW 6910	Supervised Research	1-5
SPW 6934	Seminar in Spanish American Literature and Culture	3
SPW 6938	Seminar in Spanish Literature and Culture	3
SPW 6945	Practicum Adv Col Tch	2
SPW 6971	Research for Master's Thesis	1-15
SPW 7979	Advanced Research	1-12
SPW 7980	Research for Doctoral Dissertation	1-15

Portuguese Courses

Code	Title	Credits
POR 5132	Graduate Introduction to Portuguese and Brazilian Culture	3
POW 6276	Twentieth-Century Brazilian Novel	3
POW 6385	Brazilian Lyric	3
POW 6386	Brazilian Drama	3
POW 6905	Individual Work	1-3
POW 6930	Rotating Topics in Brazilian or Portuguese Literature	3

Spanish Program Information

The Department of Spanish and Portuguese Studies offers a graduate program leading to the degrees of Master of Arts in Spanish or Master of Arts in Teaching in Spanish.

Students may choose to specialize in literature/culture or language/linguistics. A secondary specialization in Portuguese is also offered. Qualified applicants to the M.A. program are eligible for teaching assistantships.

A Master of Arts in Spanish may be earned in one of two ways:

- Non-thesis M.A. This is considered a terminal degree for those anticipating teaching careers in secondary schools or junior colleges, as well as employment in business, government, tourism, etc. Requirements: 30 credit hours and a comprehensive examination.
- M.A. with thesis. This option prepares students for later work toward a Ph.D. Requirements: 30 credit hours, a comprehensive examination, and a thesis. (Internal candidates to the Ph.D. program at UF can submit an extended paper as an alternative to the thesis.)

For more information on the M.A. or M.A.T., go to: <http://spanishandportuguese.ufl.edu/graduate-programs> (<http://spanishandportuguese.ufl.edu/graduate-programs/>) or contact the Graduate Coordinator at grad-coord@spanish.ufl.edu.

Degrees Offered

Degrees Offered with a Major in Spanish

- Master of Arts
- Master of Arts in Teaching

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Spanish and Portuguese Studies Departmental Courses

Code	Title	Credits
FOL 6326	Technology in Foreign Language Education	3
FOL 6943	Romance Language Teaching Methods	3
SPN 6060	Spanish for Functional Reading and Translation	3
SPN 6166	Teaching Spanish for the Professions	3
SPN 6425	Writing for the Profession	3
SPN 6480	Spanish Phonetics and Phonology	3
SPN 6702	Issues in Spanish Second Language Acquisition	3
SPN 6705	Foundations of Hispanic Linguistics	3
SPN 6735	Special Study in Spanish Linguistics	3
SPN 6785	Advanced Spanish Phonetics	3
SPN 6803	Introduction to Generative Syntax in Spanish	3
SPN 6804	Advanced Syntax of Spanish	3
SPN 6806	Psycholinguistics of Spanish Bilingualism	3
SPN 6827	Sociolinguistics of the Spanish-Speaking World	3
SPN 6835	Spanish and Spanish-American Dialectology	3
SPN 6845	History of the Spanish Language	3
SPN 6855	Spanish Syntax	3
SPN 6856	Spanish in Contact: Issues in Bilingualism	3
SPN 6900	Directed Readings in Spanish	3
SPN 6940	Supervised Teaching	0-5
SPN 6945	Practicum in Advanced College Teaching	2
SPW 6209	Colonial Spanish-American Literature	3
SPW 6216	Spanish Prose Fiction of the Golden Age	3
SPW 6269	Spanish Novel of the Nineteenth Century	3
SPW 6278	Postwar Spanish Fiction	3
SPW 6285	Contemporary Spanish-American Narrative I	3
SPW 6286	Contemporary Spanish-American Narrative II	3
SPW 6345	Twentieth-Century Spanish Poetry	3
SPW 6356	Spanish-American Poetry from Romanticism to Vanguardismo	3
SPW 6357	Contemporary Spanish-American Poetry	3
SPW 6366	Spanish-American Essay	3
SPW 6545	Spanish Romanticism	3
SPW 6606	Cervantes	3
SPW 6729	The Generation of 1898	3
SPW 6806	Introduction to Graduate Study and Research	3
SPW 6902	Special Study in Spanish or Spanish-American Literature	3
SPW 6905	Individual Work	1-3
SPW 6910	Supervised Research	1-5
SPW 6934	Seminar in Spanish American Literature and Culture	3
SPW 6938	Seminar in Spanish Literature and Culture	3
SPW 6945	Practicum Adv Col Tch	2
SPW 6971	Research for Master's Thesis	1-15
SPW 7979	Advanced Research	1-12
SPW 7980	Research for Doctoral Dissertation	1-15

Spanish Courses

Code	Title	Credits
SPN 6735	Special Study in Spanish Linguistics	3
SPN 6785	Advanced Spanish Phonetics	3
SPN 6827	Sociolinguistics of the Spanish-Speaking World	3
SPN 6835	Spanish and Spanish-American Dialectology	3
SPN 6845	History of the Spanish Language	3
SPN 6855	Spanish Syntax	3
SPN 6856	Spanish in Contact: Issues in Bilingualism	3
SPN 6900	Directed Readings in Spanish	3
FOL 6943	Romance Language Teaching Methods	3
SPN 6945	Practicum in Advanced College Teaching	2
SPW 6209	Colonial Spanish-American Literature	3
SPW 6216	Spanish Prose Fiction of the Golden Age	3
SPW 6269	Spanish Novel of the Nineteenth Century	3
SPW 6278	Postwar Spanish Fiction	3
SPW 6285	Contemporary Spanish-American Narrative I	3
SPW 6286	Contemporary Spanish-American Narrative II	3
SPW 6345	Twentieth-Century Spanish Poetry	3
SPW 6356	Spanish-American Poetry from Romanticism to Vanguardismo	3
SPW 6357	Contemporary Spanish-American Poetry	3
SPW 6366	Spanish-American Essay	3
SPN 6425	Writing for the Profession	3
SPW 6606	Cervantes	3
SPW 6729	The Generation of 1898	3
SPW 6806	Introduction to Graduate Study and Research	3
SPW 6902	Special Study in Spanish or Spanish-American Literature	3
SPW 6905	Individual Work	1-3
SPW 6910	Supervised Research	1-5
SPW 6934	Seminar in Spanish American Literature and Culture	3
SPW 6938	Seminar in Spanish Literature and Culture	3
SPW 6971	Research for Master's Thesis	1-15
SPW 7979	Advanced Research	1-12
SPW 7980	Research for Doctoral Dissertation	1-15

Portuguese Courses

Code	Title	Credits
POW 6276	Twentieth-Century Brazilian Novel	3
POW 6385	Brazilian Lyric	3
POW 6386	Brazilian Drama	3
POW 6905	Individual Work	1-3
POW 6930	Rotating Topics in Brazilian or Portuguese Literature	3

Student Learning Outcomes

Spanish (MA)

SLO 1 Knowledge

Identify, define, and describe the core areas of Hispanic linguistic and/or literary studies (with optional secondary-foci in Luso-Brazilian studies), as agreed upon by the faculty of the department.

SLO 2 Skills

Literary/Cultural Studies: Analyze and interpret Hispanic/Latino literary and cultural products (with optional secondary foci in Luso-Brazilian studies),

apply results to broader context and engage in academic discourse via writing and oral presentation

Hispanic Linguistics: Analyze and interpret Hispanic language and language-related data (with optional secondary foci in Portuguese), apply results to broader context and engage in academic discourse via writing and oral presentation.

SLO 3 Professional Behavior

Describe and apply ethical human data collection, professional conduct and ethical academic writing skills (as established by Linguistic Society of America Ethics Statement and/or Modern Language Association)

Statistics Department

Chair: M. Daniels

Graduate Coordinator: J.P. Hobert

Graduate programs are available leading to Master of Science in Statistics, Master of Statistics, and Doctor of Philosophy degrees. The minimum requirements for these degrees are described in the *General Information* section of this catalog.

Both master's programs usually require 2 years of course work including material covered in

Code	Title	Credits
STA 6207	Regression Analysis	3
STA 6275	Statistical Computing I: Optimization	3
STA 6276	Statistical Computing II: Monte Carlo Methods	3
STA 6326	Introduction to Theoretical Statistics I	3
STA 6327	Introduction to Theoretical Statistics II	3
STA 6246	Theory of Linear Models	3
STA 6329	Matrix Algebra and Statistical Computing	3

In addition to earning a "Ph.D. pass" on the first-year evaluation, requirements for the Ph.D. degree include the additional course requirements below:

Code	Title	Credits
STA 7233	Advanced Regression	3
STA 7249	Generalized Linear Models	3
STA 7346	Statistical Inference	3
STA 7466	Probability Theory I	3
STA 7467	Probability Theory II	3

Interdisciplinary programs: The Department offers a co-major program in conjunction with the Fisher School of Accounting leading to the Doctor of Philosophy degree in statistics and business administration accounting. The Department is also a partner in the interdisciplinary concentration in quantitative finance, along with the Departments of Mathematics; Industrial and Systems Engineering; and Finance, Insurance, and Real Estate. For information on these programs, consult the departmental graduate coordinator.

Combination program: The Department offers a bachelor's/master's degree program. Contact the graduate coordinator for information.

For more information, please visit <http://www.stat.ufl.edu/>.

Majors

- Statistics (p. 275)

Faculty

Professor

- Daniels, Michael Joseph
- Doss, John
- Hobert, James P.
- Khare, Kshitij

Assistant Professor

- Antonelli, Joseph L.
- Bhattacharjee, Satarupa
- Bhattacharya, Sohom
- Duan, Li
- Ekvall, Karl Oskar
- Karmakar, Bikram
- Karmakar, Sayar
- Papadogeorgou, Georgia
- Roycraft, Benjamin Thomas

Distinguished Professor

- Ghosh, Malay

Senior Lecturer

- Athienitis, Demetris
- Winner, Lawrence Herman

Affiliated Faculty

- Bliznyuk, Nikolay A.
Associate Professor
- Datta, Susmita
Professor
- Qiu, Peihua
Professor
- Vemuri, Baba C.
Distinguished Professor
- Wu, Samuel Shangwu
Professor

Statistics

Program Information

The Graduate program provides a Master of Science in Statistics degree, a Master of Statistics degree, and a doctoral Ph.D. degree with a major in Statistics. Program requirements for these degrees appear on the departmental page (<https://gradcatalog.ufl.edu/graduate/colleges-departments/liberal-arts-sciences/statistics/>) in this catalog. For more information, click here (<https://stat.ufl.edu/academics/graduate/>).

Degrees Offered

Degrees Offered with a Major in Statistics

- Doctor of Philosophy
 - without a concentration
 - concentration in Quantitative Finance

- Master of Science in Statistics
- Master of Statistics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Statistics Departmental Courses

Code	Title	Credits
STA 5325	Fundamentals of Probability	3
STA 5328	Fundamentals of Statistical Theory	3
STA 5503	Categorical Data Methods	3
STA 5507	Applied Nonparametric Methods	3
STA 5701	Applied Multivariate Methods	3
STA 5856	Applied Time Series Methods	3
STA 6092	Applied Statistical Practice	3
STA 6126	Statistical Methods in Social Research I	3
STA 6166	Statistical Methods in Research I	3
STA 6167	Statistical Methods in Research II	3
STA 6177	Applied Survival Analysis	3
STA 6207	Regression Analysis	3
STA 6208	Basic Design and Analysis of Experiments	3
STA 6246	Theory of Linear Models	3
STA 6275	Statistical Computing I: Optimization	3
STA 6276	Statistical Computing II: Monte Carlo Methods	3
STA 6326	Introduction to Theoretical Statistics I	3
STA 6327	Introduction to Theoretical Statistics II	3
STA 6329	Matrix Algebra and Statistical Computing	3
STA 6505	Analysis of Categorical Data	3
STA 6707	Analysis of Multivariate Data	3
STA 6905	Individual Work	1-5
STA 6910	Supervised Research	1-5
STA 6934	Special Topics in Statistics	1-4
STA 6938	Seminar	1
STA 6940	Supervised Teaching	1-5
STA 6942	Internship	1-3
STA 6971	Research for Master's Thesis	1-15
STA 7179	Survival Analysis	3
STA 7233	Advanced Regression	3
STA 7249	Generalized Linear Models	3
STA 7334	Limit Theory	3
STA 7346	Statistical Inference	3
STA 7347	Advanced Inference	3
STA 7348	Bayesian Theory	3
STA 7466	Probability Theory I	3
STA 7467	Probability Theory II	3
STA 7828	Topics in Stochastic Processes	3
STA 7934	Special Topics in Statistics	1-9
STA 7979	Advanced Research	1-12
STA 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Statistics (PHD)

SLO 1 Knowledge

Recognize and select appropriate results, models, and methods to solve a statistical problem

SLO 2 Skills

Solve problems in statistical theory and analyze statistical methods mathematically and logically

SLO 3 Skills

Review, synthesize, and explain a body of statistical literature, and propose new areas for research

SLO 4 Skills

Create, elaborate, and apply new statistical theory and/or methodology

SLO 5 Professional Behavior

Clearly and effectively present ideas in speech and writing concerning statistical theory, methodology, and applications

Statistics (MS)

SLO 1 Knowledge

Identify and select mathematical results and statistical models appropriate for an analysis

SLO 2 Knowledge

Use mathematical results to analyze statistical methods

SLO 3 Knowledge

Apply statistical methods and models to analyze data

SLO 4 Skills

Devise novel statistical methods or mathematical results, or a novel synthesis or application of existing methods and results

SLO 5 Professional Behavior

Clearly explain, both orally and in writing, statistical methods and their application to data

Statistics (MStat)

SLO 1 Knowledge

Identify and select mathematical results and statistical models appropriate for an analysis

SLO 2 Knowledge

Use mathematical results to analyze statistical methods

SLO 3 Knowledge

Apply statistical methods and models to analyze data

SLO 4 Skills

Independently acquire and synthesize new knowledge of statistical methods and the analysis of data

SLO 5 Professional Behavior

Clearly and effectively explain, both orally and in writing, statistical methods and their application to data

College of Medicine

Interim Dean: J. Hunt

Interim Associate Dean for Graduate Education: D. Bloom

The College of Medicine offers training opportunities leading to either the Doctor of Philosophy or Master of Science degree in medical sciences. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog. For more information, please see our website: <http://graduate.education.med.ufl.edu/>.

The interdisciplinary program (IDP) in biomedical sciences is the major focus leading to the Doctor of Philosophy degree. Other graduate courses and programs are listed under departmental headings. For further information, visit <http://biomed.med.ufl.edu/>.

Departments

- College of Medicine Interdisciplinary Programs (p. 280)
 - Anatomical Sciences Education (p. 280)
 - Genetics and Genomics (Medicine) (p. 281)
 - Medical Sciences (p. 284)
- Biochemistry and Molecular Biology (p. 296)
 - Biochemistry and Molecular Biology (p. 297)
- Biostatistics (p. 299)
 - Biostatistics (Medicine) (p. 301)
- Epidemiology (p. 302)
 - Epidemiology (Medicine) (p. 303)
- Health Outcomes and Biomedical Informatics (p. 305)
- Molecular Genetics and Microbiology (p. 306)

Faculty

Professor

- Ahmed, Mustafa Mohammed
- Berceli, Scott A.
- Mehrad, Borna
- Morris, John Glenn
- Scali, Salvatore
- Wang, Gary P.
- Weiner, Irving David

Associate Professor

- Brown, Ashley Nicole
- Bryant, Andrew Justin
- Clark, David J.
- Nelson, Eric Jorge
- Sarder, Pinaki
- Sibille, Kimberly T.

Assistant Professor

- Canales, Muna Thalji

Other

- Huynh, Phuong B.

Clinical Associate Professor

- Becker, Torben Kim

Clinical Professor

- Dang, Long Hoang
- Iovine, Nicole Marie

Research Assistant Professor

- Kusmartsev, Sergey Alekseyevich

Affiliated Faculty

- Abisambra, Jose Francisco
Associate Professor
- Al Mardini, Mamoun Tawfiq Hashim
Assistant Professor
- Alli, Abdel
Associate Professor
- Alvina, Karina A.
Research Assistant Professor
- Antonelli, Patrick J.
Professor
- Armstrong, Melissa Jo
Professor
- Arreola, Manuel Munoz
Clinical Assistant Professor
- Artz, Mark Edward
Clinical Assistant Professor
- Barreto, Izabella Lipnharski
Clinical Associate Professor
- Benos, Panagiotis
Professor
- Bizon, Jennifer L.
Professor
- Blackband, Stephen John
Professor
- Bloom, David C.
Professor
- Bolch, Wesley Emmett
Distinguished Professor
- Bolser, Donald Clementz
Professor
- Borchelt, David R.
Professor
- Bose, Prodip Kumar
Associate Professor
- Bova, Frank J.
Distinguished Professor
- Boye, Shannon Elizabeth
Professor
- Bruijnzeel, Adriaan Willem
Professor
- Brusko, Todd Michael
Professor
- Burke, Sara Nicole
Professor
- Burns, Matthew
Assistant Professor
- Butaric, Lauren Nicole
Associate Professor
- Byrd, Jason H.
Clinical Professor
- Byrne, Barry John
Professor
- Cabrera, Roniel
Professor
- Candelario Jalil, Eduardo Jesus
Professor
- Casadesus Smith, Gemma
Professor
- Chakrabarty, Paramita
Associate Professor
- Chandran, Vijayendran
Research Assistant Professor
- Coleman, Jason E.
Research Assistant Professor
- Cruz-Almeida, Yenisel
Associate Professor
- Cusi, Kenneth
Professor
- Daaka, Yehia
Professor
- Dale, Erica Arden
Assistant Professor
- Davey, Mary Ellen
Courtesy Associate Professor
- De Crecy, Valerie Anne
Professor
- De Kloet, Annette Diane
Assistant Professor
- De Kosky, Steven Trent
Professor
- Dehoff, Rhonda Marsha
Associate Professor
- Dinculescu, Astra
Assistant Professor
- Ding, Mingzhou
Distinguished Professor
- Donahoo, William Troy
Clinical Professor
- Elton, Amanda Lea
Assistant Professor
- Fan, Xiao
Assistant Professor
- Farrer, Matthew James
Professor
- Febo Vega, Marcelo
Associate Professor
- Flint, Jeremy Joseph
Lecturer
- Flores, Catherine
Associate Professor
- Foster, Thomas C.
Professor
- Frazier, Charles Jason
Professor
- Fujii, Kotaro
Assistant Professor
- Fuller, David
Professor
- George, Thomas J.
Professor
- Giasson, Benoit Ivan

Professor

- Goldberger, Bruce A.
Clinical Professor
- Gumus, Kazim Ziya
Research Assistant Professor
- Gunduz, Aysegul
Professor
- Guo, Yi
Associate Professor
- Hall, Jaclyn M.
Associate Scientist
- Harle, Christopher Albert William
Courtesy Professor
- Harrison, Jeffrey K.
Professor
- Hess, Christopher
Assistant Professor
- Hoffman, Brad E.
Associate Professor
- Hoh, Brian Lim
Professor
- Huang, Shuang
Professor
- Ishov, Alexander M.
Associate Professor
- Janus, Christopher George
Research Associate Professor
- Johnson, Perry B.
Clinical Associate Professor
- Johnson, Richard D.
Professor
- Kaufmann, Christopher Norfleet
Assistant Professor
- Keselowsky, Benjamin G.
Professor
- Khoshbouei, Habibeh
Professor
- Kladde, Michael P.
Professor
- Kumar, Ashok
Research Associate Professor
- Lakshmyya, Kesavalu Naidu
Professor
- Lamb, Damon Geoffrey
Assistant Professor
- Lauzardo, Michael
Research Associate Professor
- LaVoie, Matthew James
Professor
- Lemas, Dominick
Assistant Professor
- Leon, Stephanie Marie
Clinical Associate Professor
- Lewis, John B.
Assistant Professor
- Lewis, Jada M.

Professor

- Li, Jonathan G.
Clinical Professor
- Li, Yuqing
Professor
- Liao, Daiqing
Associate Professor
- Liu, Chihray
Professor
- Ma, Zhe
Assistant Professor
- Makki, Nadja
Assistant Professor
- Maldonado Molina, Mildred Merisa
Professor
- Mandel, Ronald James
Professor
- Manini, Todd M.
Professor
- Marshall, Emily Lynn
Clinical Assistant Professor
- Martindale, Mark Q.
Professor
- Martinez-Rivera, Freddyson
Assistant Professor
- Martyniuk, Christopher
Professor
- Martynyuk, Anatoly Eugeny
Research Professor
- Mathews, Carol Anne
Professor
- Maurer, Andrew P.
Associate Professor
- McFarland, Nikolaus R.
Clinical Associate Professor
- McIntyre, Jeremy C.
Assistant Professor
- Mitchell, Gordon Stewart
Professor
- Mobley, Erin Michele
Assistant Professor
- Muller, Keith E.
Professor
- Musselwhite, Matthew
Lecturer
- Narayan, Satya
Professor
- Nguyen, Cuong
Associate Professor
- Nguyen, Lien Thi Thuy
Assistant Professor
- Nixon, Sara J.
Professor
- O'Dell, Walter G.
Research Associate Professor
- Okun, Michael S.

Professor

- Opavsky, Rene
Professor
- Otto, Kevin
Professor
- Oweiss, Karim
Professor
- Padilla, Nancy
Assistant Professor
- Progulske, Ann
Distinguished Professor
- Prokop, Stefan
Assistant Professor
- Prosperi, Mattia
Professor
- Rahman, Maryam
Associate Professor
- Ranum, Laura Page
Distinguished Professor
- Rarey, Kyle E.
Professor
- Rathinasabapathi, Balasubramani
Professor
- Renne, Rolf Friedrich
Professor
- Reynolds, Brent A.
Professor
- Rill, Lynn Neitzey
Clinical Assistant Professor
- Rincon-Limas, Diego Enrique
Associate Professor
- Roper, Steven N.
Professor
- Russ, Holger Andreas
Associate Professor
- Salloum, Ramzi George
Professor
- Samant, Sanjiv Singh
Clinical Professor
- Sarkisian, Matthew R.
Associate Professor
- Sayeski, Peter Paul
Professor
- Sayour, Elias
Professor
- Schwarz, Amanda Boczkowski
Assistant Professor
- Schwarz, Bryan C.
Clinical Assistant Professor
- Scindia, Yogesh M.
Assistant Professor
- Scott, Edward W.
Professor
- Seaver, Elaine C.
Professor
- Serban, Karina Adriana

Associate Professor

- Setlow, Barry
Professor
- Shao, Wei
Assistant Professor
- Shenkman, Elizabeth Ann
Professor
- Sheremet, Alexandru Aurica
Professor
- Shickel, Benjamin P.
Assistant Professor
- Smith, Wesley Clay
Professor
- Someya, Shinichi
Associate Professor
- Sordo Vieira, Luis Alfonso
Assistant Professor
- Srivastava, Arun
Professor
- Stanifer, Megan Lynn
Assistant Professor
- Staras, Stephanie Ann
Professor
- Streit, Wolfgang Jakob
Professor
- Strother, James
Assistant Professor
- Sutton, Lerah K.
Other
- Swanson, Maurice S.
Professor
- Theis, Ryan P.
Research Associate Professor
- Tibbetts, Scott Aaron
Professor
- Topping, Daniel B.
Clinical Associate Professor
- Urs, Nikhil Mahabir
Associate Professor
- Walker, Ashby Farmer
Assistant Professor
- Wallet, Shannon Margaret
Professor
- Walter, Glenn A.
Professor
- Wang, Eric Tzy-Shi
Professor
- Warren, Brandon Lee
Assistant Professor
- Williamson, John Bonar
Associate Professor
- Wu, Jian
Clinical Assistant Professor
- Wu, Lizi
Professor
- Wu, Yonghui

Associate Professor

- Wynn, James Lawrence
Professor
- Xu, Jie
Assistant Professor
- Yan, Guanghua
Clinical Associate Professor
- Zajac-Kaye, Maria
Professor
- Zhang, Yawei
Clinical Assistant Professor
- Zolotukhin, Serge
Professor
- Zubcevic, Jasenka
Assistant Professor

Interdisciplinary Departments

Majors

- Anatomical Sciences Education (p. 280)
- Genetics and Genomics (Medicine) (p. 281)
- Medical Sciences (p. 284)

Anatomical Sciences Education

Overview

The Anatomical Sciences Education graduate program offers the Master of Science and the Doctor of Philosophy degrees. The faculty for this program is drawn from these disciplines:

- Anatomy
- Education

For the Ph.D. program, applicants must meet the minimum requirements for the University of Florida Graduate School: Junior/Senior GPA > 3.0 and a score on the Graduate Record Exam (GRE) a minimum score of 300 for the current scale. No GRE is required for the MA program. For both the MS and the PhD program, the student will submit a minimum of three letters of reference, a statement of purpose, and a resume, which the admissions committee will use to assess the student's qualifications for admission to the program. International students must comply with current UF standards for admission to the Graduate School, including requirements for English language competency and financial responsibility.

Contact Mark Zakshevsky at zmz30@ufl.edu or visit the program's website at <https://anatomy.acb.med.ufl.edu/>.

Degrees Offered

Degrees Offered with a Major in Anatomical Sciences Education

- Doctor of Philosophy
- Master of Science
 - without a concentration
 - concentration in Medical Anatomy and Physiology

Courses

Anatomical Sciences Education Courses

Student Learning Outcomes

ANATOMICAL SCIENCES EDUCATION (PH.D.)

SL01

Knowledge

Identify and describe the anatomical features of the human body with referent to systems, location, and planes of the body.

SL02

Skills

Develop tools to critically assess anatomical and educational research.

SL03

Professionalism

Display appropriate behavior to instructors, fellow students and individuals who have bequeathed their bodies to medical science.

ANATOMICAL SCIENCES EDUCATION (M.S.)

SL01

Knowledge

Identify and describe the anatomical features of the human body with referent to systems, location, and planes of the body.

SL02

Skills

Develop tools to critically assess anatomical and educational research.

SL03

Professionalism

Apply ethical standards and implement excellence in all endeavors which focus on professional identity formation (i.e., development of professional values, actions and aspirations).

Faculty

Professor

- Cogle, Christopher Ramin
- Daaka, Yehia
- Huang, Shuang
- Leeuwenburgh, Christiaan
- Narayan, Satya
- Opavsky, Rene
- Rarey, Kyle E.
- Zajac-Kaye, Maria

Associate Professor

- Aris, John Phillip
- Butaric, Lauren Nicole
- Holliday, Lexie Shannon
- Ishov, Alexander M.
- Liao, Daiqing

Assistant Professor

- Makki, Nadja

Scientist

- Reed, Jill Verlander

Clinical Associate Professor

- Topping, Daniel B.

Research Assistant Professor

- Guijarro Barrigon, Maria Del

Affiliated Faculty

- Heldermon, Coy D.
Associate Professor
- Kusmartsev, Sergey Alekseyevich
Research Assistant Professor
- Segal, Mark
Professor
- Shirk, Paul David
Courtesy Assistant Professor
- Someya, Shinichi
Associate Professor

Genetics and Genomics (Medicine)

Program Information

Program Director: T. Burris

Program Coordinator: C. Mulligan

The University of Florida Genetics Institute is a multi-college, multi-faceted research center which offers the a degree program leading to the Ph.D. in Genetics and Genomics. Minimum requirements for this degree are available in the Graduate Degrees (p. 778) section of this catalog.

What defines the Genetics & Genomics Graduate Program is the philosophy that good geneticists are integrative geneticists, who incorporate many different subfields of genetics into their work. Accordingly, faculty interests and graduate research opportunities include a wide range of areas: advances in gene therapy, understanding the maintenance of genetic variation, understanding plant immune responses, developing improved algorithms for identifying regulatory motifs in DNA sequences, and the challenges of bioethics to strategies for controlling malaria. Due to the fundamental nature of genetics in the life sciences, our training program is distributed across several colleges at UF, including but not limited to the College of Medicine (<https://graduate.education.med.ufl.edu/>), the College of Liberal Arts and Sciences (<https://clas.ufl.edu/>), the College of Agricultural and the Life Sciences (<https://cals.ufl.edu/>), and the Florida Museum of Natural History.

Graduate Program Overview

First Year:

Code	Title	Credits
ANG 7979	Advanced Research	1-12
BCH 6415	Advanced Molecular and Cell Biology	3
GMS 6221	Ethics in Genetics	1

GMS 6231	Genomics and Bioinformatics	3
GMS 6290	Genetics/Genomics Program Graduate Seminar (begins in the first semester and continues throughout students' graduate careers)	1
GMS 7877	Responsible Conduct of Biomedical Research	2
PCB 5065	Advanced Genetics	4
PHC 6052	Introduction to Biostatistical Methods	3

The first year core training is the research rotation program, in which students "rotate" through three labs in a minimum of two colleges. Rotations are critical to selecting a graduate advisor: they provide a hands-on opportunity to participate in the research being conducted in a lab, and a mutual opportunity to evaluate fit between advisor and prospective student.

Second Year:

- Individual program of courses and requirements is developed in consultation with major professor and dissertation committee

Admission Standards: Prospective students should have strong backgrounds in biology and other hard sciences. Exceptional students with other backgrounds will also be considered. The research statement required as part of the application has a particularly important part in the admissions decision. Each applicant must describe their research interests so that Graduate Faculty can evaluate knowledge of the discipline, fit to the program, and ability to articulate and motivate an interesting research problem. The required Letters of Recommendation are also extremely important in helping identify applicants with exceptional aptitude for genetics, and with research experience and promise.

Contact the Genetics and Genomics Graduate Program by email, UFGI-Info@ad.ufl.edu or by phone, 352-273-8124.

For more information, visit our website: <http://www.ufgi.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Genetics and Genomics

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Domestic Animal Genomics
- Master of Science
 - without a concentration

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Genetics and Genomics (Medicine) Courses

Code	Title	Credits
AGR 6322	Advanced Plant Breeding	3
ANG 6532	Molecular Genetics of Disease	3
ANG 7979	Advanced Research	1-12
ANG 7980	Research for Doctoral Dissertation	1-15
BCH 6415	Advanced Molecular and Cell Biology	3

BCH 7410	Advanced Gene Regulation	1
CAP 5510	Bioinformatics	3
CIS 6930	Special Topics in CIS	3
COT 5405	Analysis of Algorithms	3
GMS 6012	Human Genetics	1
GMS 6013	Developmental Genetics	1
GMS 6014	Applications of Bioinformatics to Genetics	1
GMS 6920	Genetics Journal Colloquy	1
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15
HOS 6201	Breeding Perennial Cultivars	3
PCB 5065	Advanced Genetics	4
PCB 5615	Molecular Evolution and Systematics	4
PCB 6528	Plant Cell and Developmental Biology	3
PCB 7979	Advanced Research	1-12
PCB 7980	Research for Doctoral Dissertation	1-15
STA 5325	Fundamentals of Probability	3
STA 5328	Fundamentals of Statistical Theory	3
STA 6166	Statistical Methods in Research I	3
STA 6167	Statistical Methods in Research II	3
STA 6208	Basic Design and Analysis of Experiments	3
STA 6329	Matrix Algebra and Statistical Computing	3
STA 6934	Special Topics in Statistics	1-4
STA 7979	Advanced Research	1-12
STA 7980	Research for Doctoral Dissertation	1-15
ZOO 6927	Special Topics in Zoology	1-4
ZOO 7979	Advanced Research	1-12
ZOO 7980	Research for Doctoral Dissertation	1-15

College of Medicine Courses

Code	Title	Credits
CAI 5026	AI Ethics and Alignment in Health	3
CAI 5720	Fundamentals of Artificial Intelligence in Medicine I	3
CAI 5721	Fundamentals of Artificial Intelligence in Medicine II	3
CAI 5724	AI in Health Design Studio I	1
CAI 5730	AI in Medical Image Analysis	3
CAI 6725	AI in Health Design Studio II	3
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6090	Research in Medical Sciences	1-10
GMS 6096	Introduction to NIH Grant Writing for Biomedical Sciences	1
GMS 6405	Fundamentals of Endocrine Physiology	1
GMS 6406	Fundamentals of Pulmonary/Respiratory Physiology	1
GMS 6408	Fundamentals of Renal Physiology	1
GMS 6411	Fundamentals of Cardiovascular Physiology	1
GMS 6415	Fundamentals of Gastrointestinal Physiology	1
GMS 6491	Journal Club in Physiology	1
GMS 6780	Addiction: Neuroscience and Trends	3
GMS 6865	Quantitative Literacy for Translational Research	2
GMS 6875	Ethical and Policy Issues in Clinical Research	2
GMS 6895	CTS Journal Club	1
GMS 6903	Manuscript and Abstract Writing for Clinician/Scientists	2
GMS 6905	Independent Studies in Medical Sciences	1-10

GMS 6910	Supervised Research	1-5
GMS 6940	Supervised Teaching	1-5
GMS 6971	Research for Master's Thesis	1-15
GMS 7093	Introduction to Clinical and Translational Research	2
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7944	Practicum in Biomedical Science Education	3
GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15

Faculty

Professor

- Burris, Thomas P.
- Rathinasabapathi, Balasubramani

Affiliated Faculty

- Abisambra, Jose Francisco
Associate Professor
- Allen, William L.
Associate Professor
- Atkinson, Mark A.
Eminent Scholar
- Austin, James D.
Professor
- Baer, Charles
Professor
- Barbazuk, William Bradley
Professor
- Bloom, David C.
Professor
- Bloom, Linda B.
Professor
- Bonning, Bryony
Eminent Scholar
- Braun, Edward Louis
Professor
- Bungert, Jorg
Professor
- Byrne, Barry John
Professor
- Cavallari, Larisa Humma
Professor
- Chevrette, Marc G.
Assistant Professor
- Choe, Keith P.
Associate Professor
- Cohn, Martin J.
Professor
- Corti, Manuela
Associate Professor
- De Crecy, Valerie Anne
Professor
- Denslow, Nancy D.
Professor
- Dinglasan, Rhoel David

Professor

- Driscoll, Daniel J.
Professor
- Duarte, Julio David
Associate Professor
- Farrer, Matthew James
Professor
- Ferl, Robert J.
Distinguished Professor
- Folta, Kevin M.
Professor
- Foster, Jamie S.
Professor
- Foster, Thomas C.
Professor
- Gulig, Paul A.
Professor
- Guralnick, Robert Penn
Curator
- Hansen, Peter J.
Distinguished Professor
- Harfe, Brian
Professor
- Hauser, Bernard A.
Associate Professor
- Hoffman, Brad E.
Associate Professor
- Kasahara, Hideko
Courtesy Associate Professor
- Kawahara, Akito
Curator
- Kaye, Frederic Joseph
Professor
- Kirst, Matias
Distinguished Professor
- Kladde, Michael P.
Professor
- Li, Yuqing
Professor
- Liao, Daiqing
Associate Professor
- Lu, Jianrong J.
Associate Professor
- Maden, Malcolm
Professor
- March, Keith L.
Professor
- Mathews, Carol Anne
Professor
- Maupin, Julie A.
Professor
- Mavian, Carla Nartuhi
Assistant Professor
- Mccarty, Donald R.
Professor
- McIntyre, Lauren M.

Professor

- Menezes, Amor
Associate Professor
- Mergia, Ayalew
Professor
- Merritt, Matthew E.
Professor
- Moroz, Leonid Leonidovich
Distinguished Professor
- Mulligan, Connie Jo
Professor
- Oppenheimer, David G.
Associate Professor
- Paul, Annalisa
Research Professor
- Peter, Gary Frank
Professor
- Ranum, Laura Page
Distinguished Professor
- Reed, David Lee
Curator
- Renne, Rolf Friedrich
Professor
- Resnick, James Lewis
Professor
- Ryan, Joseph Francis
Associate Professor
- Salemi, Marco
Professor
- Sayour, Elias
Professor
- Schatz, Desmond A.
Professor
- Scott, Edward W.
Professor
- Seaver, Elaine C.
Professor
- Soltis, Douglas Edward
Distinguished Professor
- Soltis, Pamela S.
Distinguished Professor
- Song, Sihong
Professor
- Swanson, Maurice S.
Professor
- Traktuev, Dmitry Olegovich
Research Associate Professor
- Triplett, Eric
Professor
- Vaillancourt, David E.
Professor
- Vallejos, Carlos E.
Professor
- Vermerris, Willem
Professor
- Vulpe, Christopher Dillon

Professor

- Wallace, Margaret R.
Professor
- Wang, Eric Tzy-Shi
Professor
- Wang, Jianping
Professor
- Wayne, Marta L.
Professor
- Wu, Lizi
Professor
- Xie, Mingyi
Associate Professor
- Zhou, Lei
Professor
- Zolotukhin, Serge
Professor

Medical Sciences

Program Information

Interim Dean: J. Hunt

Interim Associate Dean for Graduate Education: D. Bloom

A complete listing of graduate programs in the College of Medicine can be found at: <https://graduate.education.med.ufl.edu>

The College of Medicine offers training opportunities leading to either the Doctor of Philosophy or Master of Science degree in medical sciences. Minimum requirements for these degrees are given in the General Information section of this catalog. The interdisciplinary program in biomedical sciences (BMS) is the major focus leading to the Doctor of Philosophy degree. Other graduate courses and programs are listed under departmental or concentration headings.

Graduate Program in Biomedical Sciences (BMS)

The Graduate Program in Biomedical Sciences (BMS Program) is an umbrella Ph.D. program that offers students the opportunity to explore one or more areas of study before choosing their mentor and concentration of study. The BMS Program has seven concentrations of study which include:

- Biochemistry and Molecular Biology
- Cancer Biology
- Genetics
- Immunology and Microbiology
- Molecular Cell Biology
- Pharmacology and Therapeutics
- Physiology and Aging

The goal of the BMS is to prepare students for a diversity of careers in research and teaching in academic, government, and commercial settings, after completion of the Ph.D. in Medical Sciences. The program provides a modern, comprehensive graduate education in biomedical sciences while providing both maximum program flexibility and appropriate specialization for advanced training. The BMS represents a cooperative effort of seven interdisciplinary advanced concentrations with participation of over 300 faculty members.

During the first semester of study, students undertake a common, comprehensive interdisciplinary core curriculum of classroom study and

a responsible conduct of research course. During the second semester, students begin to focus their coursework in one or two concentrations. Throughout the first two semesters, students participate in at least three laboratory rotations in any of the laboratories of the BMS faculty members. The advanced concentration and the supervisory committee chair are chosen no later than the end of the spring semester to maximize flexibility and facilitate an informed decision. Students entering the advanced concentrations take more specialized courses that strengthen their knowledge of these disciplines. The advanced concentration curricula are flexible enough to allow students to integrate course work offered in other advanced concentrations. In addition, journal clubs and seminars associated with their research interests allow students to further augment their scientific development.

Prospective students should have strong backgrounds in biology including genetics, chemistry (organic, quantitative, and biochemistry), physics, and calculus. Demonstrated high motivation and a serious intention to pursue research-related careers are also important considerations. This is best accomplished by performing independent study in a research laboratory for at least a semester, with a year or more being preferred. For more information, write:

BMS P.O. Box 100229 College of Medicine Gainesville, FL 32610-0229 For expanded information about the BMS, visit <http://biomed.med.ufl.edu/>.

Advanced Concentration in Biochemistry and Molecular Biology

Coordinators: Mathew E. Merritt and Craig W. Vander Kooi

The Graduate Faculty of the biochemistry and molecular biology advanced concentration share an interest in the relationships between the structure of a biological macromolecule and the function of that molecule in the cell. The structure (encoded ultimately by the genome) sets the phenotype of the organism. The uniting theme among the Graduate Faculty is their approach to research: Each uses the techniques of biochemistry and molecular biology/genetics to characterize the function of a macromolecule and show how function (and the process it is part of) is determined by the structure of that molecule and its interactions with other macromolecules. Specific research directions range from physical determination of the molecular structure of proteins to regulation of cellular processes to the genetic mapping of disease loci.

For information about other programs and courses in this field, see the Department of Biochemistry and Molecular Biology (p. 296) listing.

Advanced Concentration in Cancer Biology

Directors: Dietmar Siemann and Maria Zajac-Kaye

The Cancer Biology Concentration (CBC) provides training opportunities in cancer research ranging from basic to translational. The program spans many disciplines, including molecular and cell biology, genetics and epigenetics, biochemistry, microbiology, pharmacology, anatomy, pathology, epidemiology, bioinformatics, immunology and many others involved in the understanding of the development, progression, dissemination, and treatment of cancer.

Students in the program will have opportunities to work with outstanding cancer investigators in state-of-the-art facilities. Through combinations of courses, seminars, small group discussions, and an interdisciplinary approach to research, the program allows students to gain a unique understanding of cancer and to build a firm foundation upon which

they can build careers in academia, government, and the biotech or pharmaceutical industry

For more information please see our website: <http://BMS.med.ufl.edu/about/cancer-biology-concentration> (<http://BMS.med.ufl.edu/about/cancer-biology-concentration/>)

Advanced Concentration in Clinical and Translational Science

Director: Wayne McCormack\

The Clinical & Translational Science PhD program provides graduate students with knowledge and skills required to develop a career in multidisciplinary clinical and translational research. This program uses a team-science approach to provide didactic training and mentoring for predoctoral students performing clinical and/or translational research in health-related fields at UF. Completion of program requirements results in the award of an interdisciplinary concentration in Clinical & Translational Science. Doctoral students from all UF doctoral graduate programs who are interested in health-related research are eligible to apply.

For more information contact:

Dr. Wayne McCormack

Program Director

mccormac@ufl.edu (<http://gradcatalog.ufl.edu/graduate/colleges-departments/medicine/interdisciplinary-departments/medical/>)

mccormac@ufl.edu

<https://www.ctsi.ufl.edu/education/ph-d-students/>

Advanced Concentration in Genetics

Coordinators: M. R. Wallace and Lei Zhou

The concentration in genetics offers graduate training in all facets of modern molecular genetics including bacterial, viral, lower eukaryotic, mouse, developmental, and human genetics. The courses listed are taught in a 5-week modular format, ranging from 1-3 modules. For more information please see our website: <https://biomed.med.ufl.edu/about/genetics/>

Advanced Concentration in Immunology and Microbiology

Coordinators: David Ostrov, Jose Lemos, and Scott Tibbetts

The concentration in immunology and microbiology offers graduate training in cellular and molecular immunology (including immunopathology, immunogenetics, and autoimmunity) and in microbiology (including virology, bacteriology, microbial genetics, and microbial pathogenesis). The courses listed are taught in a 5-week modular format, ranging from 1-3 modules.

For more information see website: <https://biomed.med.ufl.edu/about/immunology-microbiology/>

Advanced Concentration in Medical Physics

Director: Manuel Arreola

The University of Florida's Medical Physics Graduate Program is one of the oldest medical physics programs in the United States (originating in 1961) and is accredited for graduate degrees (MS and PhD) by the Commission on Accreditation of Medical Physics Education Programs (<http://www.campep.org/>)(CAMPEP).

Academically housed in the College of Medicine (<https://med.ufl.edu/>), the program is a concentration under Medical Sciences. The

program has multiple participating departments in the Colleges of Medicine and Engineering, including Radiation Oncology, Radiology, Neurosurgery, and Biomedical Engineering. Recently, students have been conducting their research at the UF Proton Therapy Institute (<https://www.floridaproton.org/>) (UFPTI) in Jacksonville; the Mayo Clinic (<https://www.mayoclinic.org/patient-visitor-guide/florida/>) in Jacksonville, the Robert Boisenault Oncology Institute (<https://www.rboi.com/>) with multiple locations in central Florida; and the Orlando Health Cancer Institute (<https://www.orlandohealth.com/services-and-specialties/orlando-health-cancer-institute/>). Faculty from UFPTI participate in the direction of clinical training and research.

Advanced Concentration in Molecular Cell Biology

Coordinators: Alexander Ishov and William Dunn

The advanced concentration in molecular cell biology (MCB) prepares investigators for careers in biomedical research in academic or industrial settings. This multidisciplinary specialization has more than 50 participating faculty members and offers an extraordinary range of opportunities for advanced study of life at the molecular and cellular levels. The Graduate Faculty share common interests in the molecular interactions that account for functionally integrated subcellular, cellular, and tissue organization found in living organisms. The model systems in use range from yeast and cellular lime molds through *Drosophila* to birds and mammals. These systems are manipulated and analyzed using a wide range of powerful molecular, genetic, protein chemical, immunological, pharmacological, nuclear magnetic resonance (NMR), and microscopic imaging strategies. Students who select MCB take advanced course work and initiate independent research during the second year. This approach provides broad-based vision early in the program and the appropriate degree of specialization later on.

For more information see website: <https://biomed.med.ufl.edu/about/molecular-cell-biology/>

Advanced Concentration in Neuroscience

Coordinators: Benoit Giasson and Eduardo Candelario-Jalil

Graduate students in the Neuroscience Concentration of Medical Sciences are mentored by faculty who are passionate about advancing our understanding of the normal and disordered nervous system using state-of-the-art technologies. This program provides a fertile ground for trainees to develop original research that will contribute to the field and that is directly relevant to preserving brain health and combatting neural disease. As a neuroscience student at UF, you will receive broad interdisciplinary training that fosters independent critical thinking and develops problem-solving skills. This program includes rigorous coursework, specialized seminar series, and explicit training in grant writing and other professional skills. Trainees have extensive opportunities to present their research for UF colleagues and at national and

international conferences. This program prioritizes student's career development, and through a partnership with UF's McKnight Brain Institute (<https://mbi.ufl.edu/education-outreach/trainee-funding-opportunities/>), offers an array of unique training opportunities.

Advanced Concentration in Pharmacology and Therapeutics

Coordinators: Jeffrey Harrison and Gemma Casadesus

The Graduate Faculty in this advanced concentration do cutting-edge research connecting mechanisms of human disease with the

development of new medical therapies. Students learn the principals of biomedicine, such as how drugs and biological agents are discovered and developed to treat human diseases or conditions. Training in this concentration prepares graduates for career paths in academic science, pharmaceutical/biotech industry, and government/regulatory affairs.

For more information see website: <https://biomed.med.ufl.edu/about/pharmacology-concentration/>

Advanced Concentration in Physiology and Aging

Directors: Gonzalo Torres and Glenn Walter

The Graduate Faculty associated with this advanced concentration have expertise in a variety of disciplines, including molecular and cellular biology, pharmacology, physiology, neuroscience, and biochemistry. These faculty bring together unique strengths to provide the students with diverse training. Students may train in laboratories involved in cardiovascular, neuro, endocrine, and developmental physiology; pharmacology; and toxicology. Students conduct research at the molecular, cellular, and integrative levels. Many of the faculty are involved in multidisciplinary, collaborative research efforts that aim to understand basic physiological mechanisms and pathophysiological processes (e.g., cardiovascular, neurodegenerative, and neoplastic diseases).

Other Doctoral Programs in Medical Sciences

Biomedical Informatics

The Ph.D. in Medical Sciences, with a concentration in Biomedical Informatics, offers advanced training in computer science, health and medicine, biostatistics, data science and analytics, engineering, and research methodology to prepare students for academic and research careers in the growing field of biomedical informatics. Graduates will be prepared to pursue faculty-level positions and help drive innovation in health care and research.

Health Outcomes and Implementation Science

The Ph.D. in Medical Sciences, with a concentration in Health Outcomes and Implementation Science, is a specialized degree designed to put its graduates at the forefront of innovative research to develop, implement, and evaluate clinical and community-based programs that promote health and health outcomes. Throughout the curriculum, special emphasis is placed on health disparities and vulnerable populations.

Combination Degree Program: The College participates in a combination degree program between a Bachelor of Science degree with a major in Biology and a Master of Science degree with a major in Medical Sciences with or without a concentration in Pharmacology. Information on this program can be found at: <https://biology.ufl.edu/undergraduates/undergraduate-combined-degree-program-offerings/bsms-program-requirements/bachelor-of-science-in-biology-and-master-of-science-in-medical-sciences/>

Degrees Offered

Degrees Offered with a Major in Medical Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Biochemistry and Molecular Biology
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Health Outcomes and Implementation Science*
 - *optional second concentration in Health Outcomes and Policy*
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Biomedical Informatics
- concentration in Cancer Biology
 - *optional second concentration in Clinical and Translational Science*
- concentration in Clinical and Translational Science
 - *optional second concentration in Health Outcomes and Implementation Science*
- concentration in Domestic Animal Genomics
- concentration in Genetics
 - *optional second concentration in Cancer Biology*
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Health Outcomes and Implementation Science*
 - *optional second concentration in Health Outcomes and Policy*
- concentration in Health Outcomes and Implementation Science
 - *optional second concentration in Clinical and Translational Science*
- concentration in Imaging Science and Technology
- concentration in Immunology and Microbiology
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Health Outcomes and Implementation Science*
 - *optional second concentration in Health Outcomes and Policy*
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Medical Physics
 - *optional second concentration in Clinical and Translational Science*
- concentration in Molecular Cell Biology
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Health Outcomes and Implementation Science*
 - *optional second concentration in Health Outcomes and Policy*
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Neuroscience
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Health Outcomes and Implementation Science*
 - *optional second concentration in Health Outcomes and Policy*
- concentration in Pharmacology & Therapeutics
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Physiology and Aging
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Reproductive Biotechnology
- concentration in Toxicology
- Master of Science
 - without a concentration
 - concentration in Biomedical Informatics
 - concentration in Biomedical Neuroscience

- concentration in Domestic Animal Genomics
- concentration in Forensic Medicine
- concentration in Genetics and Genomics
- concentration in Health Outcomes and Implementation Science
- concentration in Innovative Aging Studies
 - *optional second concentration in Medical Physiology and Pharmacology*
- concentration in Medical Anatomy and Physiology
- concentration in Medical Pharmacology and Toxicology
- concentration in Medical Physics
- concentration in Medical Physiology and Aging
 - *optional second concentration in Medical Anatomy and Physiology*
- concentration in Medical Physiology and Pharmacology
 - *optional second concentration in Medical Anatomy and Physiology*
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Molecular Cell Biology
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Molecular Genetics and Microbiology
- concentration in Neuroscience
- concentration in Pharmacology
 - *optional second concentration in Reproductive Biotechnology*
- concentration in Reproductive Biotechnology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Core Courses-IDP

Code	Title	Credits
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6007	Fundamentals of Neuroscience	3
GMS 6009	Principles of Drug Action and Therapeutics	3
GMS 6065	Fundamentals of Cancer Biology	3
GMS 6090	Research in Medical Sciences	1-10
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7593	Topics in Pharmacology and Toxicology	1-3

General and Advanced Courses

Code	Title	Credits
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6090	Research in Medical Sciences	1-10
GMS 6622	Mitochondrial Biology in Aging and Disease	2
GMS 6905	Independent Studies in Medical Sciences	1-10
GMS 6910	Supervised Research	1-5
GMS 6875	Ethical and Policy Issues in Clinical Research	2
GMS 6940	Supervised Teaching	1-5
GMS 6971	Research for Master's Thesis	1-15
GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 7944	Practicum in Biomedical Science Education	3
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15

Advanced Concentration Courses

Advanced Concentration in Biochemistry and Molecular Biology Courses

Code	Title	Credits
BCH 6040	Research Discussion in Biochemistry and Molecular Biology	1
BCH 6206	Advanced Metabolism	3
BCH 6207	Advanced Metabolism: Role of Membranes in Signal Transduction and Metabolic Control	1
BCH 6208	Advanced Metabolism: Regulation of Key Reactions in Carbohydrate and Lipid Metabolism	1
BCH 6209	Advanced Metabolism: Regulation of Key Reactions in Amino Acid and Nucleotide Metabolism	1
BCH 6415	Advanced Molecular and Cell Biology	3
BCH 6740	Physical Biochemistry/Structural Biology	3
BCH 6741C	Magnetic Resonance Imaging and Spectroscopy in Living Systems	3
BCH 6744	Molecular Structure Determination by X-ray Crystallography	1
BCH 6745	Molecular Structure and Dynamics of NMR Spectroscopy	1
BCH 6746	Structural Biology: Macromolecular Structure Determination	1
BCH 6747	Structural Biology/Advanced Physical Biochemistry: Spectroscopy and Hydrodynamics	1
BCH 6749C	Numerical Methods in Structural Biology	1
BCH 6876	Recent Advances in Membrane Biology	1
BCH 6877	Recent Advances in Structural Biology	1
BCH 6936	Biochemistry Seminar	1
BCH 7410	Advanced Gene Regulation	1
BCH 7412	Epigenetics of Human Disease and Development	1
BCH 7515	Structural Biology/Advanced Physical Biochemistry: Kinetics and Thermodynamics	1
GMS 6195	Epigenetics Journal Club	1

Advanced Concentration in Cancer Biology Courses

Code	Title	Credits
BCH 5413	Mammalian Molecular Biology and Genetics	3
BCH 7410	Advanced Gene Regulation	1
BCH 7412	Epigenetics of Human Disease and Development	1
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6009	Principles of Drug Action and Therapeutics	3
GMS 6053	Cancer Biology and Therapeutics	1
GMS 6061	Nuclear Structure and Dynamics	1
GMS 6064	Tumor Biology	1
GMS 6065	Fundamentals of Cancer Biology	3
GMS 6090	Research in Medical Sciences	1-10
GMS 6232	Advanced Applications of Bioinformatics in Genetics	1
GMS 6335	Advanced Stem Cell Biology: Tissue Engineering	1
GMS 6338	Recent Advances in Cancer Metastasis	1
GMS 6421	Cell Biology	4
GMS 6647	Transcriptional and Translational Control of Cell Growth and Proliferation	1

GMS 6683	Fundamentals of Vascular Physiology and Pathology	2
GMS 6691	Special Topics in Cell Biology and Anatomy	1-4
GMS 6812	Health Outcomes Research in Cancer	3
PHC 6937	Special Topics in Public Health	1-6

Advanced Concentration in Genetics Courses

Code	Title	Credits
BCH 7410	Advanced Gene Regulation	1
GMS 6012	Human Genetics	1
GMS 6013	Developmental Genetics	1
GMS 6014	Applications of Bioinformatics to Genetics	1
GMS 6034	Advanced Virology I: Genetics and RNA	1
GMS 6038	Bacterial Genetics and Physiology	1
GMS 6153	Advanced Bacterial Genetics	1
GMS 6195	Epigenetics Journal Club	1
GMS 6231	Genomics and Bioinformatics	3
GMS 6232	Advanced Applications of Bioinformatics in Genetics	1
GMS 6290	Genetics/Genomics Program Graduate Seminar	1
GMS 6506	Biologic Drug Development	1
GMS 6920	Genetics Journal Colloquy	1
GMS 7192	Journal Colloquy	1

Advanced Concentration in Health Outcomes and Implementation Science Courses

Code	Title	Credits
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6802	Health Outcomes Research for Chronic Diseases	3
GMS 6803	Data Science for Clinical Research	3
GMS 6804	Translational Bioinformatics	3
GMS 6805	Information Modeling in Biomedicine	3
GMS 6806	Security and Privacy for Clinical Research	3
GMS 6812	Health Outcomes Research in Cancer	3
GMS 6813	Pragmatic Clinical Trials	3
GMS 6820	Qualitative Inquiry and Analysis in Health Intervention Development and Implementation	3
GMS 6822	Measuring and Analyzing Health Outcomes II	3
GMS 6829	Longitudinal Research Design	2
GMS 6833	Health Outcomes Research in Vulnerable Populations	3
GMS 6836	Foundations of Learning Health Systems Research	1
GMS 6846	Systematic Review and Meta-Analysis in Clinical, Health Services Research and Public Health	2
GMS 6848	Ensuring Rigor and Reproducibility in Clinical and Translational Research	2
GMS 6850	Foundations of Biomedical Informatics	3
GMS 6851	Implementation Science Fundamentals	3
GMS 6852	Collaborative Clinical and Health Research Methods	2
GMS 6853	Implementation Science in the Learning Health System	3
GMS 6856	Introduction to Biomedical Natural Language Processing	3
GMS 6857	Clinical Decision Support Systems	3

GMS 6859	Foundations of Programming in Biomedical Studies	3
GMS 6885	Translational Health Research Design	3
GMS 6889	Systematic Review Methods	3
GMS 6893	Clinical and Translational Science Seminar Series	2
GMS 7858	Causal Artificial Intelligence for Health Research	3
GMS 7866	Principles of Referent Tracking in Biomedical Informatics	3
GMS 7886	Health Outcomes and Policy PhD Seminar: Applied Research	3
GMS 7887	Health Outcomes & Policy PhD Research Seminar	1
GMS 7906	Grant Writing for Health Outcomes Studies	2
STA 5503	Categorical Data Methods	3
STA 5701	Applied Multivariate Methods	3
STA 6166	Statistical Methods in Research I	3
STA 7179	Survival Analysis	3
STA 7249	Generalized Linear Models	3
STA 7346	Statistical Inference	3
STA 7347	Advanced Inference	3

Advanced Concentration in Immunology and Microbiology Courses

Code	Title	Credits
VME 6505	Autoimmunity	1
GMS 6034	Advanced Virology I: Genetics and RNA	1
GMS 6035	Advanced Virology II: RNA Viruses	1
GMS 6036	Molecular Virology III: DNA Viruses	1
GMS 6038	Bacterial Genetics and Physiology	1
GMS 6040	Host-Pathogen Interactions	1
GMS 6121	Infectious Diseases	3
GMS 6140	Principles of Immunology	4
GMS 6193	Research Conference in Oral Biology	1-3
GMS 6196	Virology Journal Club	1
GMS 6198	Bacterial Pathogenesis Journal Club	1
GMS 6337	B Cell Development in Health and Disease	1
GMS 6382	Special Topics in Immunology	1-3
GMS 6921	Immunology/Microbiology Journal Colloquy	1
GMS 7192	Journal Colloquy	1
VME 6934	Topics in Veterinary Medical Sciences	1-4

Advanced Concentration in Medical Physiology and Pharmacology Courses for the Master of Science Degree

Required core pharmacology courses (9 credits):

GMS 6551 Fundamentals of Medical Pharmacology and Therapeutics (1 cr.)

GMS 6520 Medical Pharmacology and Therapeutics I: The Nervous System (2 cr.)

GMS 6530 Medical Pharmacology and Therapeutics II: Cardiovascular, Renal and Respiratory Systems (2 cr.)

GMS 6531 Medical Pharmacology and Therapeutics III: Endocrine, Musculoskeletal and Reproductive Systems (2 cr.)

GMS 6540 Medical Pharmacology and Therapeutics IV: Cancer, Antimicrobial and Antiparasitic Agents (2 cr.)

Select an additional 6 pharmacology credits from the list below (6 Credits):

GMS 6510 Pharmacology of Cannabis, Tobacco, and Vaping (2 cr.)

GMS 6070 Sensory and Motor Systems (3 cr.)

GMS 6504 Advanced Medical Pharmacology (2 cr.)
 GMS 6552 Cell Signaling & Therapeutics (2 cr.)
 GMS 6594 Pharmacology Literature (1 cr.)
 GMS 6591 Communicating Pharmacology (1 cr.)

Required core physiology courses (9 credits):

GMS 6440 Fundamentals of Medical Physiology (1 cr.)
 GMS 6401 Medical Renal Physiology (2 cr.)
 GMS 6402 Medical Respiration Physiology (3 cr.)
 GMS 6474 Medical Cardiovascular and Muscle Physiology (3 cr.)

Select an additional 6 physiology credits from the list below (6 credits):

GMS 6419 Medical Endocrinology and Reproduction (3 cr.)
 GMS 6479 Medical Gastrointestinal Physiology (2 cr.)
 GMS 6410 Physiology of the Circulation of Blood (2 cr.)
 GMS 6413 Advances in Hypertension Research (2 cr.)
 GMS 6414 Advanced Renal Physiology (2 cr.)
 GMS 6470 Adv. Respiration Physiology 1 (3 cr.)
 GMS 6475 Adv. Respiration Physiology 2 (3 cr.)

Advanced Concentration in Molecular Cell Biology Courses

Code	Title	Credits
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6013	Developmental Genetics	1
GMS 6061	Nuclear Structure and Dynamics	1
GMS 6062	Protein Trafficking	1
GMS 6063	Cell Biology of Aging	1
GMS 6064	Tumor Biology	1
GMS 6065	Fundamentals of Cancer Biology	3
GMS 6331	Stem Cell Biology	1
GMS 6335	Advanced Stem Cell Biology: Tissue Engineering	1
GMS 6336	Advanced Stem Cell Biology: Regenerative Medicine	1
GMS 6421	Cell Biology	4
GMS 6622	Mitochondrial Biology in Aging and Disease	2
GMS 6635	Organization of Cells and Tissues	3
GMS 6647	Transcriptional and Translational Control of Cell Growth and Proliferation	1
GMS 6690	Molecular Cell Biology Journal Club	1
GMS 6691	Special Topics in Cell Biology and Anatomy	1-4
GMS 6692	Research Conference in Anatomy and Cell Biology	1

Advanced Concentration in Neuroscience Courses

Code	Title	Credits
GMS 5924	Navigating the Neuroscience PhD Program	1
GMS 6007	Fundamentals of Neuroscience	3
GMS 6021	Organization and Development of the Nervous System	2
GMS 6022	Principles of Neurophysiology	2
GMS 6023	Molecular Neuroscience and Neuropharmacology	3
GMS 6025C	Statistics for Neuroscientists	4
GMS 6029	Brain Journal Club	1
GMS 6073	Disorders of the Developing Nervous System	1
GMS 6080	Basic Magnetic Resonance Imaging	1
GMS 6082	Introduction to Functional Magnetic Resonance Imaging	1

GMS 6701	Functional and Comparative Neuroanatomy for Professionals	3
GMS 6705	Functional Human Neuroanatomy	4
GMS 6711	Neurobiology of Pain	1
GMS 6712	Biological Clocks in Neural Health and Disease	3
GMS 6713	Neurobiol of Behav Disorders	3
GMS 6719	Computational Skills for Neuroscience	2
GMS 6741	Neuropathology	1
GMS 6750	Molecular Pathobiology of Neural Disease	1
GMS 6757	Introduction to Alzheimer's Disease and Related Dementias: Clinical and Mechanistic Principles	2
GMS 6790	New Developments in Neuroscience	2
GMS 6791	Visual Neuroscience Journal Club	1-2
GMS 6792	Neuroscience Graduate Research Seminar	1
GMS 6793	Neuroimaging	1
GMS 6796	Aging and the Brain	3
GMS 6797	Neuroscience Professional Survival Skills	3
GMS 7794	Neuroscience Seminar	1
GMS 7795	Special Topics in Neuroscience	1-4

Advanced Concentration in Oral Biology Courses

Code	Title	Credits
DEN 6680	Principles and Craniofacial Biology and Emerging Therapies	2
DEN 6681	Craniofacial Pathobiology	2

Advanced Concentration in Clinical and Translational Science Courses

College of Medicine Courses

Code	Title	Credits
CAI 5026	AI Ethics and Alignment in Health	3
CAI 5720	Fundamentals of Artificial Intelligence in Medicine I	3
CAI 5721	Fundamentals of Artificial Intelligence in Medicine II	3
CAI 5724	AI in Health Design Studio I	1
CAI 5730	AI in Medical Image Analysis	3
CAI 6725	AI in Health Design Studio II	3
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6090	Research in Medical Sciences	1-10
GMS 6096	Introduction to NIH Grant Writing for Biomedical Sciences	1
GMS 6405	Fundamentals of Endocrine Physiology	1
GMS 6406	Fundamentals of Pulmonary/Respiratory Physiology	1
GMS 6408	Fundamentals of Renal Physiology	1
GMS 6411	Fundamentals of Cardiovascular Physiology	1
GMS 6415	Fundamentals of Gastrointestinal Physiology	1
GMS 6491	Journal Club in Physiology	1
GMS 6780	Addiction: Neuroscience and Trends	3
GMS 6865	Quantitative Literacy for Translational Research	2
GMS 6875	Ethical and Policy Issues in Clinical Research	2
GMS 6895	CTS Journal Club	1
GMS 6903	Manuscript and Abstract Writing for Clinician/Scientists	2

GMS 6905	Independent Studies in Medical Sciences	1-10
GMS 6910	Supervised Research	1-5
GMS 6940	Supervised Teaching	1-5
GMS 6971	Research for Master's Thesis	1-15
GMS 7093	Introduction to Clinical and Translational Research	2
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7944	Practicum in Biomedical Science Education	3
GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15

Medical Sciences Courses

Code	Title	Credits
GMS 5057	Medical Cell Biology	3
GMS 5604	Medical Human Embryology	3
GMS 5605	Medical Anatomy	3
GMS 5606L	Medical Human Anatomy Laboratory	3
GMS 5613	Medical Human Anatomy by Diagnostic Imaging	3
GMS 5630	Medical Histology	3
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 5909	Finding Biomedical Research Information and Communicating Science	1
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6007	Fundamentals of Neuroscience	3
GMS 6009	Principles of Drug Action and Therapeutics	3
GMS 6012	Human Genetics	1
GMS 6013	Developmental Genetics	1
GMS 6014	Applications of Bioinformatics to Genetics	1
GMS 6021	Organization and Development of the Nervous System	2
GMS 6022	Principles of Neurophysiology	2
GMS 6023	Molecular Neuroscience and Neuropharmacology	3
GMS 6029	Brain Journal Club	1
GMS 6034	Advanced Virology I: Genetics and RNA	1
GMS 6035	Advanced Virology II: RNA Viruses	1
GMS 6036	Molecular Virology III: DNA Viruses	1
GMS 6038	Bacterial Genetics and Physiology	1
GMS 6040	Host-Pathogen Interactions	1
GMS 6051	Signal Transduction	1
GMS 6052	Medical Radiation Shielding & Protection	3
GMS 6053	Cancer Biology and Therapeutics	1
GMS 6061	Nuclear Structure and Dynamics	1
GMS 6062	Protein Trafficking	1
GMS 6063	Cell Biology of Aging	1
GMS 6064	Tumor Biology	1
GMS 6065	Fundamentals of Cancer Biology	3
GMS 6070	Sensory and Motor Systems	3
GMS 6073	Disorders of the Developing Nervous System	1
GMS 6080	Basic Magnetic Resonance Imaging	1
GMS 6082	Introduction to Functional Magnetic Resonance Imaging	1
GMS 6090	Research in Medical Sciences	1-10
GMS 6096	Introduction to NIH Grant Writing for Biomedical Sciences	1
GMS 6099	Research Methods in Gerontology	3

GMS 6108	Bacterial Physiology, Antibiotics, and Genetics	3
GMS 6121	Infectious Diseases	3
GMS 6123	Tropical Medicine Patient Case and Journal Discussion	1
GMS 6132	Introductory Gene and Immunotherapy	2
GMS 6140	Principles of Immunology	4
GMS 6143	Cells of the Innate Immune System	1
GMS 6153	Advanced Bacterial Genetics	1
GMS 6162	Oral Microbiology and Immunology	2
GMS 6169	Antimicrobial Strategies	1
GMS 6193	Research Conference in Oral Biology	1-3
GMS 6195	Epigenetics Journal Club	1
GMS 6196	Virology Journal Club	1
GMS 6198	Bacterial Pathogenesis Journal Club	1
GMS 6221	Ethics in Genetics	1
GMS 6224	Foundations in Precision Medicine: Medical Molecular Genetics	1
GMS 6231	Genomics and Bioinformatics	3
GMS 6232	Advanced Applications of Bioinformatics in Genetics	1
GMS 6234	Introduction to phylodynamics: A practical approach to molecular phylogenetics of pathogens	3
GMS 6251	Molecular Therapy I – Vectors and Molecular Mechanisms	1
GMS 6252	Molecular Therapy II – Disease Targets and Applications	1
GMS 6253	Molecular Therapy III – Immunology of Gene Transfer	1
GMS 6290	Genetics/Genomics Program Graduate Seminar	1
GMS 6331	Stem Cell Biology	1
GMS 6335	Advanced Stem Cell Biology: Tissue Engineering	1
GMS 6336	Advanced Stem Cell Biology: Regenerative Medicine	1
GMS 6337	B Cell Development in Health and Disease	1
GMS 6338	Recent Advances in Cancer Metastasis	1
GMS 6350	Forensic Investigation	3
GMS 6351	Trauma Analysis	3
GMS 6352	Artifacts of Decomposition	3
GMS 6352L	Artifacts of Decomposition Laboratory	3
GMS 6353	Gross Anatomical Exam and Forensic Pathology	3
GMS 6354	Communication Skills in Forensic Science Context	3
GMS 6355	Traffic Homicide Investigation and Reconstruction	3
GMS 6356	Applied Osteology	3
GMS 6357	Forensic Photography	3
GMS 6357L	Forensic Photography Laboratory	3
GMS 6358	Forensic Medicine III	4
GMS 6359	Principles of Bloodstain Pattern Analysis	3
GMS 6359L	Principles of Bloodstain Pattern Analysis Laboratory	3
GMS 6360	Principles of Forensic Medicine I	4
GMS 6361	Principles of Forensic Medicine II	4
GMS 6362	Principles of Crime Scene Investigation	3
GMS 6362L	Principles of Crime Scene Investigation Laboratory	3
GMS 6363	Principles of Osteology	3

GMS 6364	Forensic Botany	3	GMS 6594	Pharmacology Literature	1
GMS 6365	Principles of Forensic Psychology	3	GMS 6607C	Essential Human Anatomy	4
GMS 6382	Special Topics in Immunology	1-3	GMS 6609	Advanced Gross Anatomy	2-4
GMS 6383	Current Topics in Immunotherapy	1	GMS 6610	Anatomy of the Peripheral Nervous System	3
GMS 6400C	Principles of Physiology	6	GMS 6622	Mitochondrial Biology in Aging and Disease	2
GMS 6401	Medical Renal Physiology	2	GMS 6635	Organization of Cells and Tissues	3
GMS 6402	Medical Respiration Physiology	3	GMS 6647	Transcriptional and Translational Control of Cell Growth and Proliferation	1
GMS 6405	Fundamentals of Endocrine Physiology	1	GMS 6683	Fundamentals of Vascular Physiology and Pathology	2
GMS 6406	Fundamentals of Pulmonary/Respiratory Physiology	1	GMS 6690	Molecular Cell Biology Journal Club	1
GMS 6408	Fundamentals of Renal Physiology	1	GMS 6691	Special Topics in Cell Biology and Anatomy	1-4
GMS 6410	Physiology of the Circulation of Blood	2	GMS 6692	Research Conference in Anatomy and Cell Biology	1
GMS 6411	Fundamentals of Cardiovascular Physiology	1	GMS 6701	Functional and Comparative Neuroanatomy for Professionals	3
GMS 6413	Advances in Hypertension Research	2	GMS 6705	Functional Human Neuroanatomy	4
GMS 6414	Advanced Renal Physiology	2	GMS 6711	Neurobiology of Pain	1
GMS 6415	Fundamentals of Gastrointestinal Physiology	1	GMS 6712	Biological Clocks in Neural Health and Disease	3
GMS 6419	Medical Endocrinology and Reproduction	3	GMS 6713	Neurobiol of Behav Disorders	3
GMS 6421	Cell Biology	4	GMS 6715	Healthy Aging: Behavioral and Clinical Outcomes	3
GMS 6440	Fundamentals of Medical Physiology	1	GMS 6717	Healthy Aging in The New Millennium	3
GMS 6470	Adv. Respiration Physiology 1	3	GMS 6740	Neuromuscular Diseases	3
GMS 6471	Core Principles of Physiology	3	GMS 6741	Neuropathology	1
GMS 6472	Fundamentals of Physiology and Functional Genomics II	1	GMS 6750	Molecular Pathobiology of Neural Disease	1
GMS 6473	Fundamentals of Physiology and Functional Genomics III	1	GMS 6757	Introduction to Alzheimer's Disease and Related Dementias: Clinical and Mechanistic Principles	2
GMS 6474	Medical Cardiovascular and Muscle Physiology	3	GMS 6771	Clinical Neuroscience of Aging	3
GMS 6475	Adv. Respiration Physiology 2	3	GMS 6780	Addiction: Neuroscience and Trends	3
GMS 6476	Fundamentals of Skeletal Muscle	3	GMS 6781	Foundations in Addiction and Substance Use Disorders	3
GMS 6479	Medical Gastrointestinal Physiology	2	GMS 6782	Addiction: Clin Eval	3
GMS 6483	Theories of Aging	3	GMS 6783	Addiction: Counseling and Treatment Methods	3
GMS 6484	Geriatric and Age Related Diseases	3	GMS 6784	Addiction: Referral	3
GMS 6485	Population Based Research on Aging	3	GMS 6785	Addiction:Pro Ethical	3
GMS 6486	Biology of Aging	3	GMS 6790	New Developments in Neuroscience	2
GMS 6487	Anti-aging Interventions	3	GMS 6791	Visual Neuroscience Journal Club	1-2
GMS 6491	Journal Club in Physiology	1	GMS 6792	Neuroscience Graduate Research Seminar	1
GMS 6495	Seminar in Physiology	1	GMS 6802	Health Outcomes Research for Chronic Diseases	3
GMS 6504	Advanced Medical Pharmacology	2	GMS 6803	Data Science for Clinical Research	3
GMS 6506	Biologic Drug Development	1	GMS 6804	Translational Bioinformatics	3
GMS 6510	Pharmacology of Cannabis, Tobacco, and Vaping	2	GMS 6805	Information Modeling in Biomedicine	3
GMS 6520	Medical Pharmacology and Therapeutics I: The Nervous System	2	GMS 6806	Security and Privacy for Clinical Research	3
GMS 6530	Medical Pharmacology and Therapeutics II: Cardiovascular, Renal and Respiratory Systems	2	GMS 6808	GeronTechnology	3
GMS 6531	Medical Pharmacology and Therapeutics III: Endocrine, Musculoskeletal and Reproductive Systems	2	GMS 6812	Health Outcomes Research in Cancer	3
GMS 6540	Medical Pharmacology and Therapeutics IV: Cancer, Antimicrobial and Antiparasitic Agents	2	GMS 6813	Pragmatic Clinical Trials	3
GMS 6551	Fundamentals of Medical Pharmacology and Therapeutics	1	GMS 6822	Measuring and Analyzing Health Outcomes II	3
GMS 6552	Cell Signaling & Therapeutics	2	GMS 6827	Advanced Clinical Trial Methods	3
GMS 6560	Molecules to Man: Past, Present and Future Therapeutic Strategies for Disease	3	GMS 6829	Longitudinal Research Design	2
GMS 6590	Seminar in Pharmacology	1	GMS 6833	Health Outcomes Research in Vulnerable Populations	3
GMS 6591	Communicating Pharmacology	1	GMS 6836	Foundations of Learning Health Systems Research	1
GMS 6592	Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes	1	GMS 6846	Systematic Review and Meta-Analysis in Clinical, Health Services Research and Public Health	2

GMS 6847	Translational Research and Therapeutics: Bench, Bedside, Community, & Policy	3	GMS 7906	Grant Writing for Health Outcomes Studies	2
GMS 6848	Ensuring Rigor and Reproducibility in Clinical and Translational Research	2	GMS 7944	Practicum in Biomedical Science Education	3
GMS 6850	Foundations of Biomedical Informatics	3	GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 6851	Implementation Science Fundamentals	3	GMS 7979	Advanced Research	1-12
GMS 6852	Collaborative Clinical and Health Research Methods	2	GMS 7980	Research for Doctoral Dissertation	1-15
GMS 6853	Implementation Science in the Learning Health System	3	Student Learning Outcomes		
GMS 6856	Introduction to Biomedical Natural Language Processing	3	Medical sciences (PHD)		
GMS 6857	Clinical Decision Support Systems	3	SLO1 Knowledge		
GMS 6865	Quantitative Literacy for Translational Research	2	Students will identify and explain the core knowledge for the Interdisciplinary Program (genetics, cell biology, biochemistry/ molecular biology) followed by concentration-specific core knowledge (genetics, molecular cell biology, immunology/microbiology, physiology/ pharmacology, biochemistry/molecular biology, or neuroscience). At the most basic level, this will include recognizing and explaining fundamental facts in the disciplines. At the intermediate level this will include explaining relationships between facts and explanation of mechanisms of biological processes. At the most advanced level this will include interpreting experimental data and designing experiments.		
GMS 6867	Big Data for the Biologist	3	SLO2 Research Skills		
GMS 6873	Introduction to Medical Bioethics	3	Students will read, interpret and critically analyze published literature in their field to formulate hypotheses; design a technically sound and up-to-date experimental plan with appropriate controls; execute the experimental plan in a technically proficient manner; interpret the data; and then reformulate the hypotheses.		
GMS 6874	Medicine and the Law	3	SLO3 Professional Behavior		
GMS 6875	Ethical and Policy Issues in Clinical Research	2	Students apply professional behavior in their conduct of research, specifically identification and illustration of ethical conduct, including employment of appropriate safety, administrative, and regulatory rules		
GMS 6876	Law & Ethics of Aging	3	Medical Sciences (MS)		
GMS 6885	Translational Health Research Design	3	SLO1 Knowledge		
GMS 6889	Systematic Review Methods	3	Identifies, describes, and explains key concepts, study designs, and research methodologies necessary to conduct research in medical and health care disciplines		
GMS 6893	Clinical and Translational Science Seminar Series	2	SLO2 Research		
GMS 6895	CTS Journal Club	1	Explains research ideas, designs, and produces a scientifically sound clinical/translational research project in an ethically sound manner, which includes testable hypotheses and specific aims, presenting scientific relevancy, stating appropriate statistical and ethical considerations, detailing subject enrollment, data collection and analysis, and reporting how the project will lead to improvement of human health		
GMS 6903	Manuscript and Abstract Writing for Clinician/Scientists	2	SLO3 Professionalism		
GMS 6905	Independent Studies in Medical Sciences	1-10	Organize activities that promote self-improvement, scientific teamwork, and improvement in human health		
GMS 6910	Supervised Research	1-5	Faculty		
GMS 6920	Genetics Journal Colloquy	1	Professor		
GMS 6921	Immunology/Microbiology Journal Colloquy	1	• Ahmed, Mustafa Mohammed		
GMS 6934	Cancer Biology Data Discussion	1	• Berceli, Scott A.		
GMS 6940	Supervised Teaching	1-5	• Mehrad, Borna		
GMS 6943	Master's Translational Biotechnology Internship	3	• Morris, John Glenn		
GMS 6945	Team Science	1	• Scali, Salvatore		
GMS 6951	Teaching Biomedical Science	2			
GMS 6952	Curricular Models for Biomedical Science	3			
GMS 6953	Art and Science of Mentoring	1			
GMS 6954	Assessing Effectiveness of Biomedical Science Teaching and Curricula	3			
GMS 6971	Research for Master's Thesis	1-15			
GMS 6975	Team Science	1			
GMS 7093	Introduction to Clinical and Translational Research	2			
GMS 7122	Advanced Tropical Medicine	3			
GMS 7133	Advanced Molecular Virology	2			
GMS 7191	Research Conference	1			
GMS 7192	Journal Colloquy	1			
GMS 7194	Biotechnology Seminar	1-2			
GMS 7593	Topics in Pharmacology and Toxicology	1-3			
GMS 7794	Neuroscience Seminar	1			
GMS 7795	Special Topics in Neuroscience	1-4			
GMS 7858	Causal Artificial Intelligence for Health Research	3			
GMS 7866	Principles of Referent Tracking in Biomedical Informatics	3			
GMS 7877	Responsible Conduct of Biomedical Research	2			
GMS 7886	Health Outcomes and Policy PhD Seminar: Applied Research	3			
GMS 7887	Health Outcomes & Policy PhD Research Seminar	1			

- Wang, Gary P.
- Weiner, Irving David

Associate Professor

- Brown, Ashley Nicole
- Bryant, Andrew Justin
- Clark, David J.
- Nelson, Eric Jorge
- Sarder, Pinaki
- Sibille, Kimberly T.

Assistant Professor

- Canales, Muna Thalji

Other

- Huynh, Phuong B.

Clinical Associate Professor

- Becker, Torben Kim

Clinical Professor

- Dang, Long Hoang
- Iovine, Nicole Marie

Research Assistant Professor

- Kusmartsev, Sergey Alekseyevich

Affiliated Faculty

- Abisambra, Jose Francisco
Associate Professor
- Al Mardini, Mamoun Tawfiq Hashim
Assistant Professor
- Alli, Abdel
Associate Professor
- Alvina, Karina A.
Research Assistant Professor
- Antonelli, Patrick J.
Professor
- Armstrong, Melissa Jo
Professor
- Arreola, Manuel Munoz
Clinical Assistant Professor
- Artz, Mark Edward
Clinical Assistant Professor
- Barreto, Izabella Lipnharski
Clinical Associate Professor
- Benos, Panagiotis
Professor
- Bizon, Jennifer L.
Professor
- Blackband, Stephen John
Professor
- Bloom, David C.
Professor
- Bolch, Wesley Emmett

Distinguished Professor

- Bolser, Donald Clementz
Professor
- Borchelt, David R.
Professor
- Bose, Prodip Kumar
Associate Professor
- Bova, Frank J.
Distinguished Professor
- Boye, Shannon Elizabeth
Professor
- Bruijnzeel, Adriaan Willem
Professor
- Brusko, Todd Michael
Professor
- Burke, Sara Nicole
Professor
- Burns, Matthew
Assistant Professor
- Butaric, Lauren Nicole
Associate Professor
- Byrd, Jason H.
Clinical Professor
- Byrne, Barry John
Professor
- Cabrera, Roniel
Professor
- Candelario Jalil, Eduardo Jesus
Professor
- Casadesus Smith, Gemma
Professor
- Chakrabarty, Paramita
Associate Professor
- Chandran, Vijayendran
Research Assistant Professor
- Coleman, Jason E.
Research Assistant Professor
- Cruz-Almeida, Yenisel
Associate Professor
- Cusi, Kenneth
Professor
- Daaka, Yehia
Professor
- Dale, Erica Arden
Assistant Professor
- Davey, Mary Ellen
Courtesy Associate Professor
- De Crecy, Valerie Anne
Professor
- De Kloet, Annette Diane
Assistant Professor
- De Kosky, Steven Trent
Professor
- Dehoff, Rhonda Marsha
Associate Professor
- Dinculescu, Astra

- Assistant Professor
- Ding, Mingzhou
Distinguished Professor
- Donahoo, William Troy
Clinical Professor
- Elton, Amanda Lea
Assistant Professor
- Fan, Xiao
Assistant Professor
- Farrer, Matthew James
Professor
- Febo Vega, Marcelo
Associate Professor
- Flint, Jeremy Joseph
Lecturer
- Flores, Catherine
Associate Professor
- Foster, Thomas C.
Professor
- Frazier, Charles Jason
Professor
- Fujii, Kotaro
Assistant Professor
- Fuller, David
Professor
- George, Thomas J.
Professor
- Giasson, Benoit Ivan
Professor
- Goldberger, Bruce A.
Clinical Professor
- Gumus, Kazim Ziya
Research Assistant Professor
- Gunduz, Aysegul
Professor
- Guo, Yi
Associate Professor
- Hall, Jaclyn M.
Associate Scientist
- Harle, Christopher Albert William
Courtesy Professor
- Harrison, Jeffrey K.
Professor
- Hess, Christopher
Assistant Professor
- Hoffman, Brad E.
Associate Professor
- Hoh, Brian Lim
Professor
- Huang, Shuang
Professor
- Ishov, Alexander M.
Associate Professor
- Janus, Christopher George
Research Associate Professor
- Johnson, Perry B.
Clinical Associate Professor
- Johnson, Richard D.
Professor
- Kaufmann, Christopher Norfleet
Assistant Professor
- Keselowsky, Benjamin G.
Professor
- Khoshbouei, Habibeh
Professor
- Kladde, Michael P.
Professor
- Kumar, Ashok
Research Associate Professor
- Lakshmyya, Kesavalu Naidu
Professor
- Lamb, Damon Geoffrey
Assistant Professor
- Lauzardo, Michael
Research Associate Professor
- LaVoie, Matthew James
Professor
- Lemas, Dominick
Assistant Professor
- Leon, Stephanie Marie
Clinical Associate Professor
- Lewis, John B.
Assistant Professor
- Lewis, Jada M.
Professor
- Li, Jonathan G.
Clinical Professor
- Li, Yuqing
Professor
- Liao, Daiqing
Associate Professor
- Liu, Chihray
Professor
- Ma, Zhe
Assistant Professor
- Makki, Nadja
Assistant Professor
- Maldonado Molina, Mildred Merisa
Professor
- Mandel, Ronald James
Professor
- Manini, Todd M.
Professor
- Marshall, Emily Lynn
Clinical Assistant Professor
- Martindale, Mark Q.
Professor
- Martinez-Rivera, Freddyson
Assistant Professor
- Martyniuk, Christopher
Professor
- Martynyuk, Anatoly Eugeny

Research Professor

- Mathews, Carol Anne
Professor
- Maurer, Andrew P.
Associate Professor
- McFarland, Nikolaus R.
Clinical Associate Professor
- McIntyre, Jeremy C.
Assistant Professor
- Mitchell, Gordon Stewart
Professor
- Mobley, Erin Michele
Assistant Professor
- Muller, Keith E.
Professor
- Musselwhite, Matthew
Lecturer
- Narayan, Satya
Professor
- Nguyen, Cuong
Associate Professor
- Nguyen, Lien Thi Thuy
Assistant Professor
- Nixon, Sara J.
Professor
- O'Dell, Walter G.
Research Associate Professor
- Okun, Michael S.
Professor
- Opavsky, Rene
Professor
- Otto, Kevin
Professor
- Oweiss, Karim
Professor
- Padilla, Nancy
Assistant Professor
- Progulske, Ann
Distinguished Professor
- Prokop, Stefan
Assistant Professor
- Prosperi, Mattia
Professor
- Rahman, Maryam
Associate Professor
- Ranum, Laura Page
Distinguished Professor
- Rarey, Kyle E.
Professor
- Rathinasabapathi, Balasubramani
Professor
- Renne, Rolf Friedrich
Professor
- Reynolds, Brent A.
Professor
- Rill, Lynn Neitzey

Clinical Assistant Professor

- Rincon-Limas, Diego Enrique
Associate Professor
- Roper, Steven N.
Professor
- Russ, Holger Andreas
Associate Professor
- Salloum, Ramzi George
Professor
- Samant, Sanjiv Singh
Clinical Professor
- Sarkisian, Matthew R.
Associate Professor
- Sayeski, Peter Paul
Professor
- Sayour, Elias
Professor
- Schwarz, Amanda Boczkowski
Assistant Professor
- Schwarz, Bryan C.
Clinical Assistant Professor
- Scindia, Yogesh M.
Assistant Professor
- Scott, Edward W.
Professor
- Seaver, Elaine C.
Professor
- Serban, Karina Adriana
Associate Professor
- Setlow, Barry
Professor
- Shao, Wei
Assistant Professor
- Shenkman, Elizabeth Ann
Professor
- Sheremet, Alexandru Aurica
Professor
- Shickel, Benjamin P.
Assistant Professor
- Smith, Wesley Clay
Professor
- Someya, Shinichi
Associate Professor
- Sordo Vieira, Luis Alfonso
Assistant Professor
- Srivastava, Arun
Professor
- Stanifer, Megan Lynn
Assistant Professor
- Staras, Stephanie Ann
Professor
- Streit, Wolfgang Jakob
Professor
- Strother, James
Assistant Professor
- Sutton, Lerah K.

Other

- Swanson, Maurice S.
Professor
- Theis, Ryan P.
Research Associate Professor
- Tibbetts, Scott Aaron
Professor
- Topping, Daniel B.
Clinical Associate Professor
- Urs, Nikhil Mahabir
Associate Professor
- Walker, Ashby Farmer
Assistant Professor
- Wallet, Shannon Margaret
Professor
- Walter, Glenn A.
Professor
- Wang, Eric Tzy-Shi
Professor
- Warren, Brandon Lee
Assistant Professor
- Williamson, John Bonar
Associate Professor
- Wu, Jian
Clinical Assistant Professor
- Wu, Lizi
Professor
- Wu, Yonghui
Associate Professor
- Wynn, James Lawrence
Professor
- Xu, Jie
Assistant Professor
- Yan, Guanghua
Clinical Associate Professor
- Zajac-Kaye, Maria
Professor
- Zhang, Yawei
Clinical Assistant Professor
- Zolotukhin, Serge
Professor
- Zubcevic, Jasenka
Assistant Professor

Biochemistry and Molecular Biology Department

Chair: J. B. Flanagan

Graduate Coordinator: A. Berglund

Biochemistry and Molecular Biology Department faculty mentor M.S. and Ph.D. students in the College of Medicine interdisciplinary program (IDP) in medical sciences. Students interested in pursuing a doctoral degree can view specific features of the biochemistry and molecular biology concentration at <http://biochem.med.ufl.edu/> and <http://idp.med.ufl.edu>. For admission information, visit the IDP website. Department faculty also mentor Ph.D. students in other college programs and participate actively

in the research and teaching functions of various centers such as the Center for Epigenetics and the Center for Structural Biology.

The Biochemistry and Molecular Biology Department also offers a combination BS/MS program that allows students to earn both a Bachelor's and Master's degree at an accelerated pace by counting 12 credit hours of approved courses towards both degrees. Students who are Interdisciplinary Science majors with a focus in Biochemistry or majoring in a related field and doing research with a faculty member in the Department of Biochemistry and Molecular Biology are eligible to apply. This program is considered to be a 4 + 1 program because students may finish both degrees within 5 years. To be considered with this program, students need to work with the department at the beginning of their junior year or earlier to identify courses that can count towards both degrees.

Majors

- Biochemistry and Molecular Biology (p. 297)

Faculty

Professor

- Bloom, Linda B.
- Bungert, Jorg
- Flanagan, James B.
- Kladde, Michael P.
- Long, Joanna R.
- Mareci, Thomas H.
- McKenna, Robert
- Merritt, Matthew E.
- Purich, Daniel L.
- Stacpoole, Peter W.

Associate Professor

- Bubbs, Michael Raymond
- Lu, Jianrong J.
- Xie, Mingyi

Assistant Professor

- Caglayan, Melike

Research Associate Professor

- Koroly, Mary J.

Research Assistant Professor

- Douma, Lauren G.

Affiliated Faculty

- Brusko, Todd Michael
Professor
- Cousins, Robert J.
Eminent Scholar
- Denslow, Nancy D.
Professor
- Fujii, Kotaro
Assistant Professor

- Gentry, Matthew Shawn
Professor
- Gumz, Michelle L.
Associate Professor
- Khemtong, Chalermchai
Associate Professor
- Li, Chenglong
Professor
- LI, ZHIPENG
Assistant Professor
- Licht, Jonathan D.
Professor
- Nemudryi, Artem A.
Assistant Professor
- Qian, Zhijian
Professor
- Southwick, Frederick Seacrest
Professor
- Sun, Ramon C.
Associate Professor
- Vander Kooi, Craig W.
Professor
- Wallace, Margaret R.
Professor
- Zarrinpar, Ali
Professor
- Zhao, Chen
Assistant Professor

Biochemistry and Molecular Biology Program Information

In addition to offering the Masters program in Biochemistry and Molecular Biology, the Biochemistry and Molecular Biology Department faculty mentor Ph.D. students in the College of Medicine interdisciplinary program (IDP) in medical sciences as well. Students interested in pursuing a doctoral degree can view specific features of the biochemistry and molecular biology concentration at <http://biochem.med.ufl.edu/> and <http://idp.med.ufl.edu>. For admission information, visit the IDP website.

The Department offers a wide variety of courses for graduate students studying in the life sciences. The research expertise of the faculty spans the areas from cell biology, metabolism, and molecular biology to physical biochemistry/structural biology. Current research interests include viral protease inhibitors, viral RNA replication, bioenergetics and proton translocation, X-chromosome structure and function, cytoskeletal assembly and dynamics, enzyme mechanism and control, chromatin structure, gene expression and regulation, mitochondrial biogenesis and evolution, the genetics of inherited disease, nutrient membrane transporters, protein site-directed mutagenesis, ribosome structure and function, signal transduction, structural biology and dynamics of macromolecules, protein-nucleic acid interactions, transgenic animal models, and virus crystal structure.

Prospective graduate students should have adequate training in chemistry and biology. Minor deficiencies may be made up immediately after entering graduate school. Previous undergraduate experience in a research laboratory is highly recommended. Doctoral students are required to take a core IDP course in fall term of their first year; and

beginning in spring term, students take advanced classes in areas of interest. Specific advanced-level courses may be recommended by the student's supervisory chair and committee. Courses are open to all graduate students and advanced undergraduates. Additional courses may be listed in the Advanced Concentration in Biochemistry and Molecular Biology section under the major of Medical Sciences.

Degrees Offered

Degrees Offered with a Major in Biochemistry and Molecular Biology

- Master of Science
 - no concentration
 - concentration in Reproductive Biotechnology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Biochemistry and Molecular Biology Courses

Code	Title	Credits
BCH 5205	Medical Metabolism	3
BCH 5404	Fundamentals of Biochemistry & Molecular Biology	4
BCH 5413	Mammalian Molecular Biology and Genetics	3
BCH 6040	Research Discussion in Biochemistry and Molecular Biology	1
BCH 6206	Advanced Metabolism	3
BCH 6207	Advanced Metabolism: Role of Membranes in Signal Transduction and Metabolic Control	1
BCH 6208	Advanced Metabolism: Regulation of Key Reactions in Carbohydrate and Lipid Metabolism	1
BCH 6209	Advanced Metabolism: Regulation of Key Reactions in Amino Acid and Nucleotide Metabolism	1
BCH 6415	Advanced Molecular and Cell Biology	3
BCH 6740	Physical Biochemistry/Structural Biology	3
BCH 6741C	Magnetic Resonance Imaging and Spectroscopy in Living Systems	3
BCH 6744	Molecular Structure Determination by X-ray Crystallography	1
BCH 6744L	Molecular Structure Determination by X-Ray Crystallography Laboratory	1
BCH 6745	Molecular Structure and Dynamics of NMR Spectroscopy	1
BCH 6745L	Molecular Structure and Dynamics by NMR Spectroscopy Laboratory	1
BCH 6746	Structural Biology: Macromolecular Structure Determination	1
BCH 6747	Structural Biology/Advanced Physical Biochemistry: Spectroscopy and Hydrodynamics	1
BCH 6749C	Numerical Methods in Structural Biology	1
BCH 6876	Recent Advances in Membrane Biology	1
BCH 6877	Recent Advances in Structural Biology	1
BCH 6905	Independent Studies in Biochemistry and Molecular Biology	1-5

BCH 6906	Readings in Medical Biochemistry & Molecular Biology	1
BCH 6910	Supervised Research	1-5
BCH 6936	Biochemistry Seminar	1
BCH 6971	Research for Master's Thesis	1-15
BCH 7410	Advanced Gene Regulation	1
BCH 7412	Epigenetics of Human Disease and Development	1
BCH 7515	Structural Biology/Advanced Physical Biochemistry: Kinetics and Thermodynamics	1
GMS 5905	Special Topics in Biomedical Sciences	1-4

College of Medicine Courses

Code	Title	Credits
CAI 5026	AI Ethics and Alignment in Health	3
CAI 5720	Fundamentals of Artificial Intelligence in Medicine I	3
CAI 5721	Fundamentals of Artificial Intelligence in Medicine II	3
CAI 5724	AI in Health Design Studio I	1
CAI 5730	AI in Medical Image Analysis	3
CAI 6725	AI in Health Design Studio II	3
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6090	Research in Medical Sciences	1-10
GMS 6096	Introduction to NIH Grant Writing for Biomedical Sciences	1
GMS 6405	Fundamentals of Endocrine Physiology	1
GMS 6406	Fundamentals of Pulmonary/Respiratory Physiology	1
GMS 6408	Fundamentals of Renal Physiology	1
GMS 6411	Fundamentals of Cardiovascular Physiology	1
GMS 6415	Fundamentals of Gastrointestinal Physiology	1
GMS 6491	Journal Club in Physiology	1
GMS 6780	Addiction: Neuroscience and Trends	3
GMS 6865	Quantitative Literacy for Translational Research	2
GMS 6875	Ethical and Policy Issues in Clinical Research	2
GMS 6895	CTS Journal Club	1
GMS 6903	Manuscript and Abstract Writing for Clinician/Scientists	2
GMS 6905	Independent Studies in Medical Sciences	1-10
GMS 6910	Supervised Research	1-5
GMS 6940	Supervised Teaching	1-5
GMS 6971	Research for Master's Thesis	1-15
GMS 7093	Introduction to Clinical and Translational Research	2
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7944	Practicum in Biomedical Science Education	3
GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Biochemistry & Molecular Biology (MS)

SLO1 Competency: Knowledge of Biochemistry & Molecular Biology

Students will identify and explain fundamental principles in biochemistry and molecular biology by applying this knowledge to solve problems, to explain the background to a research project, and to answer novel questions in a research setting

SLO2 Competency: Research Methods

Students will perform an independent research project that requires students to: develop technical expertise required to independently perform experimental work, independently analyze data, report key results from experiments in both written and oral formats, critically evaluate primary literature, and reproduce experimental methods from the literature

SLO3 Professionalism

Students will be professional in their conduct of research. They will adhere to and practice ethical conduct of research and implement established safety, regulatory, and administrative rules

Faculty

Professor

- Bloom, Linda B.
- Bungert, Jorg
- Flanagan, James B.
- Kladde, Michael P.
- Long, Joanna R.
- Mareci, Thomas H.
- Mckenna, Robert
- Merritt, Matthew E.
- Purich, Daniel L.
- Stacpoole, Peter W.

Associate Professor

- Bubb, Michael Raymond
- Lu, Jianrong J.
- Xie, Mingyi

Assistant Professor

- Caglayan, Melike

Research Associate Professor

- Koroly, Mary J.

Research Assistant Professor

- Douma, Lauren G.

Affiliated Faculty

- Brusko, Todd Michael
Professor
- Cousins, Robert J.
Eminent Scholar
- Denslow, Nancy D.
Professor
- Fujii, Kotaro
Assistant Professor
- Gentry, Matthew Shawn
Professor

- Gumz, Michelle L.
Associate Professor
- Khemtong, Chalermchai
Associate Professor
- Li, Chenglong
Professor
- LI, ZHIPENG
Assistant Professor
- Licht, Jonathan D.
Professor
- Nemudryi, Artem A.
Assistant Professor
- Qian, Zhijian
Professor
- Southwick, Frederick Seacrest
Professor
- Sun, Ramon C.
Associate Professor
- Vander Kooi, Craig W.
Professor
- Wallace, Margaret R.
Professor
- Zarrinpar, Ali
Professor
- Zhao, Chen
Assistant Professor

Biostatistics Department

Chair: P. Qiu

Associate Chair for Education: B. Brumback

Graduate Coordinator: K. Cason

The Department of Biostatistics offers the Doctor of Philosophy degree in biostatistics (p. 301), the Master of Science degree in biostatistics (<http://biostat.ufl.edu/education/ms-in-biostatistics/>), and the Master of Public Health degree with concentration biostatistics, which is described in detail in the Public Health section of the catalog. These programs in the Department are designed to prepare students for research and faculty positions; careers in health agencies and health-related institutions; and for consultation, especially in the biomedical fields. Although each graduate program has a set of required courses, there is ample flexibility in the programs to allow each student to develop strengths and interests through elective courses, seminars, and tutorials.

Doctor of Philosophy

The biostatistics doctoral program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete a minimum of 54 credits of biostatistics/statistics course work (30 credits can be transferred from a previously earned Master of Science program if applicable), 6 credits of public health course work, 3 credits of a consulting requirement, 6 credits of the cognate requirement, and 21 credits of dissertation work.

All graduates of the program are expected to be able to

- Conduct independent research in the development of new biostatistical methodology

- Engage in successful collaborations with investigators in new quantitative fields
- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals
- Write collaborative papers for peer-reviewed subject matter journals
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/phd-in-biostatistics/>.

Master of Science

The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students' development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics practice. This training is conducted in the innovative and interdisciplinary public health culture of the college of public health and health professions and the college of medicine and will produce graduates who will help address the shortage of biostatisticians. We expect our graduates to be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/ms-in-biostatistics/> (Campus) and <http://biostat.ufl.edu/education/msonline/> (Online).

Majors

- Biostatistics (Medicine) (p. 301)

Faculty

Professor

- Datta, Somnath
- Datta, Susmita
- Lee, Ji-Hyun
- Longini, Ira M.
- Lu, Qing Terry
- Qiu, Peihua
- Shan, Guogen
- Wu, Samuel Shangwu

Associate Professor

- Chen, Li
- Guha, Subharup
- Li, Zhigang
- Xiao, Feifei

Assistant Professor

- Berube, Sophie Christine
- Hitchings, Matthew David Thomas
- Liang, Muxuan
- Roy, Arkaprava

Research Associate Professor

- Kairalla, John Andrew
- Naranjo, Arlene H.

Clinical Assistant Professor

- Fischer, Jonathan R.
- Foti, Steven J.
- Parker, Robert L.
- Wang, Lixia

Research Professor

- Lou, XiangYang

Research Assistant Professor

- Brant, Jason Orr
- Lin, Tuo
- Xue, Wei

Courtesy Professor

- Yang, Yang

Affiliated Faculty

- Bacher, Rhonda Leigh
Associate Professor
- Cai, Guoshuai
Assistant Professor
- Doss, John
Professor
- Ghosh, Malay
Distinguished Professor
- Pei, Qinglin
Associate Professor

Courses

BIOSTATISTICS DEPARTMENTAL Courses

Code	Title	Credits
GMS 6827	Advanced Clinical Trial Methods	3
PHC 6020	Clinical Trial Methods	3
PHC 6022	Design and Conduct of Clinical Trials	3
PHC 6050C	Biostatistical Methods I	3
PHC 6051	Biostatistical Methods II	3
PHC 6059	Introduction to Applied Survival Analysis	3
PHC 6063	Biostatistical Consulting	3
PHC 6064	Survey of Advanced Biostatistical Methods for the Health Sciences	3
PHC 6075	Biostatistical Literacy	3
PHC 6084	Bayesian Biostatistical Methods	3
PHC 6088	Statistical Analysis of Genetic Data	3
PHC 6089	Public Health Computing	3

PHC 6092	Introduction to Biostatistical Theory	3
PHC 6097	Statistical Learning with Applications in Health Sciences	3
PHC 6099	Programing Basics for Biostatistics	3
PHC 6736	Statistical and Computational Analysis of Genomic Data	3
PHC 6790	Biostatistical Methods Using SAS	3
PHC 6791	Data Visualization in the Health Sciences	3
PHC 6905	Independent Study	1-6
PHC 6937	Special Topics in Public Health	1-6
PHC 7056	Analysis of Longitudinal Data	3
PHC 7066	Large Sample Theory	3
PHC 7068	Biostatistical Computing	3
PHC 7090	Advanced Biostatistical Methods I	3
PHC 7091	Advanced Biostatistical Methods II	3
PHC 7095	Advanced Statistical Learning for Biostatistics	3
PHC 7925	Biostatistics Journal Club	1-3
PHC 7979	Advanced Research	1-12
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
PHC 7980	Research for Doctoral Dissertation	1-15
STA 6177	Applied Survival Analysis	3
STA 6707	Analysis of Multivariate Data	3
STA 7179	Survival Analysis	3

College of Medicine Courses

Code	Title	Credits
CAI 5026	AI Ethics and Alignment in Health	3
CAI 5720	Fundamentals of Artificial Intelligence in Medicine I	3
CAI 5721	Fundamentals of Artificial Intelligence in Medicine II	3
CAI 5724	AI in Health Design Studio I	1
CAI 5730	AI in Medical Image Analysis	3
CAI 6725	AI in Health Design Studio II	3
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6090	Research in Medical Sciences	1-10
GMS 6096	Introduction to NIH Grant Writing for Biomedical Sciences	1
GMS 6405	Fundamentals of Endocrine Physiology	1
GMS 6406	Fundamentals of Pulmonary/Respiratory Physiology	1
GMS 6408	Fundamentals of Renal Physiology	1
GMS 6411	Fundamentals of Cardiovascular Physiology	1
GMS 6415	Fundamentals of Gastrointestinal Physiology	1
GMS 6491	Journal Club in Physiology	1
GMS 6780	Addiction: Neuroscience and Trends	3
GMS 6865	Quantitative Literacy for Translational Research	2
GMS 6875	Ethical and Policy Issues in Clinical Research	2
GMS 6895	CTS Journal Club	1
GMS 6903	Manuscript and Abstract Writing for Clinician/Scientists	2
GMS 6905	Independent Studies in Medical Sciences	1-10
GMS 6910	Supervised Research	1-5
GMS 6940	Supervised Teaching	1-5
GMS 6971	Research for Master's Thesis	1-15

GMS 7093	Introduction to Clinical and Translational Research	2
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7944	Practicum in Biomedical Science Education	3
GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15

Biostatistics (Medicine)

Program Information

Doctor of Philosophy

The biostatistics doctoral program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete a minimum of 54 credits of biostatistics/statistics course work (30 credits can be transferred from a previously earned Master of Science program if applicable), 6 credits of public health course work, 3 credits of a consulting requirement, 6 credits of the cognate requirement, and 21 credits of dissertation work.

All graduates of the program are expected to be able to

- Conduct independent research in the development of new biostatistical methodology
- Engage in successful collaborations with investigators in new quantitative fields
- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals
- Write collaborative papers for peer-reviewed subject matter journals
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/phd-in-biostatistics/>.

Master of Science

The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students' development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics practice. This training is conducted in the innovative and interdisciplinary public health culture of the college of public health and health professions and the college of medicine and will produce graduates who will help address the shortage of biostatisticians. We expect our graduates to be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/ms-in-biostatistics/> (Campus) and <http://biostat.ufl.edu/education/msonline/> (Online).

Degrees Offered

Degrees with a Major in Biostatistics

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Biostatistics Departmental Courses

Code	Title	Credits
GMS 6827	Advanced Clinical Trial Methods	3
PHC 6020	Clinical Trial Methods	3
PHC 6022	Design and Conduct of Clinical Trials	3
PHC 6050C	Biostatistical Methods I	3
PHC 6051	Biostatistical Methods II	3
PHC 6059	Introduction to Applied Survival Analysis	3
PHC 6063	Biostatistical Consulting	3
PHC 6064	Survey of Advanced Biostatistical Methods for the Health Sciences	3
PHC 6075	Biostatistical Literacy	3
PHC 6084	Bayesian Biostatistical Methods	3
PHC 6088	Statistical Analysis of Genetic Data	3
PHC 6089	Public Health Computing	3
PHC 6092	Introduction to Biostatistical Theory	3
PHC 6097	Statistical Learning with Applications in Health Sciences	3
PHC 6099	Programing Basics for Biostatistics	3
PHC 6736	Statistical and Computational Analysis of Genomic Data	3
PHC 6790	Biostatistical Methods Using SAS	3
PHC 6791	Data Visualization in the Health Sciences	3
PHC 6905	Independent Study	1-6
PHC 6937	Special Topics in Public Health	1-6
PHC 7056	Analysis of Longitudinal Data	3
PHC 7066	Large Sample Theory	3
PHC 7068	Biostatistical Computing	3
PHC 7090	Advanced Biostatistical Methods I	3
PHC 7091	Advanced Biostatistical Methods II	3
PHC 7095	Advanced Statistical Learning for Biostatistics	3
PHC 7925	Biostatistics Journal Club	1-3
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
STA 6177	Applied Survival Analysis	3
STA 6707	Analysis of Multivariate Data	3
STA 7179	Survival Analysis	3

College of Medicine Courses

Code	Title	Credits
CAI 5026	AI Ethics and Alignment in Health	3
CAI 5720	Fundamentals of Artificial Intelligence in Medicine I	3
CAI 5721	Fundamentals of Artificial Intelligence in Medicine II	3

CAI 5724	AI in Health Design Studio I	1
CAI 5730	AI in Medical Image Analysis	3
CAI 6725	AI in Health Design Studio II	3
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6090	Research in Medical Sciences	1-10
GMS 6096	Introduction to NIH Grant Writing for Biomedical Sciences	1
GMS 6405	Fundamentals of Endocrine Physiology	1
GMS 6406	Fundamentals of Pulmonary/Respiratory Physiology	1
GMS 6408	Fundamentals of Renal Physiology	1
GMS 6411	Fundamentals of Cardiovascular Physiology	1
GMS 6415	Fundamentals of Gastrointestinal Physiology	1
GMS 6491	Journal Club in Physiology	1
GMS 6780	Addiction: Neuroscience and Trends	3
GMS 6865	Quantitative Literacy for Translational Research	2
GMS 6875	Ethical and Policy Issues in Clinical Research	2
GMS 6895	CTS Journal Club	1
GMS 6903	Manuscript and Abstract Writing for Clinician/Scientists	2
GMS 6905	Independent Studies in Medical Sciences	1-10
GMS 6910	Supervised Research	1-5
GMS 6940	Supervised Teaching	1-5
GMS 6971	Research for Master's Thesis	1-15
GMS 7093	Introduction to Clinical and Translational Research	2
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7944	Practicum in Biomedical Science Education	3
GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Biostatistics (PHD)

SLO 1 Knowledge

Communicate the underpinning of biostatistics concepts and methods

SLO 2 Skills

Identify, research, and acquire new biostatistical concepts and methods on one's own

SLO 3 Skills

Develop and apply new biostatistical concepts and methods independently

SLO 4 Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications

SLO 5 Professional Behavior

Participation in academic conferences to disseminate knowledge and represent the university

Biostatistics (MS)

SLO 1 Knowledge

Communicate the underpinning of biostatistics concepts and methods

SLO 2 Skills

Apply biostatistical concepts and methods, interpret results, communicate

SLO 3 Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications

Epidemiology Department

Chair: L. Cottler

Ph.D. Program Director: C. Prins

M.S. Program Director: C. Woodstock Striley

The Department of Epidemiology – jointly governed by both the College of Public Health and Health Professions and the College of Medicine – offers the Doctor of Philosophy degree in epidemiology, Masters of Science in epidemiology, as well as the Master of Public Health degree with a concentration in epidemiology (described here (p. 331)). Minimum requirements for these degrees are described in the Graduate Degrees (p. 778) section of this catalog. The programs in the Department are designed to prepare students for careers in academic research environments, careers in public health agencies and health-related institutions, and for consultation, especially in the biomedical fields.

More information on these programs is available at the program page below and at the department website: <http://epidemiology.phhp.ufl.edu>.

Majors

- Epidemiology (Medicine) (p. 303)

Faculty

Professor

- Benos, Panagiotis
- Braithwaite, Dejana
- Cottler, Linda B.
- Kimmel, Stephen

Associate Professor

- Mai, Volker
- Wang, Yan
- Yaghjian, Lusine

Assistant Professor

- Canidate, Shantrel S.
- Chichetto, Natalie E.
- Liu, Jinling
- Liu, Yiyang
- Lopez-Quintero, Catalina
- Malin, Ashley
- Marini, Simone
- Westmoreland, Drew Anne
- Zhang, Sai

Research Associate Professor

- Striley, Catherine L.

Lecturer

- Shapiro, Jerne J.

Research Assistant Professor

- Varma, Deepthi Satheesa

Affiliated Faculty

- Canales, Muna Thalji
Assistant Professor
- Cook, Robert L.
Professor
- Cruz-Almeida, Yenisel
Associate Professor
- Cummings, Derek Adam
Professor
- Kwara, Awewura
Professor
- Lauzardo, Michael
Research Associate Professor
- Longini, Ira M.
Professor
- Louis-Jacques, Adetola Fadeyibi
Clinical Assistant Professor
- Maldonado Molina, Mildred Merisa
Professor
- Manini, Todd M.
Professor
- Prosperi, Mattia
Professor
- Rasmussen, Sonja A.
Professor
- Seraphin, Marie Nancy
Assistant Professor
- Shorr, Ronald I.
Research Professor
- Staras, Stephanie Ann
Professor
- Stark, Heather Anne
Clinical Associate Professor
- Vaddiparti Ananth, Srinivasa Krishna
Clinical Assistant Professor
- Winterstein, Almut Gertrud
Distinguished Professor

Epidemiology (Medicine) Program Information

The **Ph.D. in Epidemiology program** is in the Department of Epidemiology, which is jointly governed by the College of Public Health and Health Professions and the College of Medicine. The program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete at least 36 credits of epidemiology core courses, 6 credits of statistics electives, 18 credits of epidemiology electives, 15 credits of general electives, and 15 credits of dissertation research. Students may also apply to graduate with one or two concentrations selected from one of seven concentration areas. All entering students

who do not hold MPH or equivalent degrees are also required by the College of Public Health and Health Professions to complete an Introduction to Public Health course.

All students admitted to the Ph.D. program in Epidemiology are fully funded for four years, including a tuition waiver and a stipend. Depending on a student's source of funding, the student may work for up to 20 hours per week as a research assistant, a teaching assistant, or some combination of the both. Funding sources for students may include the student's research mentor, the department, the college, the Graduate School, or external fellowships or scholarships pursued by the student.

The core course work is designed to incorporate competencies recommended in the report of the 2002 workshop on doctoral education in epidemiology from the American College of Epidemiology and the Association of Schools and Programs of Public Health, and criteria for applied epidemiology competencies. The overall outcomes expected of all graduates are as follows:

1. Apply epidemiological methods to address critical and/or emerging public health issues through the use of:
 - Appropriate epidemiological research designs
 - Advanced statistical analysis methods for health studies
 - Data structures and measurement methods for health research
 - Depth of knowledge in an area of specialization
2. Apply ethical thinking to a questionable ethics case from the current news
3. Develop grant proposals and manage research projects
4. Write scientific papers for publication in peer-reviewed journals, and communicate research results to scientists, policy makers, and the public

Students in the Ph.D. program in Epidemiology may apply to graduate with a concentration in up to two of the following areas:

- Cancer Epidemiology
- Genetic Epidemiology
- Gero-Epidemiology
- Infectious Disease Epidemiology
- Psychiatric Epidemiology
- Clinical and Translational Science

Concentrations allow PhD students to focus their elective coursework toward specialized content areas that interest them. All concentrations offered by the Department of Epidemiology are completely optional, and students may enroll in up to two concentrations. Enrollment in a concentration requires the approval of the student's academic advisor, research mentor, PhD Program Director, and Curriculum Committee Chair.

All concentrations require that students submit either (a) dissertation aims or (b) a first-authored publication that documents research in the area of the concentration in addition to the required courses.

The overarching goal of each concentration is to provide learners with advanced training in each respective field. This training will help prepare researchers for the frontlines of interdisciplinary team science targeted towards improving the quality of life, health, and society using epidemiologic tools and methods.

Details of the Ph.D. in Epidemiology program and application information are available at our website: <http://epidemiology.php.ufl.edu/about/>

ph-d-in-epidemiology-2 (<http://epidemiology.phhp.ufl.edu/about/ph-d-in-epidemiology-2/>).

The **Master of Science in Epidemiology (MSE) program** is a 36-credit program that prepares students for careers in the public health arena that are focused on the surveillance and prevention of illnesses among diverse populations around the world. Students will be trained in the foundational aspects of epidemiology, including person, place, and time; risk and protective factors; and the social determinants of health. Areas of focus may include chronic disease, infectious disease, geriatric, environmental, psychiatric, social, cancer, and maternal and child health epidemiology.

The thesis is required to demonstrate skill in independent inquiry and investigation, under the tutelage of a mentor. All students must complete at least 15 credits of epidemiology core courses, 8 credits of biostatistics courses, 4 credits of professional development courses, 5 credits of electives, and 4 credits of thesis research.

Graduates of the MS in Epidemiology program will be able to:

- Apply surveillance, assessment, evaluation, and other foundational epidemiological research designs to all areas of interest,
- Choose appropriate measurement and analytic methods to study health and disease in a population,
- Utilize biological, behavioral and social theory to understand how to prevent and intervene to promote the public health.

Details of the Master of Science in Epidemiology program and application information are available at our website: <https://epidemiology.phhp.ufl.edu/academics/mse/>.

Degrees Offered

Degrees Offered with a Major in Epidemiology

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Gero-Epidemiology
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Epidemiology (PHHP/COM) Departmental Courses

Code	Title	Credits
GMS 7858	Causal Artificial Intelligence for Health Research	3
PHC 6000	Epidemiology Methods I	3
PHC 6002	Epidemiology of Infectious Diseases	3
PHC 6003	Epidemiology of Chronic Diseases and Disability	3
PHC 6009	Biology and Epidemiology of HIV/AIDS	3
PHC 6011	Epidemiology Methods II	3
PHC 6016	Social Epidemiology in Public Health	3
PHC 6041	Landmarks in Psychiatric Epidemiology	2
PHC 6194	Spatial Epidemiology	3

PHC 6517	Public Health Concepts in Infectious Diseases	3
PHC 6591	Maternal and Child Health Epidemiology	3
PHC 6598	Foundations in Precision Medicine: Genetic Epidemiology	1
PHC 6711	Measurement in Epidemiology and Outcomes Research	3
PHC 6717	Public Health Surveillance	3
PHC 6932	Psychiatric Epidemiology Online Seminar Series	1
PHC 6937	Special Topics in Public Health	1-6
PHC 6939	CPE Psychiatric Grand Rounds	1
PHC 6971	Research for Master's Thesis	1-4
PHC 7000	Epidemiology Seminar II: Critical Evaluation, Research Proposals, and Methods	2
PHC 7007	Cancer Epidemiology	3
PHC 7017	Advanced Epidemiologic Methods III	3
PHC 7038	Psychiatric Epidemiology	3
PHC 7065	Advanced Skills in Epidemiological Data Management	2
PHC 7083	Artificial Intelligence and Data Science for Epidemiology and Population Health	3
PHC 7199	Topics in Precision Medicine and Public Health Informatics	1
PHC 7427	Ethics in Population Science	2
PHC 7594	Genetic Epidemiology	3
PHC 7595	Introduction to Molecular Epidemiology	3
PHC 7727	Grant Writing for Population Health Research	3
PHC 7744	Causal Artificial Intelligence for Health Research	3
PHC 7901	Epidemiology Literature Review and Critique (Journal Club)	1
PHC 7902	Scientific Writing for Peer Reviewed Publications for Popular Science	3
PHC 7910	International Field Epidemiology	3
PHC 7916	National Field Epidemiology	1-3
PHC 7918	Epidemiology Independent Study	1-3
PHC 7934	Seminar I: Epidemiology Past, Present, and Future	2
PHC 7979	Advanced Research	1-12
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
PHC 7980	Research for Doctoral Dissertation	1-15

College of Medicine Courses

Code	Title	Credits
CAI 5026	AI Ethics and Alignment in Health	3
CAI 5720	Fundamentals of Artificial Intelligence in Medicine I	3
CAI 5721	Fundamentals of Artificial Intelligence in Medicine II	3
CAI 5724	AI in Health Design Studio I	1
CAI 5730	AI in Medical Image Analysis	3
CAI 6725	AI in Health Design Studio II	3
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6001	Fundamentals of Biomedical Sciences I	5
GMS 6003	Fundamentals of Graduate Research and Professional Development	1
GMS 6090	Research in Medical Sciences	1-10
GMS 6096	Introduction to NIH Grant Writing for Biomedical Sciences	1

GMS 6405	Fundamentals of Endocrine Physiology	1
GMS 6406	Fundamentals of Pulmonary/Respiratory Physiology	1
GMS 6408	Fundamentals of Renal Physiology	1
GMS 6411	Fundamentals of Cardiovascular Physiology	1
GMS 6415	Fundamentals of Gastrointestinal Physiology	1
GMS 6491	Journal Club in Physiology	1
GMS 6780	Addiction: Neuroscience and Trends	3
GMS 6865	Quantitative Literacy for Translational Research	2
GMS 6875	Ethical and Policy Issues in Clinical Research	2
GMS 6895	CTS Journal Club	1
GMS 6903	Manuscript and Abstract Writing for Clinician/Scientists	2
GMS 6905	Independent Studies in Medical Sciences	1-10
GMS 6910	Supervised Research	1-5
GMS 6940	Supervised Teaching	1-5
GMS 6971	Research for Master's Thesis	1-15
GMS 7093	Introduction to Clinical and Translational Research	2
GMS 7877	Responsible Conduct of Biomedical Research	2
GMS 7944	Practicum in Biomedical Science Education	3
GMS 7950	Fundamentals of Biomedical Science Education	2
GMS 7979	Advanced Research	1-12
GMS 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Epidemiology (PHD)

SLO1 Research Studies

Design epidemiologic research studies and analyze data to answer health-related research questions that are currently relevant to the population.

SLO2 Independent Research

Prepare to become an independent researcher in the field of Epidemiology.

SLO3 Epidemiology Concepts

Illustrate a thorough understanding of epidemiology concepts.

SLO4 Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication, and build academic skills such as grant writing

Epidemiology (MS)

SLO 1 MSE Knowledge

Apply surveillance, assessment, evaluation, and other foundational epidemiological research designs to all areas of interest

SLO 2 MSE Skills

Utilize biological, behavioral and social theory to understand how to prevent and intervene to promote the public health

SLO 3 MSE Skills Choose appropriate measurement and analytic methods to study health and disease in a population

SLO 4 MSE Professional Behavior

Display ethical behavior, cultural sensitivity, integrity in research conduct, honesty, and teamwork

Health Outcomes and Biomedical Informatics Department

Graduate Coordinator/Director: C. Bylund

At the Department of Health Outcomes and Biomedical Informatics (HOB), we conduct innovative research and leverage data to promote population health, improve health care delivery and outcomes, and advance health research. We offer master's and doctorate-level degrees in Medical Sciences with individual concentrations in **Health Outcomes and Implementation Science** and **Biomedical Informatics**. We also offer certificate-level degrees in **Implementation Science** and **Biomedical Informatics**. Minimum requirements for these degrees are described in the Graduate Degrees (<https://gradcatalog.ufl.edu/graduate/degrees/>) section of this catalog.

In an effort to train the next generation of researchers and health care professionals, HOB draws from the multi-disciplinary strengths of its faculty, which includes health services researchers, epidemiologists, prevention scientists, economists, medical anthropologists, biostatisticians, psychologists and medical sociologists to teach students how to develop and evaluate health interventions, treatments, prevention practices and policies and determine what works on a large-scale level and why.

More information about HOB can be found at hobi.med.ufl.edu. (<https://hobi.med.ufl.edu/>)

Courses

Health outcomes and biomedical informatics courses

Code	Title	Credits
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 6802	Health Outcomes Research for Chronic Diseases	3
GMS 6803	Data Science for Clinical Research	3
GMS 6804	Translational Bioinformatics	3
GMS 6805	Information Modeling in Biomedicine	3
GMS 6806	Security and Privacy for Clinical Research	3
GMS 6812	Health Outcomes Research in Cancer	3
GMS 6813	Pragmatic Clinical Trials	3
GMS 6820	Qualitative Inquiry and Analysis in Health Intervention Development and Implementation	3
GMS 6822	Measuring and Analyzing Health Outcomes II	3
GMS 6829	Longitudinal Research Design	2
GMS 6833	Health Outcomes Research in Vulnerable Populations	3
GMS 6836	Foundations of Learning Health Systems Research	1
GMS 6846	Systematic Review and Meta-Analysis in Clinical, Health Services Research and Public Health	2
GMS 6848	Ensuring Rigor and Reproducibility in Clinical and Translational Research	2
GMS 6850	Foundations of Biomedical Informatics	3
GMS 6851	Implementation Science Fundamentals	3
GMS 6852	Collaborative Clinical and Health Research Methods	2
GMS 6853	Implementation Science in the Learning Health System	3

GMS 6856	Introduction to Biomedical Natural Language Processing	3
GMS 6857	Clinical Decision Support Systems	3
GMS 6859	Foundations of Programming in Biomedical Studies	3
GMS 6885	Translational Health Research Design	3
GMS 6889	Systematic Review Methods	3
GMS 6893	Clinical and Translational Science Seminar Series	2
GMS 7858	Causal Artificial Intelligence for Health Research	3
GMS 7866	Principles of Referent Tracking in Biomedical Informatics	3
GMS 7886	Health Outcomes and Policy PhD Seminar: Applied Research	3
GMS 7887	Health Outcomes & Policy PhD Research Seminar	1
GMS 7906	Grant Writing for Health Outcomes Studies	2
STA 5503	Categorical Data Methods	3
STA 5701	Applied Multivariate Methods	3
STA 6166	Statistical Methods in Research I	3
STA 7179	Survival Analysis	3
STA 7249	Generalized Linear Models	3
STA 7346	Statistical Inference	3
STA 7347	Advanced Inference	3

Faculty

Professor

- Bylund-Lincoln, Carma
- Fisher, Carla L.
- Manini, Todd M.
- Muller, Keith E.
- Salloum, Ramzi George
- Shenkman, Elizabeth Ann
- Staras, Stephanie Ann

Associate Professor

- Gregory, Megan E.
- Guo, Yi
- Liu, Mei
- Wu, Yonghui

Assistant Professor

- Al Mardini, Mamoun Tawfiq Hashim
- Kaufmann, Christopher Norfleet
- Lemas, Dominick
- Mkuu, Rahma S.
- Shickel, Benjamin P.
- Song, Qianqian
- Strath, Larissa Jane
- Xu, Jie
- Yin, Rui

Research Associate Professor

- Theis, Ryan P.

Clinical Associate Professor

- Varnes, Julia Rae

Research Assistant Professor

- Alacevich, Caterina
- LeLaurin, Jennifer Hart
- Rahman, Protiva
- Wollney, Easton N.

Associate Scientist

- Hall, Jaclyn M.

Affiliated Faculty

- Al-Ani, Mohammad Ahmad Zaki
Clinical Assistant Professor
- Bihorac, Azra
Professor
- Duncan, William Dupree
Clinical Associate Professor
- Karanth, Shama Divakar
Assistant Professor
- Loftus, Tyler John
Associate Professor
- Louis-Jacques, Adetola Fadeyibi
Clinical Assistant Professor
- Mobley, Erin Michele
Assistant Professor
- Sarder, Pinaki
Associate Professor
- Shao, Wei
Assistant Professor
- Singh Ospina, Naykky
Associate Professor

Molecular Genetics and Microbiology Department

Chair: D. C. Bloom

Graduate Coordinator: P. A. Gulig

The Graduate Faculty of the Department of Molecular Genetics and Microbiology participates in the Biomedical Sciences (BMS) graduate program in the College of Medicine, leading to the Doctor of Philosophy degree, with specialization in one of the 7 advanced concentration areas of the BMS (see *Medical Sciences*). Departmental areas of research associated with the BMS focus on topical problems in gene expression, RNA processing, DNA replication, genomics, gene therapy, molecular basis of disease, and the mechanisms of viral pathogenesis. Faculty in the Department of Molecular Genetics and Microbiology also participate in the Medical Sciences M.S. concentration in Molecular Genetics and Microbiology (see *Medical Sciences*). In addition to courses associated with the BMS, the Department of Molecular Genetics and Microbiology maintains the courses noted on the courses tab here.

For more information contact:

Associate Chair of Education

Molecular Genetics and Microbiology
P.O. Box 100266
College of Medicine
Gainesville, FL 32610
Telephone (352) 273-8736 or
visit <http://mgm.ufl.edu/>

Faculty

Professor

- Bloom, David C.
- Cohn, Martin J.
- Gulig, Paul A.
- Harfe, Brian
- Karst, Stephanie M.
- McIntyre, Lauren M.
- Renne, Rolf Friedrich
- Resnick, James Lewis
- Scott, Edward W.
- Swanson, Maurice S.
- Tibbetts, Scott Aaron
- Wallace, Margaret R.
- Wang, Eric Tzy-Shi
- Wu, Lizi
- Zhou, Lei

Associate Professor

- Boulant, Steeve

Assistant Professor

- Fujii, Kotaro
- Ma, Zhe
- Nguyen, Lien Thi Thuy
- Stanifer, Megan Lynn

Distinguished Professor

- Ranum, Laura Page

Affiliated Faculty

- Aris, John Phillip
Associate Professor
- Bhaduri-McIntosh, Sumita
Professor
- Boye, Shannon Elizabeth
Professor
- Brown, Ashley Nicole
Associate Professor
- Bryant, Andrew Justin
Associate Professor
- Curtiss, Roy
Professor
- Dinculescu, Astra
Assistant Professor
- Driscoll, Daniel J.
Professor

- Efron, Philip Alexander
Professor
- Flanagan, James B.
Professor
- Ghivizzani, Steven C.
Professor
- Heine, Charles Henry
Research Associate Professor
- Hobbs, Jacqueline A.
Clinical Associate Professor
- Ildefonso, Christian J.
Research Assistant Professor
- Iovine, Nicole Marie
Clinical Professor
- Kaye, Frederic Joseph
Professor
- Lauzardo, Michael
Research Associate Professor
- Louie, Arnold
Professor
- Maden, Malcolm
Professor
- Martindale, Mark Q.
Professor
- Maurelli, Anthony Thomas
Professor
- McIntosh, Michael
Professor
- Moore, Julie M.
Professor
- Morris, John Glenn
Professor
- Slayton, William B.
Professor
- Srivastava, Arun
Professor
- Thomas, Ryan M.
Associate Professor
- Tuli, Sonal Sanjeev
Professor
- Vittor, Amy Yomiko
Assistant Professor
- Walter, Glenn A.
Professor
- Wang, Gary P.
Professor

Courses

Molecular Genetics and Microbiology Departmental Courses

Code	Title	Credits
GMS 5905	Special Topics in Biomedical Sciences	1-4
GMS 5909	Finding Biomedical Research Information and Communicating Science	1
GMS 6012	Human Genetics	1
GMS 6013	Developmental Genetics	1

GMS 6014	Applications of Bioinformatics to Genetics	1
GMS 6034	Advanced Virology I: Genetics and RNA	1
GMS 6035	Advanced Virology II: RNA Viruses	1
GMS 6036	Molecular Virology III: DNA Viruses	1
GMS 6038	Bacterial Genetics and Physiology	1
GMS 6040	Host-Pathogen Interactions	1
GMS 6108	Bacterial Physiology, Antibiotics, and Genetics	3
GMS 6109	Advanced Bacteriology	2
GMS 6121	Infectious Diseases	3
GMS 6123	Tropical Medicine Patient Case and Journal Discussion	1
GMS 6132	Introductory Gene and Immunotherapy	2
GMS 6140	Principles of Immunology	4
GMS 6153	Advanced Bacterial Genetics	1
GMS 6162	Oral Microbiology and Immunology	2
GMS 6169	Antimicrobial Strategies	1
GMS 6193	Research Conference in Oral Biology	1-3
GMS 6195	Epigenetics Journal Club	1
GMS 6196	Virology Journal Club	1
GMS 6198	Bacterial Pathogenesis Journal Club	1
GMS 6221	Ethics in Genetics	1
GMS 6224	Foundations in Precision Medicine: Medical Molecular Genetics	1
GMS 6231	Genomics and Bioinformatics	3
GMS 6232	Advanced Applications of Bioinformatics in Genetics	1
GMS 6251	Molecular Therapy I – Vectors and Molecular Mechanisms	1
GMS 6252	Molecular Therapy II – Disease Targets and Applications	1
GMS 6253	Molecular Therapy III – Immunology of Gene Transfer	1
GMS 6290	Genetics/Genomics Program Graduate Seminar	1
GMS 6335	Advanced Stem Cell Biology: Tissue Engineering	1
GMS 6336	Advanced Stem Cell Biology: Regenerative Medicine	1
GMS 6338	Recent Advances in Cancer Metastasis	1
GMS 6506	Biologic Drug Development	1
GMS 6867	Big Data for the Biologist	3
GMS 6920	Genetics Journal Colloquy	1
GMS 6921	Immunology/Microbiology Journal Colloquy	1
GMS 6943	Master's Translational Biotechnology Internship	3
GMS 7122	Advanced Tropical Medicine	3
GMS 7133	Advanced Molecular Virology	2
GMS 7191	Research Conference	1
GMS 7192	Journal Colloquy	1
GMS 7194	Biotechnology Seminar	1-2

College of Nursing

Dean: S.Henderson

The nationally ranked College of Nursing offers the graduate degree of Doctor of Philosophy in Nursing Sciences. Requirements for this degree are given in the Graduate Degrees (p. 778) section of this catalog. Students may request special review by the College of Nursing

Admissions Committee if they believe they are strong candidates for graduate study but do not fully meet all criteria.

The College also offers the professional degree of Doctor of Nursing Practice. The degree is a practice-focused doctorate designed to prepare expert nurses in specialized advanced practice. The DNP is an advanced educational credential for those who desire advanced practice knowledge but do not need or want a research focus. The focus of DNP program is on innovative and evidence-based practice. The DNP prepares advanced practice nurses with the knowledge, skills and abilities needed in today's and tomorrow's complex healthcare environment and to provide advanced practice nurses with educational backgrounds comparable to healthcare practitioners in other fields. As a professional degree, the rules and regulations, as well as the courses for the DNP are not covered under this Catalog; please see the College of Nursing website for more information: <https://nursing.ufl.edu/programs/doctor-of-nursing-practice-dnp/>. (<https://nursing.ufl.edu/programs/doctor-of-nursing-practice-dnp/>)

For additional information about the Nursing programs, please see the programs listed below and our website: <http://www.nursing.ufl.edu> or call (352) 273-6331.

Programs

- Nursing Sciences (p. 309)

Faculty

Professor

- Ezenwa, Miriam O.
- Horgas, Ann L.
- Keenan, Gail Mary
- Lyon, Debra
- Parker, Leslie Ann
- Wilkie, Diana J.

Associate Professor

- Carrington, Jane M.
- Dungan, Jennifer Rene
- Pei, Qinglin
- Pruinelli, Lisiane
- Scarton, Lisa
- Yoon, Saun-Joo

Assistant Professor

- Bendixen, Marion M.
- Booker, Staja
- Cho, Hwayoung
- Cousin, Lakeshia
- Fanfan, Dany Amanda
- Goncalves Rezende Macieira, Tamara
- Ingibjargardottir, Ragnhildur
- Terry, Ellen Louise

Research Associate Professor

- Yao, Yingwei

Clinical Assistant Professor

- Domenico, Lisa

Clinical Associate Professor

- Citty, Sandra Wolfe

Clinical Professor

- Duckworth, Laurie Jill

Nursing Sciences Program Information

Ph.D. Program Director: A. R. Starkweather

Complete faculty listing by department: Follow this link (<https://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx>).

The College of Nursing's Ph.D. program prepares scientists, scholars, advanced practitioners, and leaders in nursing. Comprehensive research and practice preparation is achieved by pairing students with faculty. Students have access to an array of faculty members for interdisciplinary study, clinical practice, and research. Individually directed dissertation research is a major aspect of the Ph.D. program. Research in the College includes aging and health, women's health, bio-behavioral interventions, and health policy.

Progression in the program depends on the student's ability to meet academic standards and clinical competencies as defined by College policy.

To be considered for admission to the Ph.D. program, students must meet the following minimum requirements:

- A BSN or master's degree in nursing from a CCNE/NLN AC accredited program.
- International students or students whose native language is not English are required to pass one of the following tests with a satisfactory score of:
 - Test of English as a Foreign Language (TOEFL):
 - Computer-based: 213
 - Paper-based: 550
 - Web-based: 80
 - iBT Speaking Component: 26
 - International English Language Testing System (IELTS):
 - Overall score: 6.5
 - Speaking Component: 7
 - Michigan English Language Assessment Battery (MELAB):
 - Overall score: 79
 - Successful completion of the University of Florida English Language Institute Program.
- International students or students whose native language is not English with unsatisfactory scores on the TOEFL, and TOEFL iBT Speaking Component, IELTS, or MELAB; unsuccessful completion of the UF English Language Institute Program; or an unacceptable score on the verbal part of the GRE must achieve an acceptable score on an essay administered by the Academic Written English Program at UF.
- Current licensure (or eligibility) as a Registered Nurse in the State of Florida.

- Availability of a primary mentor who is a College of Nursing faculty member with expertise consistent with the students' research focus area.
- Students must be either a U.S. citizen, legal U.S. resident or hold a valid visa.

Please see our website for more information: <https://nursing.ufl.edu/admissions/>

Degrees Offered

Degrees Offered with a Major in Nursing Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science

The PhD in Nursing Sciences prepares nurse scholars to develop and conduct scientific research that advances the theoretical foundations of nursing practice and health care delivery. It is also the gateway to a career in nursing education, where qualified faculty members are greatly needed to alleviate a growing nursing faculty shortage. Our program offers comprehensive research preparation with one of the strongest cores of nursing research faculty in Florida. The UF College of Nursing offers two options for research-focused doctoral studies in nursing. Select a program to learn more. <https://nursing.ufl.edu/admissions/>

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

College of nursing courses

Code	Title	Credits
NGR 6002C	Advanced Health Assessment	4
NGR 6052C	Adult Nursing: Diagnostics and Procedures	1
NGR 6101	Theory and Research for Nursing	3
NGR 6104	State of the Science in Nursing	3
NGR 6140	Physiology and Pathophysiology for Advanced Nursing Practice	4
NGR 6230C	Acute Care Nurse Practitioner: Diagnostics and Procedures for the Critically Ill	1
NGR 6241	Adult Nursing: Common Health Problems	4
NGR 6242L	Adlt-Gero Acnp Clin 1	3
NGR 6243	Acute Care Nurse Practitioner: Critically Ill Adult	4
NGR 6243L	Acute Care Nurse Practitioner: Critically Ill Adult Laboratory	3
NGR 6248	Adult Acute Care Nurse Practitioner 3	3
NGR 6248L	Adult Acute Care Nurse Practitioner 3	3
NGR 6301	Advanced Child Health Nursing I	3
NGR 6301L	Advanced Child Health Nursing I	3
NGR 6302	Advanced Child Health Nursing II	4
NGR 6302L	Advanced Child Health Nursing II	3
NGR 6307	Advanced Child Health Nursing III	3
NGR 6307L	Advanced Child Health Nursing III	3
NGR 6311	Adv Acute and Chron Chi	4
NGR 6311L	Adv Acu Nsg Clinical	3
NGR 6350	Family Nurse Practitioner: Women, Adolescents, And Children	4

NGR 6372C	Advanced Pediatric Procedures and Diagnostics	3
NGR 6503	Psych Np Indiv Psych	3
NGR 6503L	Psych Np: Indiv Clin	3
NGR 6508	Psych Np Group Psych	2
NGR 6508L	Psych Np: Group Clin	3
NGR 6509L	Psych Np Fam Clin	3
NGR 6538	Psychopharmacology for Psychiatric Nursing	3
NGR 6560C	Adv Psych Assess Diag	3
NGR 6612	Family Nurse Practitioner: Complex Family Health Care (Focus On Gerontology)	3
NGR 6638	Health Promotion	3
NGR 6740	Role Transition: Issues in Advanced Practice Nursing	3
NGR 6807	Mixed Methods in Health Research	3
NGR 6815	Foundations of Qualitative Health Research	3
NGR 6840	Applied Statistical Analysis I	3
NGR 6845	Applied Statistical Analysis II	3
NGR 6850	Research Methods and Evidence-Based Practice	3
NGR 6905	Individual Study	1-3
NGR 6930	Special Topics in Nursing	1-3
NGR 6937	Synthesis and Integration of State of the Science Research	3
NGR 6941	Practicum in Nursing	1-4
NGR 6943L	Teaching Practicum	2-4
NGR 6944	Individual Clinical Practice	1-6
NGR 6945L	Post Master Certificate Practicum	1-4
NGR 7115	Philosophy of Nursing Science	3
NGR 7124	Theory Development in Nursing	3
NGR 7661	Nursing Science in Health Disparities and Vulnerable Populations	3
NGR 7700	Leadership and Role Development in Advanced Nursing Practice	3
NGR 7709	Nurse Scientist and Scholar I	1
NGR 7816	Quantitative Research Design and Measurement in Nursing	3
NGR 7835	Nurse Scientist and Scholar II	1
NGR 7891	Health Policy and Finance in Advanced Nursing Practice	3
NGR 7979	Advanced Research	1-12
NGR 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Nursing sciences

Upon completion of the program, the PhD graduate is expected to engage in the following:

- Research: Synthesizes and generates knowledge for the discipline of nursing.
- Scholarly Activity: Disseminates findings to researchers, practitioners, and other stakeholders in healthcare.
- Leadership: Assumes leadership and advocacy positions to advance healthcare.
- Ethics: Synthesizes ethical issues and standards related to science and knowledge development.
- Collaboration: Develops and engages in interdisciplinary teams within the scientific and healthcare practice communities.

College of Pharmacy

Dean: P. Swaan

The College of Pharmacy offers the Doctor of Philosophy and the Master of Science in Pharmacy degrees in the pharmaceutical sciences, with concentrations in medicinal chemistry, pharmacodynamics, pharmaceutical outcomes and policy, and pharmacy which includes pharmaceuticals. There are additional concentrations in the Master of Science in Pharmacy program in pharmaceutical sciences offered in a distance-learning, nonthesis format: forensic science, forensic drug chemistry, forensic serology and DNA, clinical toxicology, pharmaceutical chemistry, medication therapy management and clinical pharmacy. Complete descriptions of the minimum requirements for the M.S.P. and Ph.D. degrees are provided in the Graduate Degrees (p. 778) section of this catalog.

The Graduate Faculty and courses offered are listed under department headings in this catalog. The courses listed below consist of seminar, supervised teaching and research, and research for thesis or doctoral dissertation. These courses are offered in each of the departments.

Students who wish to pursue graduate studies in the College of Pharmacy must have an undergraduate degree in pharmacy, chemistry, biology, or related sciences.

Satisfactory completion of a thesis or dissertation based on research is a requirement for a graduate degree in the pharmaceutical sciences.

Inquiries regarding applications and general information about the graduate programs are processed through the College of Pharmacy Graduate Programs Office at graduateadmissions@cop.ufl.edu.

For more information, please see the program pages listed below and our website: <http://pharmacy.ufl.edu>.

Departments

- Medicinal Chemistry Department (p. 311)
 - Pharmaceutical Sciences (Medicinal Chemistry Department Concentrations) (p. 311)
- Pharmaceutical Outcomes and Policy Department (p. 314)
 - Pharmaceutical Sciences (Pharmaceutical Outcomes and Policy Department Concentrations) (p. 315)
- Pharmaceutics Department (p. 318)
 - Pharmaceutical Sciences (Pharmaceutics Department Concentrations) (p. 319)
- Pharmacodynamics Department (p. 321)
 - Pharmaceutical Sciences (Pharmacodynamics Department Concentrations) (p. 322)
- Pharmacotherapy and Translational Research Department (p. 325)
 - Pharmaceutical Sciences (Pharmacotherapy and Translational Research Department Concentrations) (p. 326)

Faculty

Professor

- Lamba, Jatinder Kaur

Associate Professor

- Duarte, Julio David

Affiliated Faculty

- Hochhaus, Guenther
Professor
- Mobley, William C.
Clinical Associate Professor
- Song, Sihong
Professor
- Xing, Chengguo
Professor

Medicinal Chemistry Department

Chair: H. Luesch

Graduate Coordinator: C. Li

The mission of the Department of Medicinal Chemistry is to conduct basic research in chemistry and biochemistry as it relates to drug discovery, to teach these principles in the professional and graduate programs, and to provide service to the scientific community.

The Department of Medicinal Chemistry is located in the College of Pharmacy and is an integral part of the University of Florida's Health Science Center. Medicinal Chemistry is a unique blend of the physical and biological sciences. The scope of the field is sufficiently broad to give students with many different science backgrounds a rewarding and challenging program of study. Areas of active interest include drug discovery, organic synthesis of medicinal agents, natural products chemistry, prodrugs, topical drug delivery, peptide chemistry, molecular modeling, drug metabolism, and molecular toxicology. The department has excellent facilities for research in the major areas of Medicinal Chemistry and faculty have been highly successful in attracting extramural research support for the past several years. The Department faculty members are involved in teaching, research, and service.

Medicinal Chemistry areas of research in drug design, marine natural products, and toxicology are a unique blend of the physical and biological sciences. The scope of the field is sufficiently broad to give students with many different science backgrounds a rewarding and challenging program of study. Areas of active interest include drug discovery, organic synthesis of medicinal agents, natural products chemistry, prodrugs, topical drug delivery, peptide chemistry, molecular modeling, drug metabolism, and molecular toxicology. This Department also participates in the interdisciplinary concentration of toxicology.

For more information, please visit our website: <http://pharmacy.ufl.edu/mc> (<http://pharmacy.ufl.edu/mc/>).

Majors

- Pharmaceutical Sciences (Medicinal Chemistry Department Concentrations) (p. 311)

Faculty

Professor

- Aldrich, Jane V.
- Li, Chenglong
- Luesch, Hendrik
- McCurdy, Christopher R.

- Xing, Chengguo
- Zheng, Guangrong

Associate Professor

- Cui, Lina
- Ding, Yousong

Assistant Professor

- Li, Yanjun
- Liu, Xingui
- Xie, Wenjun

Research Associate Professor

- De Miranda Seabra, Gustavo
- Ratnayake, Ranjala

Clinical Professor

- Grundmann, Oliver

Affiliated Faculty

- Dang, Long Hoang
Clinical Professor

Pharmaceutical Sciences (Medicinal Chemistry Department Concentrations)

Program Information

The College of Pharmacy offers the Doctor of Philosophy degree in Pharmaceutical Sciences with a concentration in Medicinal Chemistry. Medicinal chemistry is a unique blend of the physical and biological sciences. The scope of the field is sufficiently broad to give students with many different science backgrounds a rewarding and challenging program of study. Areas of active research include organic synthesis of medicinal agents, metal chelate design, prodrugs and topical drug delivery, drug metabolism, molecular toxicology, molecular biology, combinatorial chemistry, neurochemistry, analytical chemistry, molecular modeling, natural products, and drug discovery.

The College also offers the Master of Science in Pharmacy degree in Pharmaceutical Sciences (non-thesis option) with concentrations in both forensic drug chemistry and forensic serology and DNA in a distance learning format. Minimum requirements for the M.S.P. and Ph.D. degrees are described in the Graduate Degrees (p. 778) section of this catalog.

The applicant should have an undergraduate degree in pharmacy, chemistry, biology, or premedical sciences. A background in calculus and physical and organic chemistry is required. In addition to graduate medicinal chemistry courses in the College of Pharmacy, graduate courses in chemistry and biochemistry are required for the program.

For more information, please see our websites: <http://pharmacy.ufl.edu/education/graduate-programs> (<http://pharmacy.ufl.edu/education/graduate-programs/>) and <http://pharmacy.ufl.edu/mc> (<http://pharmacy.ufl.edu/mc/>)

Degrees Offered**Degrees Offered With a Major in Pharmaceutical Sciences through the Department of Medicinal Chemistry**

- Doctor of Philosophy
 - concentration in Medicinal Chemistry
 - *optional second concentration in Clinical and Translational Science*
 - *optional second concentration in Toxicology*
- Master of Science in Pharmacy
 - concentration in Clinical Toxicology
 - concentration in Drug Development and Optimized Pharmacotherapy
 - concentration in Forensic DNA and Serology
 - concentration in Forensic Drug Chemistry
 - concentration in Forensic Science
 - concentration in Medicinal Chemistry
 - concentration in Pharmaceutical Chemistry

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses**Medicinal Chemistry Courses**

Code	Title	Credits
PHA 6354	Natural Medicinal Products	3
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6357	Herbal & Dietary Supplements	3
PHA 6417	Pharmaceutical Analysis II	3
PHA 6425	Drug Biotrans and Molecular Mechanisms of Toxicity	3
PHA 6432	Fundamentals of Pharmaceutical Chemistry	1
PHA 6435	Biosynthetic Logic of Medicinal Natural Products	3
PHA 6444	Pharmaceutical Chemistry I	3
PHA 6447	Drug Design	3
PHA 6471	Synthetic Medicinal Chemistry	3
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6534	Toxicology of Chemical Weapons	3
PHA 6535	Principles of Nucleotide Activity	2
PHA 6543	Pharmaceutical Chemistry II	3
PHA 6556	Introduction to Clinical Toxicology	3
PHA 6557	Clinical Toxicology I	3
PHA 6840	Medicinal Chemistry of Drugs of Abuse	3
PHA 6850	Principles of Forensic Science	3
PHA 6851	Forensic Analysis of DNA	3
PHA 6853	Biological Evidence and Serology	3
PHA 6854	Forensic Immunology	3
PHA 6855	Forensic Genetics	3
PHA 6856	Bloodstain Pattern Analysis	3
PHA 6905C	Research Procedures in Pharmaceutical Sciences	1-4
PHA 6934	Seminar in Medicinal Chemistry	1
PHA 6852	Mammalian Molecular Biology	3
VME 6602	General Toxicology	3
VME 6605	Toxic Substances	3

VME 6613	Forensic Toxicology I	3
VME 6614	Forensic Toxicology II	3
VME 6650	Principles of Mammalian Pharmacology	4
VME 6766	Laboratory Quality Assurance/Quality Control	3

Pharmaceutical Outcomes and Policy Courses

Code	Title	Credits
PHA 5270	Health Care and Patient Safety	3
PHA 5271	Health Care Risk Management	3
PHA 6227	Institutional Pharmacy Leadership I	3
PHA 6228	Institutional Pharmacy Leadership II	3
PHA 6264	Pharmaceutical Health Technology Assessment	3
PHA 6265	Introduction to Pharmaceutical Outcomes and Policy I	3
PHA 6268	Pharmacoepidemiology and Patient Safety	3
PHA 6269	Pharmaceutical Products and Public Policy	3
PHA 6273	Structure, Process, and Outcomes of Regulation	3
PHA 6274	Federal Regulations of Drugs and Pharmacy	3
PHA 6275	Federal Regulations of Controlled Substances	3
PHA 6276	Pharmacy Benefit Design & Management	3
PHA 6277	Ethics in Drug Development Production and Use	3
PHA 6278	State Regulation of Drugs and Pharmacy	3
PHA 6279	Pharmaceutical Outcomes and Policy Capstone	3
PHA 6280	Medicare and Medicaid	3
PHA 6283	Introduction to Pharmacoeconomics	3
PHA 6286	Pharmaceutical Microeconomics	3
PHA 6287	Pharmaceutical Health Economics	3
PHA 6288	Critical Review of Research Methods	3
PHA 6289	Regulating Clinical Research	3
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6717	Measurement in Pharmaceutical Outcomes and Policy Research	3
PHA 6793	Evidentiary Basis of Pharmaceutical Use	3
PHA 6796	Study Design in Pharmaceutical Outcomes & Policy Research	3
PHA 6799	Medication Safety & Quality Program Evaluation	3
PHA 6805	Applied Data Interpretation and Reporting of Findings in Pharmacy	3
PHA 6891	Introduction to Pharmacoepidemiology	3
PHA 6892	Practices and Procedures of the IRB	3
PHA 6893	Research Ethics	3
PHA 6937	Topics in Pharmaceutical Administration	2

Pharmacodynamics Courses

Code	Title	Credits
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6508	Systems Physiology and Pathophysiology I	3
PHA 6509	Systems Physiology and Pathophysiology II	3
PHA 6512L	Experiential Research Training in Pharmacodynamics	1-4
PHA 6521C	Research Techniques in Pharmacodynamics	1
PHA 7939	Journal Club in Pharmaceutical Sciences	1

Pharmacology Courses

Code	Title	Credits
GMS 6590	Seminar in Pharmacology	1
GMS 6592	Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes	1
GMS 6847	Translational Research and Therapeutics: Bench, Bedside, Community, & Policy	3
GMS 7593	Topics in Pharmacology and Toxicology	1-3

Medicinal Chemistry Departmental Courses

Code	Title	Credits
PHA 6242	Artificial Intelligence in Clinical Toxicology	3
PHA 6354	Natural Medicinal Products	3
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6357	Herbal & Dietary Supplements	3
PHA 6416	Pharmaceutical Analysis I	3
PHA 6417	Pharmaceutical Analysis II	3
PHA 6425	Drug Biotrans and Molecular Mechanisms of Toxicity	3
PHA 6432	Fundamentals of Pharmaceutical Chemistry	1
PHA 6435	Biosynthetic Logic of Medicinal Natural Products	3
PHA 6444	Pharmaceutical Chemistry I	3
PHA 6447	Drug Design	3
PHA 6452	Metabolic Biochemistry	3
PHA 6460	Principles of Drug Action & Development I	3
PHA 6461	Principles of Drug Action & Development II	3
PHA 6467C	Drug Design II	3
PHA 6468	Biotransformation Considerations in Drug Design	2
PHA 6471	Synthetic Medicinal Chemistry	3
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6532	Occupational Toxicology	3
PHA 6533	Epidemiology & Biostatistics in Clinical Toxicology	3
PHA 6534	Toxicology of Chemical Weapons	3
PHA 6535	Principles of Nucleotide Activity	2
PHA 6537	The Toxicology of Licit & Illicit Drugs of Abuse	3
PHA 6543	Pharmaceutical Chemistry II	3
PHA 6556	Introduction to Clinical Toxicology	3
PHA 6557	Clinical Toxicology 1	3
PHA 6840	Medicinal Chemistry of Drugs of Abuse	3
PHA 6850	Principles of Forensic Science	3
PHA 6851	Forensic Analysis of DNA	3
PHA 6852	Mammalian Molecular Biology	3
PHA 6853	Biological Evidence and Serology	3
PHA 6854	Forensic Immunology	3
PHA 6855	Forensic Genetics	3
PHA 6856	Bloodstain Pattern Analysis	3
PHA 6857	Forensic Analysis of DNA 2	3
PHA 6861	Intro to Forensic Medicine 2	4
PHA 6905C	Research Procedures in Pharmaceutical Sciences	1-4
PHA 6910	Supervised Research	1-5
PHA 6934	Seminar in Medicinal Chemistry	1
PHA 6935	Selected Topics in Pharmacy	1-4

PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

College of Pharmacy Courses

Code	Title	Credits
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6418	Model-Informed Drug Development	3
PHA 6471	Synthetic Medicinal Chemistry	3

Code	Title	Credits
GMS 6951	Teaching Biomedical Science	2
GMS 6952	Curricular Models for Biomedical Science	3
GMS 6953	Art and Science of Mentoring	1
GMS 6954	Assessing Effectiveness of Biomedical Science Teaching and Curricula	3
PHA 6042L	Literature Survey in Pharmacy	1-3
PHA 6051	Principles of Community Engagement Research for Health Equity	2
PHA 6120	Foundations of Precision Medicine: Pharmacogenomics	3
PHA 6134	Foundations in Precision Medicine: Genomic Technologies	1
PHA 6135	Clinical Applications of Precision Medicine: Pharmacogenomics	2
PHA 6136	Clinical Applications of Precision Medicine: Oncology	3
PHA 6137	Clinical Pharmacogenomics Implementations	3
PHA 6138	Foundations in Precision Medicine: Genetic Epidemiology	1
PHA 6139	Personal Genomics and Your Health	3
PHA 6140	Quality Control and Assurance in the Pharmaceutical Industry	3
PHA 6184	Pharmaceutical Research & Development: Foundations and Impact on Individualized Medicine	3
PHA 6232	Forensic Ethics	2
PHA 6241	Introduction to Artificial Intelligence in Pharmacy	3
PHA 6247	Principles of Pharmacy Informatics	3
PHA 6427	Pharmacogenetics of Drug Metabolism	3
PHA 6443	Case Studies in Clinical Pharmacogenomics	3
PHA 6449	Pharmacogenomic and Genomic Data Analysis	3
PHA 6462	Drug Development Strategies	3
PHA 6539	Evidence-Based Applications in Clinical Toxicology	3
PHA 6613	Clinical Applications Precision Medicine: Precision Health	3
PHA 6630	Foundations of Medication Management: Pharmacotherapy of Chronic Disease	3
PHA 6631	Foundations of Medication Management: Patient Care and Practice	3
PHA 6632	Foundations of Medication Therapy Management II	3
PHA 6633	Foundations of Medication Management: Individualized Pharmacotherapy I	3

PHA 6634	Foundations of Medication Management: Individualized Pharmacotherapy II	3
PHA 6635	Medication Therapy Management: A Renal Focus	3
PHA 6636	Medication Therapy Management: A Gastrointestinal Focus	3
PHA 6637	Medication Therapy Management: A Psychiatric Focus	3
PHA 6638	Medication Therapy Management: A Neurologic Focus	3
PHA 6639	Medication Therapy Management: A Respiratory Focus	3
PHA 6725	Ethics in Genetics	3
PHA 6746	Patient Education and Communication in the Era of Precision Medicine	3
PHA 6821	Risk Management & Assessment in Clinical Trials	3
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6946	Practicum in the Pharmaceutical Sciences	2
PHA 6950	Precision Medicine Conference	1
PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

PHARMACEUTICAL SCIENCES (PH.D.)

SLO 1

Knowledge

Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences as it relates to the student's research. At the most advanced level, this will include interpreting experimental data and designing experiments.

SLO 2

Problem Solving/Critical Thinking

Apply discipline- and research project-related knowledge to complete the student's dissertation research by formulating hypotheses, designing experiments, interpreting results, and forming conclusions from their experiments.

SLO 3

Skills

Discuss and defend the published literature of the Pharmaceutical Sciences field. The students will present analysis of the literature in a formal, structured class setting to clearly convey the background, methods, results, and significance of the literature to faculty and students.

SLO 4

Research Skills

Utilize the scientific method to formulate hypotheses based on their ability to use the literature, their own experimental observations, and those of others; design a technically sound and up-to-date experimental plan with appropriate controls; execute the experimental plan in a technically proficient manner; interpret the data; reformulate the hypotheses.

SLO 5

Professional Behavior

Exhibit behaviors and values that are consistent with ethical standards in research appropriate to safety, administrative, and regulatory rules. Professionalism, safety and adherence to regulations will be monitored by the student's mentor.

SLO6

Professional Presentations

Deliver a formal scholarly presentation of their original research results in oral and written formats at an internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmaceutical Sciences - Medicinal Chemistry (MSP)

SLO 1

Knowledge

Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences.

SLO 2

Problem-Solving/Critical Thinking

Analyze and apply material from foundation courses in the curriculum, interpret data, and synthesize a response to a complex problem or case.

SLO 3

Professional Communication

Deliver a presentation of a discipline-specific topic related to Pharmaceutical Sciences for internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmaceutical Outcomes and Policy Department

Chair: A. Winterstein

Interim Graduate Coordinator: R. Segal

Integral to the University of Florida's Health Science Center, the Department of Pharmaceutical Outcomes and Policy offers a unique blend of research and training in patient safety, pharmacoepidemiology, pharmacoeconomics, and social-behavioral issues surrounding medication use.

Pharmaceutical Outcomes and Policy offers a broad spectrum of opportunities for training, including a residential PhD and a residential MS program, for students in the health and related sciences. Students can choose between several specialty areas and have the opportunity to immerse themselves in research early in their training with ongoing faculty research programs.

The Ph.D. degree provides individuals with the credentials to develop and direct clinical research units in universities, pharmaceutical companies and contract research organizations, and government organizations. Successful graduates have a range of technical and disciplinary competencies in research design, measurement, inferential statistics, the communication and evaluation of research, research ethics, healthcare delivery and the medication use system, the drug product, and behavioral

and policy issues surrounding medication use. Those successful graduates of the residential MS degree who have a desire to continue their studies can apply for the Ph.D. program, with MS course work and other scholastic requirements applicable.

The Department has excellent facilities for quantitative and qualitative research, and faculty have been highly successful in attracting extramural research support. Qualitative research infrastructure includes conference facilities with state-of-the art equipment for focus groups or patient interviews. Quantitative research facilities include computer labs for students, a department-owned secure research server that houses various population-based datasets, and a variety of software packages.

For more information, please see the program page below and visit our website: <http://pop.pharmacy.ufl.edu>.

Majors

- Pharmaceutical Sciences (Pharmaceutical Outcomes and Policy Department Concentrations) (p. 315)

Faculty

Professor

- Segal, Richard

Associate Professor

- Lo Ciganic, Wei Hsuan Jenny
- Park, Haesuk

Assistant Professor

- Goodin, Amie J.
- Guo, Jingchuan
- Hampp, Christian
- Hasan, Md Mahmudul
- Jiao, Tianze
- Rouhizadeh, Masoud
- Vadlamudi, Nirma Khatri
- Ye, Zhiqiu

Clinical Assistant Professor

- Reise, Rachel Caroline

Distinguished Professor

- Winterstein, Almut Gertrud

Clinical Associate Professor

- Happe, Laura Elizabeth

Research Assistant Professor

- Morris, Earl Julian

Affiliated Faculty

- Kaufmann, Christopher Norfleet
Assistant Professor
- Smith, Steven M.
Associate Professor

Pharmaceutical Sciences (Pharmaceutical Outcomes and Policy Department Concentrations)

Program Information

The College of Pharmacy offers the Master of Science in Pharmacy and Doctor of Philosophy degrees in Pharmaceutical Sciences with a concentration in Pharmaceutical Outcomes and Policy, and an additional concentration in Medication Therapy Management in the M.S.P. Minimum requirements for these degrees are provided in the *Graduate Degrees* section of this catalog.

Research in the department emphasizes the epidemiological, socio-behavioral, administrative, regulatory, and economic aspects of drug therapy and pharmaceutical services, including assessment of safety, effectiveness, efficiency and quality aspects of patient-oriented pharmaceutical services and medication use.

The department offers both a research-oriented residential M.S.P. and Ph.D. degree programs as well as an online M.S.P. program. For the research oriented degree programs, graduate studies include core curricula and four specializations in patient safety and program evaluation, pharmacoeconomics, pharmacoepidemiology and social-behavioral research in medication use. Electives and required courses draw from the resources of the entire University. Graduates are prepared for leadership positions in academia, public service, pharmaceutical industry, and health service industry with a focus on the evaluation of drugs and related services.

The online non-thesis M.S.P. program is designed for working professionals, and focuses on pharmaceutical regulation and outcomes. Prior pharmacy experience/knowledge is not required and the program is available to persons located in the United States only. Coursework is delivered in both asynchronous and live, synchronous sessions. Students may choose among six specialty tracks including Pharmacy Regulation & Policy, Applied Pharmacoeconomics, Drug Regulatory Affairs, Clinical Research Regulation in Pharmacy, Patient Safety & Medication Risk Management, and Institutional Pharmacy Leadership.

For more information, please visit our websites: <http://pop.pharmacy.ufl.edu/education/prospective-students> (<http://pop.pharmacy.ufl.edu/education/prospective-students/>) and <http://pop.pharmacy.ufl.edu>.

Degrees Offered

Degrees Offered With a Major in Pharmaceutical Sciences through the Department of Pharmaceutical Outcomes and Policy

- Doctor of Philosophy
 - concentration in Pharmaceutical Outcomes and Policy
 - *optional second concentration in Clinical and Translational Science*
- Master of Science in Pharmacy
 - concentration in Drug Development and Optimized Pharmacotherapy
 - concentration in Managed Care Pharmacy

- concentration in Pharmaceutical Outcomes and Policy
- concentration in Pharmaceutical Policy
- concentration in Pharmaceutical Value Communications
- concentration in Pharmacoeconomics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Medicinal Chemistry Courses

Code	Title	Credits
PHA 6242	Artificial Intelligence in Clinical Toxicology	3
PHA 6354	Natural Medicinal Products	3
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6357	Herbal & Dietary Supplements	3
PHA 6416	Pharmaceutical Analysis I	3
PHA 6417	Pharmaceutical Analysis II	3
PHA 6425	Drug Biotrans and Molecular Mechanisms of Toxicity	3
PHA 6432	Fundamentals of Pharmaceutical Chemistry	1
PHA 6435	Biosynthetic Logic of Medicinal Natural Products	3
PHA 6444	Pharmaceutical Chemistry I	3
PHA 6447	Drug Design	3
PHA 6452	Metabolic Biochemistry	3
PHA 6460	Principles of Drug Action & Development I	3
PHA 6461	Principles of Drug Action & Development II	3
PHA 6467C	Drug Design II	3
PHA 6468	Biotransformation Considerations in Drug Design	2
PHA 6471	Synthetic Medicinal Chemistry	3
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6532	Occupational Toxicology	3
PHA 6533	Epidemiology & Biostatistics in Clinical Toxicology	3
PHA 6534	Toxicology of Chemical Weapons	3
PHA 6535	Principles of Nucleotide Activity	2
PHA 6537	The Toxicology of Licit & Illicit Drugs of Abuse	3
PHA 6543	Pharmaceutical Chemistry II	3
PHA 6556	Introduction to Clinical Toxicology	3
PHA 6557	Clinical Toxicology 1	3
PHA 6840	Medicinal Chemistry of Drugs of Abuse	3
PHA 6850	Principles of Forensic Science	3
PHA 6851	Forensic Analysis of DNA	3
PHA 6852	Mammalian Molecular Biology	3
PHA 6853	Biological Evidence and Serology	3
PHA 6854	Forensic Immunology	3
PHA 6855	Forensic Genetics	3
PHA 6856	Bloodstain Pattern Analysis	3
PHA 6857	Forensic Analysis of DNA 2	3
PHA 6861	Intro to Forensic Medicine 2	4
PHA 6905C	Research Procedures in Pharmaceutical Sciences	1-4
PHA 6910	Supervised Research	1-5
PHA 6934	Seminar in Medicinal Chemistry	1
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1

PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Pharmacodynamics Courses

Code	Title	Credits
MCB 5252	Microbiology, Immunology, and Immunotherapeutics	4
PHA 6189	CNS Drug Discovery	3
PHA 6508	Systems Physiology and Pathophysiology I	3
PHA 6509	Systems Physiology and Pathophysiology II	3
PHA 6512L	Experiential Research Training in Pharmacodynamics	1-4
PHA 6521C	Research Techniques in Pharmacodynamics	1
PHA 6563	Pathophysiology of Diseases I	3
PHA 6564	Pathophysiology of Diseases II	3
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7900	Journal Club in Pharmaceutical Research	1
PHA 7939	Journal Club in Pharmaceutical Sciences	1
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Pharmacology Courses

Code	Title	Credits
GMS 6590	Seminar in Pharmacology	1
GMS 6592	Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes	1
GMS 6847	Translational Research and Therapeutics: Bench, Bedside, Community, & Policy	3
GMS 7593	Topics in Pharmacology and Toxicology	1-3

Pharmaceutical Outcomes and Policy Departmental Courses

Code	Title	Credits
PHA 5270	Health Care and Patient Safety	3
PHA 5271	Health Care Risk Management	3
PHA 6041	Principles of Peer-Reviewed Biomedical Publications	3
PHA 6186	Pharm Outcomes/Policy Found 1	3
PHA 6187	Pharm Outcomes/Policy Found 2	3
PHA 6211	Applied Pharmacy Benefit Design	3
PHA 6213	Advanced Case Studies in Managed Care Pharmacy	3
PHA 6227	Institutional Pharmacy Leadership I	3
PHA 6228	Institutional Pharmacy Leadership II	3
PHA 6246	Medication Safety & Technology	3
PHA 6264	Pharmaceutical Health Technology Assessment	3
PHA 6265	Introduction to Pharmaceutical Outcomes and Policy I	3
PHA 6268	Pharmacoepidemiology and Patient Safety	3
PHA 6269	Pharmaceutical Products and Public Policy	3

PHA 6273	Structure, Process, and Outcomes of Regulation	3	PHA 6134	Foundations in Precision Medicine: Genomic Technologies	1
PHA 6274	Federal Regulations of Drugs and Pharmacy	3	PHA 6135	Clinical Applications of Precision Medicine: Pharmacogenomics	2
PHA 6275	Federal Regulations of Controlled Substances	3	PHA 6136	Clinical Applications of Precision Medicine: Oncology	3
PHA 6276	Pharmacy Benefit Design & Management	3	PHA 6137	Clinical Pharmacogenomics Implementations	3
PHA 6277	Ethics in Drug Development Production and Use	3	PHA 6138	Foundations in Precision Medicine: Genetic Epidemiology	1
PHA 6278	State Regulation of Drugs and Pharmacy	3	PHA 6139	Personal Genomics and Your Health	3
PHA 6279	Pharmaceutical Outcomes and Policy Capstone	3	PHA 6140	Quality Control and Assurance in the Pharmaceutical Industry	3
PHA 6280	Medicare and Medicaid	3	PHA 6184	Pharmaceutical Research & Development: Foundations and Impact on Individualized Medicine	3
PHA 6283	Introduction to Pharmacoeconomics	3	PHA 6232	Forensic Ethics	2
PHA 6286	Pharmaceutical Microeconomics	3	PHA 6241	Introduction to Artificial Intelligence in Pharmacy	3
PHA 6287	Pharmaceutical Health Economics	3	PHA 6247	Principles of Pharmacy Informatics	3
PHA 6288	Critical Review of Research Methods	3	PHA 6427	Pharmacogenetics of Drug Metabolism	3
PHA 6289	Regulating Clinical Research	3	PHA 6443	Case Studies in Clinical Pharmacogenomics	3
PHA 6717	Measurement in Pharmaceutical Outcomes and Policy Research	3	PHA 6449	Pharmacogenomic and Genomic Data Analysis	3
PHA 6741	Writing for Pharmaceutical Outcomes and Policy	3	PHA 6462	Drug Development Strategies	3
PHA 6791	Systematic Reviews and Meta-Analyses for Pharmaceutical Interventions	3	PHA 6539	Evidence-Based Applications in Clinical Toxicology	3
PHA 6793	Evidentiary Basis of Pharmaceutical Use	3	PHA 6613	Clinical Applications Precision Medicine: Precision Health	3
PHA 6795	Quantitative Methods in Evidence-Based Pharmacy	3	PHA 6630	Foundations of Medication Management: Pharmacotherapy of Chronic Disease	3
PHA 6796	Study Design in Pharmaceutical Outcomes & Policy Research	3	PHA 6631	Foundations of Medication Management: Patient Care and Practice	3
PHA 6797	Applied Pharmaceutical Research Communications	3	PHA 6632	Foundations of Medication Therapy Management II	3
PHA 6799	Medication Safety & Quality Program Evaluation	3	PHA 6633	Foundations of Medication Management: Individualized Pharmacotherapy I	3
PHA 6805	Applied Data Interpretation and Reporting of Findings in Pharmacy	3	PHA 6634	Foundations of Medication Management: Individualized Pharmacotherapy II	3
PHA 6806	Pharmacoeconomic Modeling	3	PHA 6635	Medication Therapy Management: A Renal Focus	3
PHA 6891	Introduction to Pharmacoepidemiology	3	PHA 6636	Medication Therapy Management: A Gastrointestinal Focus	3
PHA 6892	Practices and Procedures of the IRB	3	PHA 6637	Medication Therapy Management: A Psychiatric Focus	3
PHA 6893	Research Ethics	3	PHA 6638	Medication Therapy Management: A Neurologic Focus	3
PHA 6910	Supervised Research	1-5	PHA 6639	Medication Therapy Management: A Respiratory Focus	3
PHA 6935	Selected Topics in Pharmacy	1-4	PHA 6725	Ethics in Genetics	3
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2	PHA 6746	Patient Education and Communication in the Era of Precision Medicine	3
PHA 6937	Topics in Pharmaceutical Administration	2	PHA 6821	Risk Management & Assessment in Clinical Trials	3
PHA 6938	Research Seminar	1	PHA 6910	Supervised Research	1-5
PHA 6940	Supervised Teaching	1-5	PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6971	Research for Master's Thesis	1-15	PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 7807	Advanced Pharmacoepidemiology	3	PHA 6938	Research Seminar	1
PHA 7979	Advanced Research	1-12	PHA 6940	Supervised Teaching	1-5
PHA 7980	Research for Doctoral Dissertation	1-15	PHA 6946	Practicum in the Pharmaceutical Sciences	2
			PHA 6950	Precision Medicine Conference	1
			PHA 6971	Research for Master's Thesis	1-15

College of Pharmacy Courses

Code	Title	Credits
GMS 6951	Teaching Biomedical Science	2
GMS 6952	Curricular Models for Biomedical Science	3
GMS 6953	Art and Science of Mentoring	1
GMS 6954	Assessing Effectiveness of Biomedical Science Teaching and Curricula	3
PHA 6042L	Literature Survey in Pharmacy	1-3
PHA 6051	Principles of Community Engagement Research for Health Equity	2
PHA 6120	Foundations of Precision Medicine: Pharmacogenomics	3

PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

PHARMACEUTICAL SCIENCES (PH.D.)

SLO 1

Knowledge

Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences as it relates to the student's research. At the most advanced level, this will include interpreting experimental data and designing experiments.

SLO 2

Problem Solving/Critical Thinking

Apply discipline- and research project-related knowledge to complete the student's dissertation research by formulating hypotheses, designing experiments, interpreting results, and forming conclusions from their experiments.

SLO 3

Skills

Discuss and defend the published literature of the Pharmaceutical Sciences field. The students will present analysis of the literature in a formal, structured class setting to clearly convey the background, methods, results, and significance of the literature to faculty and students.

SLO 4

Research Skills

Utilize the scientific method to formulate hypotheses based on their ability to use the literature, their own experimental observations, and those of others; design a technically sound and up-to-date experimental plan with appropriate controls; execute the experimental plan in a technically proficient manner; interpret the data; reformulate the hypotheses.

SLO 5

Professional Behavior

Exhibit behaviors and values that are consistent with ethical standards in research appropriate to safety, administrative, and regulatory rules. Professionalism, safety and adherence to regulations will be monitored by the student's mentor.

SLO6

Professional Presentations

Deliver a formal scholarly presentation of their original research results in oral and written formats at an internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmaceutical Sciences - Pharmaceutical Outcomes & Policy (MSP)

SLO 1

Knowledge

Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences.

SLO 2

Problem-Solving/Critical Thinking

Analyze and apply material from foundation courses in the curriculum, interpret data, and synthesize a response to a complex problem or case.

SLO 3

Professional Communication

Deliver a presentation of a discipline-specific topic related to Pharmaceutical Sciences for internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmaceutics Department

Chair: H. C. Derendorf

Graduate Coordinator: S. Song

The focus of the Department of Pharmaceutics, which houses the Center for Drug Discovery, differs sufficiently from that of other College of Pharmacy departments as to justify a specialization. The uniqueness of the department is evident in present research activities which encompass basic, applied and clinical investigations in the areas of Biopharmaceutics and Pharmacokinetics, Pharmaceutical Biotechnology, Pharmaceutical Analysis, Drug Delivery, and Drug Discovery.

In addition to teaching, faculty members in the Department of Pharmaceutics are involved in collaborative research projects with clinical and other basic scientists within the Health Center or on campus. Many maintain collaborative ties with scientists in other universities and the pharmaceutical industry worldwide.

Currently, the Department of Pharmaceutics offers a Ph.D. in Pharmaceutical Sciences with a concentration in Pharmacy. A foundation in physical chemistry, chemistry, mathematics, and in the life sciences is required for applicants to be successful in the program. Many graduates of the Ph.D. program have built international careers in drug discovery and in the pharmaceutical industry. *Please note that all students enter directly into the Ph.D. program as the department does not accept student applications for an M.S. degree.*

The Department of Pharmaceutics is located in the University of Florida J. Hillis Miller Health Science Center complex, which includes colleges of Dentistry (<https://dental.ufl.edu/>), Medicine (<https://med.ufl.edu/>), Nursing (<https://nursing.ufl.edu/>), Pharmacy (<https://pharmacy.ufl.edu/>), Public Health and Health Professions (<https://phhp.ufl.edu/>), and Veterinary Medicine (<https://www.vetmed.ufl.edu/>). The UF&Shands system also encompasses six research institutes: the Clinical and Translational Science Institute, the McKnight Brain Institute, the Genetics Institute, the UF&Shands Cancer Center, the Institute on Aging and the Emerging Pathogens Institute. The location of the College of Pharmacy in this complex offers a broad variety of opportunities for learning and research collaboration.

For more information, please visit our website: <http://pharmacy.ufl.edu/> pc (<http://pharmacy.ufl.edu/pc/>).

Majors

- Pharmaceutical Sciences (Pharmaceutics Department Concentrations) (p. 319)

Faculty

Professor

- Hochhaus, Guenther
- Schmidt, Stephan
- Schmittgen, Thomas D.
- Song, Sihong

Associate Professor

- Dehoff, Rhonda Marsha
- He, Mei

Assistant Professor

- Cicali, Brian M.
- Cristofolletti, Rodrigo
- De Moraes, Natalia Valadares
- Kim, Sarah
- Sharma, Abhisheak
- Zhang, Fan

Clinical Associate Professor

- Mobley, William C.

Research Assistant Professor

- Azeredo, Francine Johansson

Affiliated Faculty

- Brown, Ashley Nicole
Associate Professor
- Bulitta, Jurgen Bernd
Professor
- Lamba, Jatinder Kaur
Professor
- Markowitz, John S.
Professor
- McCurdy, Christopher R.
Professor
- Peloquin, Charles A.
Professor
- Whisler, Yan G.
Associate Professor

Pharmaceutical Sciences (Pharmaceutics Department Concentrations)

Program Information

The College of Pharmacy offers the Doctor of Philosophy degree in Pharmaceutical Sciences with / without a concentration in Pharmacy, and the Master of Science in Pharmacy (M.S.P) in Pharmaceutical Sciences with / without a concentration in Pharmacy. The minimum requirements for these degrees are listed in the Graduate Degrees (p. 778) section of this Catalog.

Pharmaceutics is the scientific endeavor concerned with the design, formulation, evaluation, and use of drug delivery systems. Its domain extends from studies of the physiochemical properties of drugs and related molecules to investigations of the mechanisms of physiological processes affecting drug delivery and therapeutic effectiveness.

The Department's general focus involves studying the design and evaluation of traditional and novel dosage forms for delivering drug molecules and macromolecules. The design involves physical chemical studies and development of analytical techniques involving spectroscopy and chromatography. Evaluation includes development of sensitive analytical techniques for the drug in biological fluids and subsequent biopharmaceutical and clinical pharmacokinetic studies.

Applicants are required to have a foundation in physical chemistry, chemistry, mathematics, and in the life sciences. *Please note that all students enter directly into the Ph.D. program as the department does not accept student applications for an M.S. degree.*

For more information, please see our websites: <http://pharmacy.ufl.edu/pc/education/phd> (<http://pharmacy.ufl.edu/pc/education/phd/>) and <http://pharmacy.ufl.edu/pc> (<http://pharmacy.ufl.edu/pc/>).

Degrees Offered

Degrees Offered With a Major in Pharmaceutical Sciences through The Department of Pharmaceutics

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Pharmaceutics
 - *optional second concentration in Clinical and Translational Science*
- Master of Science in Pharmacy
 - without a concentration
 - concentration in Drug Development and Optimized Pharmacotherapy
 - concentration in Pharmaceutics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Medicinal Chemistry Courses

Code	Title	Credits
PHA 6354	Natural Medicinal Products	3
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6357	Herbal & Dietary Supplements	3
PHA 6417	Pharmaceutical Analysis II	3
PHA 6425	Drug Biotrans and Molecular Mechanisms of Toxicity	3
PHA 6432	Fundamentals of Pharmaceutical Chemistry	1
PHA 6435	Biosynthetic Logic of Medicinal Natural Products	3
PHA 6444	Pharmaceutical Chemistry I	3
PHA 6447	Drug Design	3
PHA 6471	Synthetic Medicinal Chemistry	3
PHA 6472	Organic Synthesis of Drug Molecules	3

PHA 6534	Toxicology of Chemical Weapons	3
PHA 6535	Principles of Nucleotide Activity	2
PHA 6543	Pharmaceutical Chemistry II	3
PHA 6556	Introduction to Clinical Toxicology	3
PHA 6557	Clinical Toxicology I	3
PHA 6840	Medicinal Chemistry of Drugs of Abuse	3
PHA 6850	Principles of Forensic Science	3
PHA 6851	Forensic Analysis of DNA	3
PHA 6853	Biological Evidence and Serology	3
PHA 6854	Forensic Immunology	3
PHA 6855	Forensic Genetics	3
PHA 6856	Bloodstain Pattern Analysis	3
PHA 6905C	Research Procedures in Pharmaceutical Sciences	1-4
PHA 6934	Seminar in Medicinal Chemistry	1
PHA 6852	Mammalian Molecular Biology	3
VME 6602	General Toxicology	3
VME 6605	Toxic Substances	3
VME 6613	Forensic Toxicology I	3
VME 6614	Forensic Toxicology II	3
VME 6650	Principles of Mammalian Pharmacology	4
VME 6766	Laboratory Quality Assurance/Quality Control	3

Pharmaceutical Outcomes and Policy Courses

Code	Title	Credits
PHA 5270	Health Care and Patient Safety	3
PHA 5271	Health Care Risk Management	3
PHA 6227	Institutional Pharmacy Leadership I	3
PHA 6228	Institutional Pharmacy Leadership II	3
PHA 6264	Pharmaceutical Health Technology Assessment	3
PHA 6265	Introduction to Pharmaceutical Outcomes and Policy I	3
PHA 6268	Pharmacoepidemiology and Patient Safety	3
PHA 6269	Pharmaceutical Products and Public Policy	3
PHA 6273	Structure, Process, and Outcomes of Regulation	3
PHA 6274	Federal Regulations of Drugs and Pharmacy	3
PHA 6275	Federal Regulations of Controlled Substances	3
PHA 6276	Pharmacy Benefit Design & Management	3
PHA 6277	Ethics in Drug Development Production and Use	3
PHA 6278	State Regulation of Drugs and Pharmacy	3
PHA 6279	Pharmaceutical Outcomes and Policy Capstone	3
PHA 6280	Medicare and Medicaid	3
PHA 6283	Introduction to Pharmacoeconomics	3
PHA 6286	Pharmaceutical Microeconomics	3
PHA 6287	Pharmaceutical Health Economics	3
PHA 6288	Critical Review of Research Methods	3
PHA 6289	Regulating Clinical Research	3
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6717	Measurement in Pharmaceutical Outcomes and Policy Research	3
PHA 6793	Evidentiary Basis of Pharmaceutical Use	3
PHA 6796	Study Design in Pharmaceutical Outcomes & Policy Research	3
PHA 6799	Medication Safety & Quality Program Evaluation	3

PHA 6805	Applied Data Interpretation and Reporting of Findings in Pharmacy	3
PHA 6891	Introduction to Pharmacoepidemiology	3
PHA 6892	Practices and Procedures of the IRB	3
PHA 6893	Research Ethics	3
PHA 6937	Topics in Pharmaceutical Administration	2

Pharmacodynamics Courses

Code	Title	Credits
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6508	Systems Physiology and Pathophysiology I	3
PHA 6509	Systems Physiology and Pathophysiology II	3
PHA 6512L	Experiential Research Training in Pharmacodynamics	1-4
PHA 6521C	Research Techniques in Pharmacodynamics	1
PHA 7939	Journal Club in Pharmaceutical Sciences	1

Pharmacology Courses

Code	Title	Credits
GMS 6590	Seminar in Pharmacology	1
GMS 6592	Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes	1
GMS 6847	Translational Research and Therapeutics: Bench, Bedside, Community, & Policy	3
GMS 7593	Topics in Pharmacology and Toxicology	1-3

Pharmaceutics Departmental Courses

Code	Title	Credits
PHA 5729	Intentional Living: Developing a Wellness Mindset (AKA, The Happiness Course)	1
PHA 6116	In Vivo and In Vitro Stability of Drugs	3
PHA 6122	Population Pharmacokinetics and Pharmacodynamics	3
PHA 6123	Quantitative Systems Pharmacology (QSP) Modeling	3
PHA 6125	Introduction to Quantitative Pharmacology	3
PHA 6131	Physiologically-Based Modeling	3
PHA 6133	Translational Clinical Pharmacology	3
PHA 6170C	Pharmaceutical Product Formulation	3
PHA 6183	Pharmaceutical Gene Delivery	3
PHA 6185	Life Cycle of a Drug	1
PHA 6416	Pharmaceutical Analysis I	3
PHA 6418	Model-Informed Drug Development	3
PHA 6449	Pharmacogenomic and Genomic Data Analysis	3
PHA 6630	Foundations of Medication Management: Pharmacotherapy of Chronic Disease	3
PHA 6631	Foundations of Medication Management: Patient Care and Practice	3
PHA 6632	Foundations of Medication Therapy Management II	3
PHA 6633	Foundations of Medication Management: Individualized Pharmacotherapy I	3
PHA 6634	Foundations of Medication Management: Individualized Pharmacotherapy II	3
PHA 6635	Medication Therapy Management: A Renal Focus	3
PHA 6636	Medication Therapy Management: A Gastrointestinal Focus	3

PHA 6637	Medication Therapy Management: A Psychiatric Focus	3
PHA 6638	Medication Therapy Management: A Neurologic Focus	3
PHA 6639	Medication Therapy Management: A Respiratory Focus	3
PHA 6740	Fundamentals of Grant Writing in the Pharmaceutical Sciences	2
PHA 6830	Nanomedicine-based Immunotherapy	3
PHA 6894	Introduction to Graduate Studies	1
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

College of Pharmacy Courses

Code	Title	Credits
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6418	Model-Informed Drug Development	3
PHA 6471	Synthetic Medicinal Chemistry	3

Student Learning Outcomes

PHARMACEUTICAL SCIENCES (PH.D.)

SLO 1

Knowledge

Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences as it relates to the student's research. At the most advanced level, this will include interpreting experimental data and designing experiments.

SLO 2

Problem Solving/Critical Thinking

Apply discipline- and research project-related knowledge to complete the student's dissertation research by formulating hypotheses, designing experiments, interpreting results, and forming conclusions from their experiments.

SLO 3

Skills

Discuss and defend the published literature of the Pharmaceutical Sciences field. The students will present analysis of the literature in a formal, structured class setting to clearly convey the background, methods, results, and significance of the literature to faculty and students.

SLO 4

Research Skills

Utilize the scientific method to formulate hypotheses based on their ability to use the literature, their own experimental observations, and those of others; design a technically sound and up-to-date experimental plan with appropriate controls; execute the experimental plan in a technically proficient manner; interpret the data; reformulate the hypotheses.

SLO 5

Professional Behavior

Exhibit behaviors and values that are consistent with ethical standards in research appropriate to safety, administrative, and regulatory rules. Professionalism, safety and adherence to regulations will be monitored by the student's mentor.

SLO6

Professional Presentations

Deliver a formal scholarly presentation of their original research results in oral and written formats at an internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmaceutical Sciences - Pharmaceutics (M.S.P.)

SLO 1

Knowledge

Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences.

SLO 2

Problem-Solving/Critical Thinking

Analyze and apply material from foundation courses in the curriculum, interpret data, and synthesize a response to a complex problem or case.

SLO 3

Professional Communication

Deliver a presentation of a discipline-specific topic related to Pharmaceutical Sciences for internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmacodynamics Department

Chair: M. Keller-Wood

Graduate Coordinator: C. Frazier

The Department of Pharmacodynamics offers a Doctor of Philosophy degree in Pharmaceutical Sciences with a concentration in Pharmacodynamics, and the Master of Science in Pharmacy (M.S.P) in Pharmaceutical Sciences with a concentration in Pharmacodynamics. The minimum requirements for these degrees are listed in the Graduate Degrees (p. 778) section of this Catalog. The department also participates in the Interdisciplinary Toxicology concentration. *Please note that all students enter directly into the Ph.D. program as the department does not accept student applications for an M.S. degree.*

Pharmacodynamics is an integrated field of study involving pharmacology, physiology, and toxicology in a holistic approach to drug action in living systems. The Department of Pharmacodynamics focuses on neuroendocrinology, cardiovascular pharmacology, and neuropharmacology with diverse research interests in aging, hypertension, reproduction, glaucoma, neurotoxicity, and environmental physiology. Students graduating with a Ph.D. in Pharmacodynamics can compete for jobs in the areas of academia, industry, research institutes, and government laboratories/regulatory agencies.

An undergraduate degree in pharmacy, chemistry, biology, or related sciences is required for students to be successful in the program. In

addition to graduate courses in pharmacy, courses are taken in the College of Medicine and in statistics in the College of Liberal Arts and Sciences.

The Department of Pharmacodynamics is located in the University of Florida J. Hillis Miller Health Science Center complex, which includes colleges of Dentistry (<https://dental.ufl.edu/>), Medicine (<https://med.ufl.edu/>), Nursing (<https://nursing.ufl.edu/>), Pharmacy (<https://pharmacy.ufl.edu/>), Public Health and Health Professions (<https://phhp.ufl.edu/>), and Veterinary Medicine (<https://www.vetmed.ufl.edu/>). The UF&Shands system also encompasses six research institutes: the Clinical and Translational Science Institute, the McKnight Brain Institute, the Genetics Institute, the UF&Shands Cancer Center, the Institute on Aging and the Emerging Pathogens Institute. The location of the College of Pharmacy in this complex offers a broad variety of opportunities for learning and research collaboration.

For more information, please see the program page below and visit our website: <http://pharmacy.ufl.edu/pd> (<http://pharmacy.ufl.edu/pd/>).

Majors

- Pharmaceutical Sciences (Pharmacodynamics Department Concentrations) (p. 322)

Faculty

Professor

- Bortolato, Marco
- Chakraborty, Anutosh
- Frazier, Charles Jason
- McLaughlin, Jay Patrick
- Sombers, Leslie Ann

Associate Professor

- Liu, Bin
- Malany, Siobhan

Assistant Professor

- Warren, Brandon Lee

Affiliated Faculty

- Burris, Thomas P.
Professor
- Zhang, Weizhou
Professor

Pharmaceutical Sciences (Pharmacodynamics Department Concentrations)

Program Information

The College of Pharmacy offers the Doctor of Philosophy in Pharmaceutical Sciences with a concentration in Pharmacodynamics, and the Master of Science in Pharmacy (M.S.P) in Pharmaceutical Sciences with a concentration in Pharmacodynamics. The minimum requirements for these degrees are listed in the Graduate Degrees

(p. 778) section of this Catalog. The department also participates in the Interdisciplinary Toxicology concentration.

Pharmacodynamics is an integrated field of study involving pharmacology, physiology, and toxicology in a holistic approach to drug action in living systems. The department focuses on neuroendocrinology, cardiovascular pharmacology, and neuropharmacology with diverse research interests in aging, hypertension, reproduction, glaucoma, neurotoxicity, and environmental physiology.

The program is designed for students committed to pursuing a career in the basic and health related sciences. In addition to graduate courses in pharmacy, courses are taken in the College of Medicine and in statistics in the College of Liberal Arts and Sciences. *Please note that all students enter directly into the Ph.D. program, as the department does not accept students who wish to receive only the M.S. degree.* An undergraduate degree in pharmacy, chemistry, biology, or related sciences is required of applicants.

For more information, please visit our websites: <http://pharmacy.ufl.edu/pd/education/phd/prospective-students-3> (<http://pharmacy.ufl.edu/pd/education/phd/prospective-students-3/>) and <http://pharmacy.ufl.edu/pd> (<http://pharmacy.ufl.edu/pd/>).

Degrees Offered

Degrees Offered With a Major in Pharmaceutical Sciences through The Department of Pharmacodynamics

- Doctor of Philosophy
 - concentration in Pharmacodynamics
 - *optional second concentration in Clinical and Translational Science*
- Master of Science in Pharmacy
 - concentration in Drug Development and Optimized Pharmacotherapy
 - concentration in Pharmacodynamics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Pharmacodynamics Courses

Code	Title	Credits
MCB 5252	Microbiology, Immunology, and Immunotherapeutics	4
PHA 6189	CNS Drug Discovery	3
PHA 6508	Systems Physiology and Pathophysiology I	3
PHA 6509	Systems Physiology and Pathophysiology II	3
PHA 6512L	Experiential Research Training in Pharmacodynamics	1-4
PHA 6521C	Research Techniques in Pharmacodynamics	1
PHA 6563	Pathophysiology of Diseases I	3
PHA 6564	Pathophysiology of Diseases II	3
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15

PHA 7900	Journal Club in Pharmaceutical Research	1
PHA 7939	Journal Club in Pharmaceutical Sciences	1
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Medicinal Chemistry Courses

Code	Title	Credits
PHA 6242	Artificial Intelligence in Clinical Toxicology	3
PHA 6354	Natural Medicinal Products	3
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6357	Herbal & Dietary Supplements	3
PHA 6416	Pharmaceutical Analysis I	3
PHA 6417	Pharmaceutical Analysis II	3
PHA 6425	Drug Biotrans and Molecular Mechanisms of Toxicity	3
PHA 6432	Fundamentals of Pharmaceutical Chemistry	1
PHA 6435	Biosynthetic Logic of Medicinal Natural Products	3
PHA 6444	Pharmaceutical Chemistry I	3
PHA 6447	Drug Design	3
PHA 6452	Metabolic Biochemistry	3
PHA 6460	Principles of Drug Action & Development I	3
PHA 6461	Principles of Drug Action & Development II	3
PHA 6467C	Drug Design II	3
PHA 6468	Biotransformation Considerations in Drug Design	2
PHA 6471	Synthetic Medicinal Chemistry	3
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6532	Occupational Toxicology	3
PHA 6533	Epidemiology & Biostatistics in Clinical Toxicology	3
PHA 6534	Toxicology of Chemical Weapons	3
PHA 6535	Principles of Nucleotide Activity	2
PHA 6537	The Toxicology of Licit & Illicit Drugs of Abuse	3
PHA 6543	Pharmaceutical Chemistry II	3
PHA 6556	Introduction to Clinical Toxicology	3
PHA 6557	Clinical Toxicology 1	3
PHA 6840	Medicinal Chemistry of Drugs of Abuse	3
PHA 6850	Principles of Forensic Science	3
PHA 6851	Forensic Analysis of DNA	3
PHA 6852	Mammalian Molecular Biology	3
PHA 6853	Biological Evidence and Serology	3
PHA 6854	Forensic Immunology	3
PHA 6855	Forensic Genetics	3
PHA 6856	Bloodstain Pattern Analysis	3
PHA 6857	Forensic Analysis of DNA 2	3
PHA 6861	Intro to Forensic Medicine 2	4
PHA 6905C	Research Procedures in Pharmaceutical Sciences	1-4
PHA 6910	Supervised Research	1-5
PHA 6934	Seminar in Medicinal Chemistry	1
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Pharmaceutical Outcomes and Policy Courses

Code	Title	Credits
PHA 5270	Health Care and Patient Safety	3
PHA 5271	Health Care Risk Management	3
PHA 6041	Principles of Peer-Reviewed Biomedical Publications	3
PHA 6186	Pharm Outcomes/Policy Found 1	3
PHA 6187	Pharm Outcomes/Policy Found 2	3
PHA 6211	Applied Pharmacy Benefit Design	3
PHA 6213	Advanced Case Studies in Managed Care Pharmacy	3
PHA 6227	Institutional Pharmacy Leadership I	3
PHA 6228	Institutional Pharmacy Leadership II	3
PHA 6246	Medication Safety & Technology	3
PHA 6264	Pharmaceutical Health Technology Assessment	3
PHA 6265	Introduction to Pharmaceutical Outcomes and Policy I	3
PHA 6268	Pharmacoepidemiology and Patient Safety	3
PHA 6269	Pharmaceutical Products and Public Policy	3
PHA 6273	Structure, Process, and Outcomes of Regulation	3
PHA 6274	Federal Regulations of Drugs and Pharmacy	3
PHA 6275	Federal Regulations of Controlled Substances	3
PHA 6276	Pharmacy Benefit Design & Management	3
PHA 6277	Ethics in Drug Development Production and Use	3
PHA 6278	State Regulation of Drugs and Pharmacy	3
PHA 6279	Pharmaceutical Outcomes and Policy Capstone	3
PHA 6280	Medicare and Medicaid	3
PHA 6283	Introduction to Pharmacoeconomics	3
PHA 6286	Pharmaceutical Microeconomics	3
PHA 6287	Pharmaceutical Health Economics	3
PHA 6288	Critical Review of Research Methods	3
PHA 6289	Regulating Clinical Research	3
PHA 6717	Measurement in Pharmaceutical Outcomes and Policy Research	3
PHA 6741	Writing for Pharmaceutical Outcomes and Policy	3
PHA 6791	Systematic Reviews and Meta-Analyses for Pharmaceutical Interventions	3
PHA 6793	Evidentiary Basis of Pharmaceutical Use	3
PHA 6795	Quantitative Methods in Evidence-Based Pharmacy	3
PHA 6796	Study Design in Pharmaceutical Outcomes & Policy Research	3
PHA 6797	Applied Pharmaceutical Research Communications	3
PHA 6799	Medication Safety & Quality Program Evaluation	3
PHA 6805	Applied Data Interpretation and Reporting of Findings in Pharmacy	3
PHA 6806	Pharmacoeconomic Modeling	3
PHA 6891	Introduction to Pharmacoepidemiology	3
PHA 6892	Practices and Procedures of the IRB	3
PHA 6893	Research Ethics	3
PHA 6910	Supervised Research	1-5

PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6937	Topics in Pharmaceutical Administration	2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7807	Advanced Pharmacoepidemiology	3
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Pharmacology Courses

Code	Title	Credits
GMS 6590	Seminar in Pharmacology	1
GMS 6592	Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes	1
GMS 6847	Translational Research and Therapeutics: Bench, Bedside, Community, & Policy	3
GMS 7593	Topics in Pharmacology and Toxicology	1-3

Pharmacodynamics Departmental Courses

Code	Title	Credits
MCB 5252	Microbiology, Immunology, and Immunotherapeutics	4
PHA 6189	CNS Drug Discovery	3
PHA 6508	Systems Physiology and Pathophysiology I	3
PHA 6509	Systems Physiology and Pathophysiology II	3
PHA 6512L	Experiential Research Training in Pharmacodynamics	1-4
PHA 6521C	Research Techniques in Pharmacodynamics	1
PHA 6563	Pathophysiology of Diseases I	3
PHA 6564	Pathophysiology of Diseases II	3
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7900	Journal Club in Pharmaceutical Research	1
PHA 7939	Journal Club in Pharmaceutical Sciences	1
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

College of Pharmacy Courses

Code	Title	Credits
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6418	Model-Informed Drug Development	3
PHA 6471	Synthetic Medicinal Chemistry	3
Code	Title	Credits
GMS 6951	Teaching Biomedical Science	2
GMS 6952	Curricular Models for Biomedical Science	3
GMS 6953	Art and Science of Mentoring	1
GMS 6954	Assessing Effectiveness of Biomedical Science Teaching and Curricula	3
PHA 6042L	Literature Survey in Pharmacy	1-3
PHA 6051	Principles of Community Engagement Research for Health Equity	2

PHA 6120	Foundations of Precision Medicine: Pharmacogenomics	3
PHA 6134	Foundations in Precision Medicine: Genomic Technologies	1
PHA 6135	Clinical Applications of Precision Medicine: Pharmacogenomics	2
PHA 6136	Clinical Applications of Precision Medicine: Oncology	3
PHA 6137	Clinical Pharmacogenomics Implementations	3
PHA 6138	Foundations in Precision Medicine: Genetic Epidemiology	1
PHA 6139	Personal Genomics and Your Health	3
PHA 6140	Quality Control and Assurance in the Pharmaceutical Industry	3
PHA 6184	Pharmaceutical Research & Development: Foundations and Impact on Individualized Medicine	3
PHA 6232	Forensic Ethics	2
PHA 6241	Introduction to Artificial Intelligence in Pharmacy	3
PHA 6247	Principles of Pharmacy Informatics	3
PHA 6427	Pharmacogenetics of Drug Metabolism	3
PHA 6443	Case Studies in Clinical Pharmacogenomics	3
PHA 6449	Pharmacogenomic and Genomic Data Analysis	3
PHA 6462	Drug Development Strategies	3
PHA 6539	Evidence-Based Applications in Clinical Toxicology	3
PHA 6613	Clinical Applications Precision Medicine: Precision Health	3
PHA 6630	Foundations of Medication Management: Pharmacotherapy of Chronic Disease	3
PHA 6631	Foundations of Medication Management: Patient Care and Practice	3
PHA 6632	Foundations of Medication Therapy Management II	3
PHA 6633	Foundations of Medication Management: Individualized Pharmacotherapy I	3
PHA 6634	Foundations of Medication Management: Individualized Pharmacotherapy II	3
PHA 6635	Medication Therapy Management: A Renal Focus	3
PHA 6636	Medication Therapy Management: A Gastrointestinal Focus	3
PHA 6637	Medication Therapy Management: A Psychiatric Focus	3
PHA 6638	Medication Therapy Management: A Neurologic Focus	3
PHA 6639	Medication Therapy Management: A Respiratory Focus	3
PHA 6725	Ethics in Genetics	3
PHA 6746	Patient Education and Communication in the Era of Precision Medicine	3
PHA 6821	Risk Management & Assessment in Clinical Trials	3
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6946	Practicum in the Pharmaceutical Sciences	2
PHA 6950	Precision Medicine Conference	1

PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

PHARMACEUTICAL SCIENCES (PH.D.)

SLO 1

Knowledge

Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences as it relates to the student's research. At the most advanced level, this will include interpreting experimental data and designing experiments.

SLO 2

Problem Solving/Critical Thinking

Apply discipline- and research project-related knowledge to complete the student's dissertation research by formulating hypotheses, designing experiments, interpreting results, and forming conclusions from their experiments.

SLO 3

Skills

Discuss and defend the published literature of the Pharmaceutical Sciences field. The students will present analysis of the literature in a formal, structured class setting to clearly convey the background, methods, results, and significance of the literature to faculty and students.

SLO 4

Research Skills

Utilize the scientific method to formulate hypotheses based on their ability to use the literature, their own experimental observations, and those of others; design a technically sound and up-to-date experimental plan with appropriate controls; execute the experimental plan in a technically proficient manner; interpret the data; reformulate the hypotheses.

SLO 5

Professional Behavior

Exhibit behaviors and values that are consistent with ethical standards in research appropriate to safety, administrative, and regulatory rules. Professionalism, safety and adherence to regulations will be monitored by the student's mentor.

SLO 6

Professional Presentations

Deliver a formal scholarly presentation of their original research results in oral and written formats at an internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmaceutical Sciences - Pharmacodynamics (M.S.P.)

SLO 1

Knowledge

Demonstrate comprehensive knowledge related to a specific discipline within the pharmaceutical sciences.

SLO 2

Problem-Solving/Critical Thinking

Analyze and apply material from foundation courses in the curriculum, interpret data, and synthesize a response to a complex problem or case.

SLO 3

Professional Communication

Deliver a presentation of a discipline-specific topic related to Pharmaceutical Sciences for internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature and will utilize appropriate audiovisual aids that are clearly constructed.

Pharmacotherapy and Translational Research Department

Chair: R. Frye

Graduate Coordinator: J. Lamba

The Department of Pharmacotherapy and Translational Research provides classroom and clinical instruction for pharmacy students and trains graduate students in clinical translational research. The department is proud of its national reputation as a leader in the areas of pharmacy practice, education and clinical translational research. Faculty members in the department are successful in obtaining research funding from numerous sources, including the National Institutes of Health.

The Department of Pharmacotherapy and Translational Research offers a variety of excellent clinical residencies and research fellowships, and offers a PhD program in Clinical Pharmaceutical Science. The goal of the Clinical Pharmaceutical Sciences training program is to prepare motivated individuals to pursue independent research careers in academia, industry, or government. The current research focus of the program is on understanding genetic and non-genetic factors that contribute to variability in drug response.

The Department of Pharmacotherapy and Translational Research is located in the University of Florida J. Hillis Miller Health Science Center complex, which includes colleges of Dentistry (<https://dental.ufl.edu/>), Medicine (<https://med.ufl.edu/>), Nursing (<https://nursing.ufl.edu/>), Pharmacy (<https://pharmacy.ufl.edu/>), Public Health and Health Professions (<https://phhp.ufl.edu/>), and Veterinary Medicine (<https://www.vetmed.ufl.edu/>). The UF&Shands system also encompasses six research institutes: the Clinical and Translational Science Institute, the McKnight Brain Institute, the Genetics Institute, the UF&Shands Cancer Center, the Institute on Aging and the Emerging Pathogens Institute. The location of the College of Pharmacy in this complex offers a broad variety of opportunities for learning and research collaboration.

For more information, please see the program page below and visit our website: <http://ptr.pharmacy.ufl.edu>.

Majors

- Pharmaceutical Sciences (Pharmacotherapy and Translational Research Department Concentrations) (p. 326)

Faculty

Professor

- Bulitta, Jürgen Bernd
- Cavallari, Larisa Humma

- Gums, John G.
- Markowitz, John S.
- Peloquin, Charles A.

Associate Professor

- Ricks-Santi, Luisel
- Smith, Steven M.
- Wang, Danxin
- Whisler, Yan G.

Assistant Professor

- Gbadamosi, Mohammed
- Rowe, Caitrin W.

Clinical Assistant Professor

- Seligson, Nathan David

Clinical Associate Professor

- Vogel Anderson, Katherine Lynn

Clinical Professor

- DeRemer, David
- Whalen, Karen Palmquist

Research Assistant Professor

- Kapetanaki, Maria
- Mohamed, Marwa Tantawy Aly
- Shastri, Vivek Mohan

Affiliated Faculty

- Dehoff, Rhonda Marsha
Associate Professor
- Duarte, Julio David
Associate Professor
- Lamba, Jatinder Kaur
Professor

Pharmaceutical Sciences (Pharmacotherapy and Translational Research Department Concentrations)

Program Information

The College of Pharmacy offers the Doctor of Philosophy degree in Pharmaceutical Sciences with a concentration in Clinical Pharmaceutical Sciences and the Master of Science in Pharmacy (M.S.P.) in Pharmaceutical Sciences with a concentration in Clinical Pharmacy. The minimum requirements for these degrees are listed in the Graduate Degrees (p. 778) section of this Catalog.

The Clinical Pharmaceutical Sciences training program is a collaborative effort between the Departments of Pharmacotherapy and Translational Research and Pharmaceutics with the goal of preparing motivated individuals to pursue independent research careers in academia,

industry, or government. The current research focus of the program is on understanding genetic and non-genetic factors that contribute to variability in drug response.

Students in the program conduct hypothesis-driven clinical research that includes a strong laboratory component. Excellent research facilities are available including state-of-the art bioanalytical and pharmacogenomics laboratories, and an NIH-funded Clinical Translational Science Institute (CTSI) and Clinical Research Center (UF CRC (<https://www.ctsi.ufl.edu/research/uf-clinical-research-center/>)) for clinical study conduction. Upon completion of the core/elective curriculum and dissertation, the Doctor of Philosophy (Ph.D.) Degree is awarded.

Graduate students in the Clinical Pharmaceutical Sciences program are expected to actively participate in clinical practice experiences and are required to spend 200 hours (minimum) to 600 hours (recommended) in a clinical practice setting. These experiences strengthen clinical background and foster development of the student as a translational research scientist. Preference will be given to candidates who have earned a PharmD degree from an accredited school of pharmacy.

For more information, please see our websites: <http://ptr.pharmacy.ufl.edu/education/clinical-pharmaceutical-sciences> (<http://ptr.pharmacy.ufl.edu/education/clinical-pharmaceutical-sciences/>) and <http://ptr.pharmacy.ufl.edu>.

Degrees Offered

Degrees Offered With a Major in Pharmaceutical Sciences through the Department of Pharmacotherapy and Translational Research

- Doctor of Philosophy
 - concentration in Clinical Pharmaceutical Sciences
- Master of Science in Pharmacy
 - concentration in Clinical Pharmaceutical Sciences
 - concentration in Clinical Pharmacogenomics and Precision Medicine
 - concentration in Drug Development and Optimized Pharmacotherapy
 - concentration in Individualized Medicine
 - concentration in Medication Therapy Management
 - concentration in Personalized Medicine

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Medicinal Chemistry Departmental Courses

Code	Title	Credits
PHA 6242	Artificial Intelligence in Clinical Toxicology	3
PHA 6354	Natural Medicinal Products	3
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6357	Herbal & Dietary Supplements	3
PHA 6416	Pharmaceutical Analysis I	3
PHA 6417	Pharmaceutical Analysis II	3

PHA 6425	Drug Biotrans and Molecular Mechanisms of Toxicity	3	PHA 6246	Medication Safety & Technology	3
PHA 6432	Fundamentals of Pharmaceutical Chemistry	1	PHA 6264	Pharmaceutical Health Technology Assessment	3
PHA 6435	Biosynthetic Logic of Medicinal Natural Products	3	PHA 6265	Introduction to Pharmaceutical Outcomes and Policy I	3
PHA 6444	Pharmaceutical Chemistry I	3	PHA 6268	Pharmacoepidemiology and Patient Safety	3
PHA 6447	Drug Design	3	PHA 6269	Pharmaceutical Products and Public Policy	3
PHA 6452	Metabolic Biochemistry	3	PHA 6273	Structure, Process, and Outcomes of Regulation	3
PHA 6460	Principles of Drug Action & Development I	3	PHA 6274	Federal Regulations of Drugs and Pharmacy	3
PHA 6461	Principles of Drug Action & Development II	3	PHA 6275	Federal Regulations of Controlled Substances	3
PHA 6467C	Drug Design II	3	PHA 6276	Pharmacy Benefit Design & Management	3
PHA 6468	Biotransformation Considerations in Drug Design	2	PHA 6277	Ethics in Drug Development Production and Use	3
PHA 6471	Synthetic Medicinal Chemistry	3	PHA 6278	State Regulation of Drugs and Pharmacy	3
PHA 6472	Organic Synthesis of Drug Molecules	3	PHA 6279	Pharmaceutical Outcomes and Policy Capstone	3
PHA 6532	Occupational Toxicology	3	PHA 6280	Medicare and Medicaid	3
PHA 6533	Epidemiology & Biostatistics in Clinical Toxicology	3	PHA 6283	Introduction to Pharmacoeconomics	3
PHA 6534	Toxicology of Chemical Weapons	3	PHA 6286	Pharmaceutical Microeconomics	3
PHA 6535	Principles of Nucleotide Activity	2	PHA 6287	Pharmaceutical Health Economics	3
PHA 6537	The Toxicology of Licit & Illicit Drugs of Abuse	3	PHA 6288	Critical Review of Research Methods	3
PHA 6543	Pharmaceutical Chemistry II	3	PHA 6289	Regulating Clinical Research	3
PHA 6556	Introduction to Clinical Toxicology	3	PHA 6717	Measurement in Pharmaceutical Outcomes and Policy Research	3
PHA 6557	Clinical Toxicology 1	3	PHA 6741	Writing for Pharmaceutical Outcomes and Policy	3
PHA 6840	Medicinal Chemistry of Drugs of Abuse	3	PHA 6791	Systematic Reviews and Meta-Analyses for Pharmaceutical Interventions	3
PHA 6850	Principles of Forensic Science	3	PHA 6793	Evidentiary Basis of Pharmaceutical Use	3
PHA 6851	Forensic Analysis of DNA	3	PHA 6795	Quantitative Methods in Evidence-Based Pharmacy	3
PHA 6852	Mammalian Molecular Biology	3	PHA 6796	Study Design in Pharmaceutical Outcomes & Policy Research	3
PHA 6853	Biological Evidence and Serology	3	PHA 6797	Applied Pharmaceutical Research Communications	3
PHA 6854	Forensic Immunology	3	PHA 6799	Medication Safety & Quality Program Evaluation	3
PHA 6855	Forensic Genetics	3	PHA 6805	Applied Data Interpretation and Reporting of Findings in Pharmacy	3
PHA 6856	Bloodstain Pattern Analysis	3	PHA 6806	Pharmacoeconomic Modeling	3
PHA 6857	Forensic Analysis of DNA 2	3	PHA 6891	Introduction to Pharmacoepidemiology	3
PHA 6861	Intro to Forensic Medicine 2	4	PHA 6892	Practices and Procedures of the IRB	3
PHA 6905C	Research Procedures in Pharmaceutical Sciences	1-4	PHA 6893	Research Ethics	3
PHA 6910	Supervised Research	1-5	PHA 6910	Supervised Research	1-5
PHA 6934	Seminar in Medicinal Chemistry	1	PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6935	Selected Topics in Pharmacy	1-4	PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2	PHA 6937	Topics in Pharmaceutical Administration	2
PHA 6938	Research Seminar	1	PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5	PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15	PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12	PHA 7807	Advanced Pharmacoepidemiology	3
PHA 7980	Research for Doctoral Dissertation	1-15	PHA 7979	Advanced Research	1-12
			PHA 7980	Research for Doctoral Dissertation	1-15

Pharmaceutical Outcomes and Policy Departmental Courses

Code	Title	Credits
PHA 5270	Health Care and Patient Safety	3
PHA 5271	Health Care Risk Management	3
PHA 6041	Principles of Peer-Reviewed Biomedical Publications	3
PHA 6186	Pharm Outcomes/Policy Found 1	3
PHA 6187	Pharm Outcomes/Policy Found 2	3
PHA 6211	Applied Pharmacy Benefit Design	3
PHA 6213	Advanced Case Studies in Managed Care Pharmacy	3
PHA 6227	Institutional Pharmacy Leadership I	3
PHA 6228	Institutional Pharmacy Leadership II	3

Pharmacodynamics Departmental Courses

Code	Title	Credits
MCB 5252	Microbiology, Immunology, and Immunotherapeutics	4

PHA 6189	CNS Drug Discovery	3
PHA 6508	Systems Physiology and Pathophysiology I	3
PHA 6509	Systems Physiology and Pathophysiology II	3
PHA 6512L	Experiential Research Training in Pharmacodynamics	1-4
PHA 6521C	Research Techniques in Pharmacodynamics	1
PHA 6563	Pathophysiology of Diseases I	3
PHA 6564	Pathophysiology of Diseases II	3
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6971	Research for Master's Thesis	1-15
PHA 7900	Journal Club in Pharmaceutical Research	1
PHA 7939	Journal Club in Pharmaceutical Sciences	1
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Pharmacology Courses

Code	Title	Credits
GMS 6590	Seminar in Pharmacology	1
GMS 6592	Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes	1
GMS 6847	Translational Research and Therapeutics: Bench, Bedside, Community, & Policy	3
GMS 7593	Topics in Pharmacology and Toxicology	1-3

Pharmacotherapy and Translational Research Departmental Courses (Pharmacy-Practice)

Code	Title	Credits
GMS 6951	Teaching Biomedical Science	2
GMS 6952	Curricular Models for Biomedical Science	3
GMS 6953	Art and Science of Mentoring	1
GMS 6954	Assessing Effectiveness of Biomedical Science Teaching and Curricula	3
PHA 6042L	Literature Survey in Pharmacy	1-3
PHA 6051	Principles of Community Engagement Research for Health Equity	2
PHA 6120	Foundations of Precision Medicine: Pharmacogenomics	3
PHA 6134	Foundations in Precision Medicine: Genomic Technologies	1
PHA 6135	Clinical Applications of Precision Medicine: Pharmacogenomics	2
PHA 6136	Clinical Applications of Precision Medicine: Oncology	3
PHA 6137	Clinical Pharmacogenomics Implementations	3
PHA 6138	Foundations in Precision Medicine: Genetic Epidemiology	1
PHA 6139	Personal Genomics and Your Health	3
PHA 6140	Quality Control and Assurance in the Pharmaceutical Industry	3
PHA 6184	Pharmaceutical Research & Development: Foundations and Impact on Individualized Medicine	3
PHA 6232	Forensic Ethics	2

PHA 6241	Introduction to Artificial Intelligence in Pharmacy	3
PHA 6247	Principles of Pharmacy Informatics	3
PHA 6427	Pharmacogenetics of Drug Metabolism	3
PHA 6443	Case Studies in Clinical Pharmacogenomics	3
PHA 6449	Pharmacogenomic and Genomic Data Analysis	3
PHA 6462	Drug Development Strategies	3
PHA 6539	Evidence-Based Applications in Clinical Toxicology	3
PHA 6613	Clinical Applications Precision Medicine: Precision Health	3
PHA 6630	Foundations of Medication Management: Pharmacotherapy of Chronic Disease	3
PHA 6631	Foundations of Medication Management: Patient Care and Practice	3
PHA 6632	Foundations of Medication Therapy Management II	3
PHA 6633	Foundations of Medication Management: Individualized Pharmacotherapy I	3
PHA 6634	Foundations of Medication Management: Individualized Pharmacotherapy II	3
PHA 6635	Medication Therapy Management: A Renal Focus	3
PHA 6636	Medication Therapy Management: A Gastrointestinal Focus	3
PHA 6637	Medication Therapy Management: A Psychiatric Focus	3
PHA 6638	Medication Therapy Management: A Neurologic Focus	3
PHA 6639	Medication Therapy Management: A Respiratory Focus	3
PHA 6725	Ethics in Genetics	3
PHA 6746	Patient Education and Communication in the Era of Precision Medicine	3
PHA 6821	Risk Management & Assessment in Clinical Trials	3
PHA 6910	Supervised Research	1-5
PHA 6935	Selected Topics in Pharmacy	1-4
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2
PHA 6938	Research Seminar	1
PHA 6940	Supervised Teaching	1-5
PHA 6946	Practicum in the Pharmaceutical Sciences	2
PHA 6950	Precision Medicine Conference	1
PHA 6971	Research for Master's Thesis	1-15
PHA 7979	Advanced Research	1-12
PHA 7980	Research for Doctoral Dissertation	1-15

Additional Courses: Pharmacotherapy and Translational Research

Code	Title	Credits
GMS 7877	Responsible Conduct of Biomedical Research	2
PCB 5065	Advanced Genetics	4
PHC 6001	Principles of Epidemiology in Public Health	3

Pharmaceutics Departmental Courses

Code	Title	Credits
PHA 5729	Intentional Living: Developing a Wellness Mindset (AKA, The Happiness Course)	1

PHA 6116	In Vivo and In Vitro Stability of Drugs	3	Identify, interpret, and utilize core knowledge across the spectrum of Pharmaceutical Sciences as it relates to the student's research. At the most advanced level, this will include interpreting experimental data and designing experiments.
PHA 6122	Population Pharmacokinetics and Pharmacodynamics	3	
PHA 6123	Quantitative Systems Pharmacology (QSP) Modeling	3	SLO 2
PHA 6125	Introduction to Quantitative Pharmacology	3	Problem Solving/Critical Thinking
PHA 6131	Physiologically-Based Modeling	3	Apply discipline- and research project-related knowledge to complete the student's dissertation research by formulating hypotheses, designing experiments, interpreting results, and forming conclusions from their experiments.
PHA 6133	Translational Clinical Pharmacology	3	
PHA 6170C	Pharmaceutical Product Formulation	3	SLO 3
PHA 6183	Pharmaceutical Gene Delivery	3	Skills
PHA 6185	Life Cycle of a Drug	1	Discuss and defend the published literature of the Pharmaceutical Sciences field. The students will present analysis of the literature in a formal, structured class setting to clearly convey the background, methods, results, and significance of the literature to faculty and students.
PHA 6416	Pharmaceutical Analysis I	3	
PHA 6418	Model-Informed Drug Development	3	SLO 4
PHA 6449	Pharmacogenomic and Genomic Data Analysis	3	Research Skills
PHA 6630	Foundations of Medication Management: Pharmacotherapy of Chronic Disease	3	Utilize the scientific method to formulate hypotheses based on their ability to use the literature, their own experimental observations, and those of others; design a technically sound and up-to-date experimental plan with appropriate controls; execute the experimental plan in a technically proficient manner; interpret the data; reformulate the hypotheses.
PHA 6631	Foundations of Medication Management: Patient Care and Practice	3	
PHA 6632	Foundations of Medication Therapy Management II	3	SLO 5
PHA 6633	Foundations of Medication Management: Individualized Pharmacotherapy I	3	Professional Behavior
PHA 6634	Foundations of Medication Management: Individualized Pharmacotherapy II	3	Exhibit behaviors and values that are consistent with ethical standards in research appropriate to safety, administrative, and regulatory rules. Professionalism, safety and adherence to regulations will be monitored by the student's mentor.
PHA 6635	Medication Therapy Management: A Renal Focus	3	
PHA 6636	Medication Therapy Management: A Gastrointestinal Focus	3	SLO6
PHA 6637	Medication Therapy Management: A Psychiatric Focus	3	Professional Presentations
PHA 6638	Medication Therapy Management: A Neurologic Focus	3	Deliver a formal scholarly presentation of their original research results in oral and written formats at an internal academic review. These presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.
PHA 6639	Medication Therapy Management: A Respiratory Focus	3	
PHA 6740	Fundamentals of Grant Writing in the Pharmaceutical Sciences	2	
PHA 6830	Nanomedicine-based Immunotherapy	3	
PHA 6894	Introduction to Graduate Studies	1	
PHA 6910	Supervised Research	1-5	
PHA 6935	Selected Topics in Pharmacy	1-4	
PHA 6936	Advanced Topics in Pharmaceutical Sciences	1-2	
PHA 6938	Research Seminar	1	
PHA 6940	Supervised Teaching	1-5	
PHA 6971	Research for Master's Thesis	1-15	
PHA 7979	Advanced Research	1-12	
PHA 7980	Research for Doctoral Dissertation	1-15	

College of Pharmacy Courses

Code	Title	Credits
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6418	Model-Informed Drug Development	3
PHA 6471	Synthetic Medicinal Chemistry	3

Student Learning Outcomes

PHARMACEUTICAL SCIENCES (PH.D.)

SLO 1
Knowledge

Professional Communication
Deliver a presentation of a discipline-specific topic related to Pharmaceutical Sciences for internal academic review. These

presentations will be clear in providing information at an appropriate level to the audience, complete in providing the necessary and relevant background from the literature, and will utilize appropriate audiovisual aids that are clearly constructed.

College of Public Health and Health Professions

Dean: B. Virnig

Executive Associate Dean: S. L. Hanson

The University of Florida College of Public Health and Health Professions has established a new educational model that focuses on the integration of public health problem-solving and individual patient care. The college's mission is to preserve, promote and improve the health and well-being of populations, communities and individuals. To fulfill this mission, we foster collaborations among public health and the health professions in education, research and service.

For more information, please see our website: <http://phhp.ufl.edu> (<http://phhp.ufl.edu/>)

Departments

- College of PHHP Interdisciplinary Programs (p. 331)
 - Public Health (M.P.H.) (p. 331)
 - Public Health (Ph.D.) (p. 335)
 - Rehabilitation Science (p. 337)
- Biostatistics (p. 339)
 - Biostatistics (PHHP) (p. 340)
- Clinical and Health Psychology (p. 342)
 - Psychology (Clinical and Health Psychology - PHHP) (p. 343)
- Environmental and Global Health (p. 344)
 - Environmental and Global Health (M.H.S. - One Health) (p. 345)
 - Public Health (Ph.D. - Environmental and Global Health) (p. 346)
 - Public Health (Ph.D. - One Health) (p. 346)
- Epidemiology (p. 347)
 - Epidemiology (PHHP) (p. 348)
- Health Services Research, Management and Policy (p. 351)
 - Health Administration (p. 351)
- Speech, Language, and Hearing Sciences (p. 353)
 - Audiology (p. 353)
 - Communication Sciences and Disorders (p. 355)

Faculty

Professor

- Cook, Robert L.
- Mitchell, Gordon Stewart

Associate Professor

- Bacher, Rhonda Leigh
- Ross, Kathryn Marie

Research Associate Professor

- Ali, Afsar

Clinical Assistant Professor

- Shakeel Ahmed, Fnu

Clinical Professor

- Blue, Amy Victoria
- Hack, George O.
- Hanson, Stephanie Lee

Research Professor

- Lednicki, John

Research Assistant Professor

- Barnard, Alison M.
- Heil, Gary Lee

Affiliated Faculty

- Applebaum, Jennifer W.
Assistant Professor
- Beau De Rochars, Valery E.
Research Assistant Professor
- Benson, Keith
Clinical Professor
- Canidate, Shantrel S.
Assistant Professor
- Colon-Burgos, Jose F.
Assistant Professor
- Cottler, Linda B.
Professor
- Datta, Santanu K.
Clinical Associate Professor
- Dixon-Daniel, Brittney Nicole
Clinical Assistant Professor
- Galloway, Anna
Clinical Assistant Professor
- Hammarlund, Noah Evan
Assistant Professor
- Harle, Christopher Albert William
Courtesy Professor
- Jacobs, Molly M.
Associate Professor
- Janicke, David
Professor
- Jo, Ara
Clinical Associate Professor
- Kairalla, John Andrew
Research Associate Professor
- Kane, Andrew S.
Associate Professor
- Kates, Frederick Richard
Clinical Associate Professor
- King, Lindsey Marie
Clinical Associate Professor
- Lauzardo, Michael
Research Associate Professor
- Mai, Volker

Associate Professor

- Mainous, Arch G.
Professor
- Marlow, Nicole Marguerite
Research Assistant Professor
- McKune, Sarah Lindley
Research Associate Professor
- Moorhouse, Michael D.
Clinical Associate Professor
- Naranjo, Arlene H.
Research Associate Professor
- Pearl, Rebecca
Associate Professor
- Pomeranz, Jamie L.
Clinical Associate Professor
- Revere, Frances Lee
Professor
- Shapiro, Jerne J.
Lecturer
- Sibille, Kimberly T.
Associate Professor
- Stark, Heather Anne
Clinical Associate Professor
- Strelakova, Yulia A.
Assistant Professor
- Striley, Catherine L.
Research Associate Professor
- Varnes, Julia Rae
Clinical Associate Professor
- Vilario, Melissa J.
Assistant Professor
- Walker, Ashby Farmer
Assistant Professor
- Zori, Gaia Lynn
Clinical Assistant Professor

- Public health practice
- Social and behavioral sciences

Both a 48-credit program for students without terminal health science degrees and a 42-credit program for students with a terminal degree are offered. A combination bachelor's/master of public health program is available, as well as a 15-credit college certificate program. Students interested in collaborative programs may pursue joint MPH and DVM, MD, JD, PharmD, DPT, or DMD degrees, or concurrent master's and PhD programs. The MPH degree program and the Public Health certificate are available on campus and online. For program descriptions and information on applying, visit the website: www.mph.ufl.edu (<http://gradcatalog.ufl.edu/graduate/colleges-departments/public-health-professions/interdisciplinary-departments/public-health-mph/www.mph.ufl.edu>).

48-credit Master of Public Health: Students who do not hold a terminal degree in a health science discipline are eligible to apply for the 48-credit program. The program provides comprehensive coverage of core public health content and allows selection of a concentration. Students must complete 18 credits of core public health course work, 12 to 15 credits of concentration core courses, up to 12 credits of elective courses, and three credits of applied practice experience. The course work representing these requirements is described below.

42-credit accelerated Master of Public Health: Students who hold a terminal degree (usually a doctoral degree) in a health science discipline may be eligible for the 42-credit accelerated program. This program requires completion of 16 credits of core public health course work, 21 credits of concentration and elective course work, and a five-credit internship.

Combination degree program: The College offers a combination degree program to allow qualified undergraduates to earn both a bachelor's degree and the Master of Public Health degree efficiently. Seniors with any undergraduate major are eligible for the combination degree program as long as they have an undergraduate GPA of at least 3.2 and competitive scores on the verbal and quantitative portions of the GRE, and their career interests match the MPH program. Students accepted into the combination degree program complete 15 credits of public health course work while still undergraduates, leaving only 33 credits after admission to graduate school. Students must achieve a B or better in public health courses taken as an undergraduate and be accepted to graduate school to complete the program.

Core Courses: All MPH students take five public health core courses. The core courses in environmental health, epidemiology, public health management and policy, and social and behavioral sciences are taken by all students. The core biostatistics course varies across concentration areas. Students in the biostatistics, environmental health, epidemiology and social and behavioral sciences concentrations must take PHC 6052: Introduction to Biostatistical Methods. All other MPH students must take PHC 6050: Statistical Methods for Health Sciences Research I. In addition, all students must take a three-credit Master of Public Health Capstone course and three credits of PHC 6946: MPH Applied Practice Experience.

Applied Practice Experience (APE): Each student completes an internship during their APE course, which provides an opportunity to apply knowledge acquired in the classroom to a real public health problem in a practice setting. Students may engage in many activities during an internship, but each student must produce at least two portfolio products that demonstrate achievement of at least five Public Health Competencies.

Interdisciplinary Departments

Majors

- Public Health (M.P.H.) (p. 331)
- Public Health (Ph.D.) (p. 335)
- Rehabilitation Science (p. 337)

Public Health (M.P.H.)

Program Information

Director: J. Varnes

The Master of Public Health degree is offered as a non-thesis program and is designed to prepare students to become effective public health practitioners, scientists, and educators.

Students select one of six concentration areas:

- Biostatistics
- Environmental health
- Epidemiology
- Population health management

MPH Capstone: This course serves as the required integrative learning experience for students in the MPH program. Students will demonstrate synthesis of foundational and concentration competencies through an individual or group project that addresses the needs of a public health agency. Students will produce a high-quality written report for their agency and present their project on Public Health Day near the end of the semester.

Master of Public Health with a Concentration in Biostatistics

The contribution of biostatisticians is far reaching and includes both core public health research and consultation with other health professionals. The biostatistics concentration is designed primarily for students with a previous graduate degree (particularly in the health sciences) who want to obtain a solid background in quantitative and analytical methods for public health research. The course work exposes students to methodology typically used to analyze different types of public health data and gives them opportunities to apply these methodologies themselves.

Graduates of the MPH program with a concentration in biostatistics return to their careers with an improved understanding of quantitative methods for public health research. This increased knowledge will facilitate their own research programs and will enhance their ability to critically read the literature in their field. The biostatistics concentration requires completion of four concentration core courses: Regression Methods for the Health and Life Sciences, Epidemiology Research Methods I, Public Health Computing, and Survival Analysis. Remaining courses include the public health internship and electives in statistics and public health. Visit the biostatistics concentration website for the most up-to-date information about course options: <http://mph.ufl.edu/programs/master-of-public-health/biostatistics>. (<http://mph.ufl.edu/programs/master-of-public-health/biostatistics.html>)

See the department Biostatistics website for information about other programs offered by the department: <http://biostat.ufl.edu/>.

Master of Public Health with a Concentration in Environmental Health

Professionals trained in environmental health study the impact of our surroundings on our health. They understand how environmental risk factors can cause diseases like asthma, cancer, and food poisoning. Environmental health professionals make up approximately half of public health personnel and the field accounts for about half of public health expenditures. Students interested in environmental health typically have a background in biological or physical sciences, engineering, nursing, medicine, and veterinary medicine. Prior experience in chemistry, biology, statistics, and Microsoft Excel software is desirable. Please note the prerequisites for Environmental Health courses and speak with the instructor if you have not successfully completed the prerequisites. The following courses are required for all students pursuing the environmental health concentration: Environmental Toxicology Applications in Public Health, Environmental Policy and Risk Management in Public Health, Exposure Measurement and Assessment, Environmental Ecology of Human Pathogens, Global Health and Development I, and MPH Capstone. Students may also choose from elective course work listed on the department website below. Environmental health students complete their programs with an internship and electives on a wide variety of environmental health and public health topics.

Visit the environmental health concentration website for the most up-to-date information about course options:

<http://mph.ufl.edu/programs/master-of-public-health/environmental-health> (<http://mph.ufl.edu/programs/master-of-public-health/environmental-health/>). And visit the Website of the Department of Environmental and Global Health for information about other academic programs and activities in the department: <http://egh.phhp.ufl.edu>.

Master of Public Health with a Concentration in Epidemiology

Epidemiology focuses on the study of the distribution and determinants of health in populations and communities. It is the scientific foundation of public health research that seeks to reduce risk factors and improve health. The discipline also contributes to public health practice and policy, and research in other health-related fields such as medicine and pharmacy. This concentration area is designed to train professionals to apply the principles and methods of epidemiological investigation in a broad range of settings. The required concentration core courses in epidemiology are Epidemiology Research Methods I, Epidemiology Research Methods II, Epidemiology of Infectious Diseases, Epidemiology of Chronic Disease, and MPH Capstone. Epidemiology concentration students complete their programs with an internship and electives in epidemiology and public health.

Additional detail and options for epidemiology elective course work are at the website: <http://mph.ufl.edu/programs/master-of-public-health/epidemiology> (<http://mph.ufl.edu/programs/master-of-public-health/epidemiology/>). Please also visit the website of the Department of Epidemiology for up-to-date information about other epidemiology programs and activities: <http://epidemiology.phhp.ufl.edu>.

Master of Public Health with a Concentration in Population Health Management (PHM)

This concentration focuses on the structure and administration of health organizations and the policies that impact health programs and reimbursement of health services. The concentration encompasses two of the major roles of leaders in public health. Essential skills for managing a health agency or organization include accounting, financial management, human resource management, strategic and program planning, operations research, economics, and monitoring outcome measures. Development, analysis, interpretation, and evaluation of government policies require analytical skills and social skills, as well as a deep understanding of politics.

The required concentration core courses in PHM are Evidence-Based Management of Public Health Programs, Health Economics, Public Health Quality & Outcomes, Survey Research Methods, Systems Thinking and Public Health, and MPH Capstone. PHM students complete their programs with an internship and electives in population health management. Visit the population health management concentration website for the most up-to-date information about course options: <http://mph.ufl.edu/prospective-students/mph/traditional-mph-degree/concentrations/public-health-management-and-policy/>. (<http://mph.ufl.edu/prospective-students/mph/traditional-mph-degree/concentrations/public-health-management-and-policy/>)

The website of Department of Health Services Research, Management, and Policy provides additional information about activities and other academic programs in the department: <http://hsrmp.phhp.ufl.edu>.

Master of Public Health with a Concentration in Public Health Practice

This concentration provides the opportunity to develop breadth in public health by taking coursework in two, three, or four of the core public

health concentrations. Such breadth is often required of professionals who assume positions of leadership in public health. It is available to students in joint and concurrent degree programs, medical and other health scientists, and working professionals. The Public Health Practice concentration is available on-campus and online.

The campus curriculum for this concentration follows the same model as the other concentrations. Students pursuing public health practice begin their programs with the five core courses required of all MPH students. Instead of a specified set of concentration core courses, however, these students may choose two or more courses from advanced course options in two to four of the other concentrations. Students complete their degree with a capstone course and an internship. All students in this concentration must hold a prior health professional degree or be enrolled in a joint or concurrent graduate program. To be eligible for the accelerated option, applicants must hold a terminal degree in a health or health-related field.

The online Public Health Practice curriculum begins with the five core courses and then offers two or more courses in epidemiology, environmental health, public health management and policy and social and behavioral sciences. Students complete their degree with a capstone course and an internship. Online students are not available to pursue the MPH on campus in Gainesville, either due to employment or geographic distance.

Master of Public Health with a Concentration in Social and Behavioral Sciences

The social and behavioral sciences concentration is based on the understanding that health and health behavior are influenced by multiple psychological, behavioral, social, and cultural factors. Central to addressing health problems and eliminating health disparities and inequalities, these factors must be understood and addressed using a framework exploring multiple levels (individual, interpersonal, organizational, community, and population) and the interactions among them. Through classroom instruction, research, and field practice, MPH students who concentrate in social and behavioral sciences explore the unique issues faced by diverse groups and populations and acquire skills to achieve social and behavioral change. Students in the social and behavioral sciences concentration are required to take six courses: Assessment and Surveillance in Public Health, Public Health Program Planning and Evaluation, Social and Behavioral Research Methods, Public Health Information for Diverse Populations: Theory & Methods, Theoretical Foundations of Public Health, and MPH Capstone. Social and behavioral science students complete their programs with an internship and elective courses in public health or related fields.

Visit the social and behavioral science concentration website for the most up-to-date information about course options.

Campus program: <http://mph.ufl.edu/prospective-students/mph/traditional-mph-degree/concentrations/social-and-behavioral-science/>.
(<http://mph.ufl.edu/prospective-students/mph/traditional-mph-degree/concentrations/social-and-behavioral-science/>)

Online program: <http://mph.ufl.edu/prospective-students/mph/online-mph-degree/concentrations/social-and-behavioral-sciences/>.
(<http://mph.ufl.edu/prospective-students/mph/online-mph-degree/concentrations/social-and-behavioral-sciences/>)

Degrees Offered

Degrees Offered with a Major in Public Health

- Master of Public Health
 - without a concentration
 - with a concentration in Biostatistics
 - with a concentration in Environmental Health
 - with a concentration in Epidemiology
 - with a concentration in Public Health Management
 - with a concentration in Public Health Practice
 - with a concentration in Social and Behavioral Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Public Health Courses

Code	Title	Credits
HMG 6747	Marketing in Hospitality/Tourism	2
HSA 6105	Professional Skills Seminar	1
HSA 6114	Health Care System and Policy	3
HSA 6115	Introduction to Management of Health Services Organizations	3
HSA 6188	Strategic Management in Health Administration	3
HSA 6198	Information Management in Health Administration	3
HSA 6385	Performance Management for Health Care Managers	3
HSA 6395	Healthcare Data Analytics I	3
HSA 6427	Legal and Ethical Issues in Health Administration	3
HSA 6436	Health Economics	3
HSA 6930	Special Topics in Health Services Administration	1-3
HSA 7106	Seminar in Health Care Access and Utilization	3
HSA 7437	Advanced Health Economics	3
HSA 7759	Quality and Outcomes in Health Services Research	3
PHC 6000	Epidemiology Methods I	3
PHC 6001	Principles of Epidemiology in Public Health	3
PHC 6002	Epidemiology of Infectious Diseases	3
PHC 6003	Epidemiology of Chronic Diseases and Disability	3
PHC 6009	Biology and Epidemiology of HIV/AIDS	3
PHC 6011	Epidemiology Methods II	3
PHC 6016	Social Epidemiology in Public Health	3
PHC 6022	Design and Conduct of Clinical Trials	3
PHC 6050	Statistical Methods for Health Sciences Research I	3
PHC 6052	Introduction to Biostatistical Methods	3
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6059	Introduction to Applied Survival Analysis	3
PHC 6089	Public Health Computing	3
PHC 6103	Systems Thinking for Public Health	3

PHC 6104	Evidence-Based Management of Public Health Programs	3
PHC 6146	Public Health Program Planning and Evaluation	3
PHC 6183	Disaster Preparedness and Emergency Response	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6251	Assessment and Surveillance in Public Health	3
PHC 6301	Aquatic Systems and Environmental Health	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6403	Adolescence, Risk Taking and Health	3
PHC 6404	Gender, Sexuality, and Health	3
PHC 6405	Theoretical Foundations of Public Health	3
PHC 6410	Designing & Implementing Public Health Solutions	3
PHC 6421	Public Health Law and Ethics	3
PHC 6424	Environmental Policy and Risk Management in Public Health	3
PHC 6441	Health Disparities in the United States	3
PHC 6446	Systems Thinking in One Health	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6512	Environmental Management of Vector-Borne Diseases	3
PHC 6515	One Health: Applied Techniques in Public Health Entomology	3
PHC 6517	Public Health Concepts in Infectious Diseases	3
PHC 6519	Zoonotic Diseases in Humans and Animals	3
PHC 6520	Foodborne Diseases	3
PHC 6521	Fundamentals of Public Health Nutrition	3
PHC 6530	Public Health Issues of Mothers and Children	3
PHC 6534	Trauma Informed Approaches for Individuals, Communities, and Public Health	3
PHC 6601	Professional Series in Public Health	1
PHC 6700	Social and Behavioral Research Methods	3
PHC 6702	Environmental Monitoring and Exposure Assessment	3
PHC 6706	Scientific Communication in Public Health	3
PHC 6711	Measurement in Epidemiology and Outcomes Research	3
PHC 6716	Survey Research Methods	3
PHC 6764	Global Public Health and Development I	3
PHC 6905	Independent Study	1-6
PHC 6917	Supervised Research Project	1-6
PHC 6931	Seminar in Global Public Health	1
PHC 6937	Special Topics in Public Health	1-6
PHC 6940	Master of Public Health Capstone	2
PHC 6947	Environmental and Global Health Capstone Experience	3-5
PHC 6946	Public Health Internship	1-9
PHC 7000	Epidemiology Seminar II: Critical Evaluation, Research Proposals, and Methods	2
PHC 7007	Cancer Epidemiology	3
PHC 7038	Psychiatric Epidemiology	3
PHC 7056	Analysis of Longitudinal Data	3
PHC 7066	Large Sample Theory	3
PHC 7307	Quantitative Assessment of Environmental Health Impacts	3
PHC 7980	Research for Doctoral Dissertation	1-15

PHC 7901	Epidemiology Literature Review and Critique (Journal Club)	1
STA 5325	Fundamentals of Probability	3
STA 5328	Fundamentals of Statistical Theory	3
STA 5503	Categorical Data Methods	3
STA 5507	Applied Nonparametric Methods	3
STA 5701	Applied Multivariate Methods	3
STA 6177	Applied Survival Analysis	3
STA 6208	Basic Design and Analysis of Experiments	3
SWS 5551	Soils, Water, and Public Health	3
VME 6607	Human Health Risk Assessment	4

Environmental Health Courses

Code	Title	Credits
ENV 5105	Foundations of Air Pollution	3
FOS 5205	Current Issues in Food Safety and Sanitation	3
PHC 6702	Environmental Monitoring and Exposure Assessment	3
SWS 5551	Soils, Water, and Public Health	3
VME 6602	General Toxicology	3
VME 6603	Advanced Toxicology	3
VME 6605	Toxic Substances	3
VME 6607	Human Health Risk Assessment	4

Epidemiology Courses

Code	Title	Credits
PHC 6000	Epidemiology Methods I	3
PHC 6002	Epidemiology of Infectious Diseases	3
PHC 6003	Epidemiology of Chronic Diseases and Disability	3
PHC 6011	Epidemiology Methods II	3
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6405	Theoretical Foundations of Public Health	3
PHC 6912	Special Project: Independent Research	1-9
PHC 6946	Public Health Internship	1-9

Public Health Management and Policy Courses

Code	Title	Credits
HSA 5174	Fundamentals of Health Care Finance	3
HSA 6115	Introduction to Management of Health Services Organizations	3
HSA 6152	Overview of U.S. Health Policy	3
PHC 6103	Systems Thinking for Public Health	3
PHC 6104	Evidence-Based Management of Public Health Programs	3
PHC 6421	Public Health Law and Ethics	3

Social and Behavioral Sciences Courses

Code	Title	Credits
PHC 6146	Public Health Program Planning and Evaluation	3
PHC 6251	Assessment and Surveillance in Public Health	3
PHC 6441	Health Disparities in the United States	3
PHC 6700	Social and Behavioral Research Methods	3
PHC 6937	Special Topics in Public Health	1-6

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/ Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Public Health (MPH)

SLO 1: MPH Core Knowledge & Skills

Demonstrate competence in the practice of public health.

SLO 2: Public Health Concentration Knowledge

Communicate a thorough understanding of one public health core discipline

SLO 3: Professional Behavior

Display professional conduct

SLO 4: Public Health Integration

Demonstrate synthesis of core and concentration competencies.

Public Health (Ph.D.)

Program Information

Coordinators:

Environmental Health and One Health: J. Bisesi

Health Services Research: S. Datta

Social and Behavioral Sciences: J. Pomeranz

The College of Public Health and Health Professions does not offer the Ph.D. in Public Health without a concentration. All students accepted into the program must choose one of four concentrations: Environmental Health (p. 346), Health Services Research (<https://hsrmp.phhp.ufl.edu/>), One Health (p. 346), or Social and Behavioral Sciences (<http://gradcatalog.ufl.edu/graduate/colleges-departments/public-health-professions/behavioral-science-community/public-health/>). Please see those program pages for more information.

Degrees Offered

Degrees Offered with a Major in Public Health

- Doctor of Philosophy
 - concentration in Environmental Health
 - concentration in Health Services Research
 - concentration in One Health
 - concentration in Social and Behavioral Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/ Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4

RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

public health

SLO 1 Knowledge

Generate new knowledge in the field of public health.

SLO 2 Teaching Skills

Demonstrate competence in class preparation, engagement and contributions to a positive learning environment

SLO 3 Problem-Solving Skills

Demonstrate problem-solving skills by applying, analyzing and synthesizing content knowledge in public health.

SLO 4 Professional Behavior

Display behavior appropriate to scientific discourse and communication

Faculty

Professor

- Cook, Robert L.
- Mitchell, Gordon Stewart

Associate Professor

- Bacher, Rhonda Leigh
- Ross, Kathryn Marie

Research Associate Professor

- Ali, Afsar

Clinical Assistant Professor

- Shakeel Ahmed, Fnu

Clinical Professor

- Blue, Amy Victoria
- Hack, George O.
- Hanson, Stephanie Lee

Research Professor

- Lednický, John

Research Assistant Professor

- Barnard, Alison M.
- Heil, Gary Lee

Affiliated Faculty

- Applebaum, Jennifer W.
Assistant Professor
- Beau De Rochars, Valery E.
Research Assistant Professor
- Benson, Keith
Clinical Professor
- Canidate, Shantrel S.
Assistant Professor

- Colon-Burgos, Jose F.
Assistant Professor
- Cottler, Linda B.
Professor
- Datta, Santanu K.
Clinical Associate Professor
- Dixon-Daniel, Brittney Nicole
Clinical Assistant Professor
- Galloway, Anna
Clinical Assistant Professor
- Hammarlund, Noah Evan
Assistant Professor
- Harle, Christopher Albert William
Courtesy Professor
- Jacobs, Molly M.
Associate Professor
- Janicke, David
Professor
- Jo, Ara
Clinical Associate Professor
- Kairalla, John Andrew
Research Associate Professor
- Kane, Andrew S.
Associate Professor
- Kates, Frederick Richard
Clinical Associate Professor
- King, Lindsey Marie
Clinical Associate Professor
- Lauzardo, Michael
Research Associate Professor
- Mai, Volker
Associate Professor
- Mainous, Arch G.
Professor
- Marlow, Nicole Marguerite
Research Assistant Professor
- McKune, Sarah Lindley
Research Associate Professor
- Moorhouse, Michael D.
Clinical Associate Professor
- Naranjo, Arlene H.
Research Associate Professor
- Pearl, Rebecca
Associate Professor
- Pomeranz, Jamie L.
Clinical Associate Professor
- Revere, Frances Lee
Professor
- Shapiro, Jerne J.
Lecturer
- Sibille, Kimberly T.
Associate Professor
- Stark, Heather Anne
Clinical Associate Professor
- Strekalova, Yulia A.
Assistant Professor
- Striley, Catherine L.

Research Associate Professor

- Varnes, Julia Rae
Clinical Associate Professor
- Vilaro, Melissa J.
Assistant Professor
- Walker, Ashby Farmer
Assistant Professor
- Zori, Gaia Lynn
Clinical Assistant Professor

Rehabilitation Science Program Information

Director: D. D. Fuller

Graduate Coordinator: L. Quintana

The interdisciplinary Ph.D. program in rehabilitation science is offered through the College of Public Health and Health Professions. Rehabilitation science describes those disciplines which focus on both basic and applied aspects of health science and services, the social sciences, and engineering as they relate to restoring human functional capacity and improving a person's interaction with the surrounding environment. An important point of emphasis is that rehabilitation science should encompass research ranging from molecular biology through population health. The program embraces a wide range of disciplines, and supports the view that collaboration is the best way to advance human health. Students work closely with their faculty mentor within three broad concentrations/emphasis areas: Neuromuscular Plasticity, Disability, Occupation and Participation Science, and Communication and Swallowing Sciences and Disorders. On successful completion of the program, graduates typically take positions in research universities and research centers. Requirements for the Ph.D. degree are provided elsewhere in this catalog.

Admissions decisions are determined by an interdisciplinary admissions committee. The program is a minimum of 90 credit hours of study beyond the bachelor's degree. The curriculum includes 10 credit hours in rehabilitation science application; 6 credit hours in rehabilitation science teaching; 13 graduate credits in research methods and statistics; 31 credit hours in research; 18 credit hours within the student's concentration/emphasis area; 12 credit hours of elective courses. Course work should be selected with guidance and approval from the faculty mentor and when applicable, the supervisory committee. Up to 30 credit hours may be transferred in from a master's degree program with the approval of the faculty mentor, supervisory committee, and steering committee.

For more information, including admissions requirements and deadlines, please see our website: <http://rehabsci.phphp.ufl.edu> (<http://rehabsci.phphp.ufl.edu/>).

Degrees Offered

Degrees Offered with a Major in Rehabilitation Science

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Communication and Swallowing Sciences and Disorders

- concentration in Disability, Health, and Participation
- concentration in Neuromuscular Plasticity

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Rehabilitation Sciences Courses

Code	Title	Credits
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6401	Skeletal Muscle in Aging and Disease, and Implications for Rehabilitation	3
RSD 6410	Development and Evaluation of Rehabilitation Interventions to Promote Participation	3
RSD 6701	Matlab Foundations for Rehabilitation Science	3
RSD 6710	Motor Control: Translating from Fundamental Research to Rehabilitation Practice	3
RSD 6718	Neuroplasticity: A Foundation for Neurorehabilitation	3
RSD 6900	College Classroom: Teaching Process and Practice	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6920	Rehabilitation Science Journal Club	1
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6938	Doctoral Seminar in Rehabilitation Science	1
RSD 6940	Supervised Teaching	1-3
RSD 7752	Measurement Development for Health and Rehabilitation	2
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2

PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Rehabilitation science

SLO 1 Skills

Conduct high quality rehabilitation research.

SLO 2 Knowledge

Display an understanding of the fundamental models and theories and principles underlying the discipline of Rehabilitation Science.

SLO 3 Professional Behavior

Display understanding of the ethics of research, and exhibit ethical research conduct.

Faculty

Affiliated Faculty

- Alappattu, Meryl J.
Research Associate Professor
- Barnard, Alison M.
Research Assistant Professor
- Beneciuk, Jason M.
Research Assistant Professor
- Bialosky, Joel Eric
Clinical Professor
- Bishop, Mark Donald
Professor
- Bodison, Stefanie
Assistant Professor
- Centanni, Tracy Michelle
Associate Professor
- Chheda, Neil N.
Clinical Associate Professor
- Clark, David J.
Associate Professor
- Classen, Sherrilene
Professor
- Ellis, Charles
Professor
- Forbes, Sean Charles
Associate Professor
- Fox, Emily Jane
Research Assistant Professor
- Fuller, David
Professor
- Gauger, Laurie Mercado
Clinical Associate Professor
- Gonzalez-Rothi, Elisa Janine
Research Associate Professor
- Hegland, Karen W.
Associate Professor
- Hepple, Russell Thomas
Professor
- Horodyski, Marybeth
Professor
- Judge, Sarah M.
Research Assistant Professor
- Kramer, Jessica M.
Associate Professor
- Kramer, John
Clinical Assistant Professor
- Kreider, Consuelo Maun
Clinical Associate Professor
- Liu, Chiung-ju
Associate Professor
- Lott, Donovan J.
Research Professor
- Manini, Todd M.
Professor
- Mir, Michela J.
Assistant Professor
- Mitchell, Gordon Stewart
Professor
- Myers, Christine T.
Clinical Professor
- Nittrouer, Susan N.
Professor
- Pomeranz, Jamie L.
Clinical Associate Professor
- Pozzi, Federico
Assistant Professor
- Romero, Sergio
Associate Professor
- Rose, Dorian K.
Research Associate Professor
- Shakeel Ahmed, Fnu
Clinical Assistant Professor
- Smith, Barbara K.
Assistant Professor
- Triggs, William Joseph
Associate Professor
- Vandenborne, Krista H.
Distinguished Professor
- Vasilopoulos, Terrie
Research Associate Professor
- Vincent, Heather K.
Associate Professor
- Vose, Alicia K.
Assistant Professor
- Wang, Hongwu
Assistant Professor
- Wang, Zheng
Assistant Professor
- Willcocks, Rebecca

Research Assistant Professor

- Winter, Sandra M.
Research Assistant Scientist
- Wu, Chien-Te
Associate Professor

Biostatistics Department

Chair: P. Qiu

Associate Chair for Education: B. Brumback

Graduate Coordinator: K. Cason

The Department of Biostatistics offers the Doctor of Philosophy degree in biostatistics (p. 339), the Master of Science degree in biostatistics (<http://biostat.ufl.edu/education/ms-in-biostatistics/>), and the Master of Public Health degree with concentration biostatistics, which is described in detail in the Public Health section of the catalog. These programs in the Department are designed to prepare students for research and faculty positions; careers in health agencies and health-related institutions; and for consultation, especially in the biomedical fields. Although each graduate program has a set of required courses, there is ample flexibility in the programs to allow each student to develop strengths and interests through elective courses, seminars, and tutorials.

Doctor of Philosophy

The biostatistics doctoral program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete a minimum of 54 credits of biostatistics/statistics course work (30 credits can be transferred from a previously earned Master of Science program if applicable), 6 credits of public health course work, 3 credits of a consulting requirement, 6 credits of the cognate requirement, and 21 credits of dissertation work.

All graduates of the program are expected to be able to

- Conduct independent research in the development of new biostatistical methodology
- Engage in successful collaborations with investigators in new quantitative fields
- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals
- Write collaborative papers for peer-reviewed subject matter journals
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/phd-in-biostatistics/curriculum-overview/>.

Master of Science

The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students' development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics practice. This training is conducted in the innovative and interdisciplinary public health culture of the college of public health and health professions and the college of medicine and will produce graduates who will help address the shortage of biostatisticians. We expect our graduates to be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/ms-in-biostatistics/> (Campus) and <http://biostat.ufl.edu/education/msonline/> (Online).

Majors

- Biostatistics (PHHP) (p. 340)

Faculty

Professor

- Datta, Somnath
- Datta, Susmita
- Lee, Ji-Hyun
- Longini, Ira M.
- Lu, Qing Terry
- Qiu, Peihua
- Shan, Guogen
- Wu, Samuel Shangwu

Associate Professor

- Chen, Li
- Guha, Subharup
- Li, Zhigang
- Xiao, Feifei

Assistant Professor

- Berube, Sophie Christine
- Hitchings, Matthew David Thomas
- Liang, Muxuan
- Roy, Arkaprava

Research Associate Professor

- Kairalla, John Andrew
- Naranjo, Arlene H.

Clinical Assistant Professor

- Fischer, Jonathan R.
- Foti, Steven J.
- Parker, Robert L.
- Wang, Lixia

Research Professor

- Lou, XiangYang

Research Assistant Professor

- Brant, Jason Orr
- Lin, Tuo
- Xue, Wei

Courtesy Professor

- Yang, Yang

Affiliated Faculty

- Bacher, Rhonda Leigh
Associate Professor
- Cai, Guoshuai
Assistant Professor
- Doss, John
Professor
- Ghosh, Malay
Distinguished Professor
- Pei, Qinglin
Associate Professor

Courses

BIOSTATISTICS

Code	Title	Credits
GMS 6827	Advanced Clinical Trial Methods	3
PHC 6020	Clinical Trial Methods	3
PHC 6022	Design and Conduct of Clinical Trials	3
PHC 6050C	Biostatistical Methods I	3
PHC 6051	Biostatistical Methods II	3
PHC 6059	Introduction to Applied Survival Analysis	3
PHC 6063	Biostatistical Consulting	3
PHC 6064	Survey of Advanced Biostatistical Methods for the Health Sciences	3
PHC 6075	Biostatistical Literacy	3
PHC 6084	Bayesian Biostatistical Methods	3
PHC 6088	Statistical Analysis of Genetic Data	3
PHC 6089	Public Health Computing	3
PHC 6092	Introduction to Biostatistical Theory	3
PHC 6097	Statistical Learning with Applications in Health Sciences	3
PHC 6099	Programing Basics for Biostatistics	3
PHC 6736	Statistical and Computational Analysis of Genomic Data	3
PHC 6790	Biostatistical Methods Using SAS	3
PHC 6791	Data Visualization in the Health Sciences	3
PHC 6905	Independent Study	1-6
PHC 6937	Special Topics in Public Health	1-6
PHC 7056	Analysis of Longitudinal Data	3
PHC 7066	Large Sample Theory	3
PHC 7068	Biostatistical Computing	3
PHC 7090	Advanced Biostatistical Methods I	3
PHC 7091	Advanced Biostatistical Methods II	3
PHC 7095	Advanced Statistical Learning for Biostatistics	3
PHC 7925	Biostatistics Journal Club	1-3
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
STA 6177	Applied Survival Analysis	3

STA 6707	Analysis of Multivariate Data	3
STA 7179	Survival Analysis	3

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/ Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Biostatistics (PHHP)

Program Information

Doctor of Philosophy

The biostatistics doctoral program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete a minimum of 54 credits of biostatistics/statistics course work (30 credits can be transferred from a previously earned Master of Science program if applicable), 6 credits of public health course work, 3 credits of a consulting requirement, 6 credits of the cognate requirement, and 21 credits of dissertation work.

All graduates of the program are expected to be able to

- Conduct independent research in the development of new biostatistical methodology
- Engage in successful collaborations with investigators in new quantitative fields

- Write statistical methodology papers for peer-reviewed statistical and biostatistical journals
- Write collaborative papers for peer-reviewed subject matter journals
- Compete successfully for research and teaching positions in academic institutions, federal and state agencies, or private institutions

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/phd-in-biostatistics/>.

Master of Science

The Master of Science in Biostatistics Program in the Department of Biostatistics requires a minimum of 36 post-baccalaureate credit hours. The program is designed to facilitate students' development of a strong theoretical foundation in biostatistics, broad-based understanding of biostatistical methods, and expertise in a cognate field. A typical student will be enrolled full-time for two years. Upon successful completion of the program, graduates will be awarded an M.S. degree in biostatistics. We currently offer the Master of Science program in both traditional (campus) and online learning delivery methods.

The principal goal of the M.S. program is to prepare highly qualified individuals for future Ph.D. training and for careers in biostatistics practice. This training is conducted in the innovative and interdisciplinary public health culture of the college of public health and health professions and the college of medicine and will produce graduates who will help address the shortage of biostatisticians. We expect our graduates to be highly competitive in three primary settings: academic university-based settings, industry, and federal agencies that involve research and/or public health practice.

Specific course requirements are described at the program website <http://biostat.ufl.edu/education/ms-in-biostatistics/> (Campus) and <http://biostat.ufl.edu/education/msonline/> (Online).

Degrees Offered

Degrees Offered with a Major in Biostatistics

- Doctor of Philosophy
- Master of Science
 - without a concentration
 - with a concentration in Biostatistical Methods and Practice
 - with a concentration in Health Data Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Biostatistics Departmental Courses

Code	Title	Credits
GMS 6827	Advanced Clinical Trial Methods	3
PHC 6020	Clinical Trial Methods	3
PHC 6022	Design and Conduct of Clinical Trials	3
PHC 6050C	Biostatistical Methods I	3
PHC 6051	Biostatistical Methods II	3
PHC 6059	Introduction to Applied Survival Analysis	3
PHC 6063	Biostatistical Consulting	3
PHC 6064	Survey of Advanced Biostatistical Methods for the Health Sciences	3

PHC 6075	Biostatistical Literacy	3
PHC 6084	Bayesian Biostatistical Methods	3
PHC 6088	Statistical Analysis of Genetic Data	3
PHC 6089	Public Health Computing	3
PHC 6092	Introduction to Biostatistical Theory	3
PHC 6097	Statistical Learning with Applications in Health Sciences	3
PHC 6099	Programing Basics for Biostatistics	3
PHC 6736	Statistical and Computational Analysis of Genomic Data	3
PHC 6790	Biostatistical Methods Using SAS	3
PHC 6791	Data Visualization in the Health Sciences	3
PHC 6905	Independent Study	1-6
PHC 6937	Special Topics in Public Health	1-6
PHC 7056	Analysis of Longitudinal Data	3
PHC 7066	Large Sample Theory	3
PHC 7068	Biostatistical Computing	3
PHC 7090	Advanced Biostatistical Methods I	3
PHC 7091	Advanced Biostatistical Methods II	3
PHC 7095	Advanced Statistical Learning for Biostatistics	3
PHC 7925	Biostatistics Journal Club	1-3
PHC 7979	Advanced Research	1-12
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
PHC 7980	Research for Doctoral Dissertation	1-15
STA 6177	Applied Survival Analysis	3
STA 6707	Analysis of Multivariate Data	3
STA 7179	Survival Analysis	3

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/ Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3

RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Biostatistics (PHD)

SLO 1 Knowledge

Communicate the underpinning of biostatistics concepts and methods

SLO 2 Skills

Identify, research, and acquire new biostatistical concepts and methods on one's own

SLO 3 Skills

Develop and apply new biostatistical concepts and methods independently

SLO 4 Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications

SLO 5 Professional Behavior

Participation in academic conferences to disseminate knowledge and represent the university

Biostatistics (MS)

SLO 1 Knowledge

Communicate the underpinning of biostatistics concepts and methods.

SLO 2 Skills

Apply biostatistical concepts and methods, interpret results, communicate.

SLO 3 Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, conduct and communications.

Clinical and Health Psychology Department

Department Chair: S. Hanson

Program Director and Graduate Coordinator: D. Janicke

Academic Coordinator: M. Naidu

The Department of Clinical and Health Psychology is a unit of the College of Public Health and Health Professions. The department's programs are its doctoral clinical psychology studies leading to the Ph.D. degree in psychology; doctoral internship program; and postdoctoral studies and research all accredited by the American Psychological Association. Requirements for the Ph.D. degree is given in the Graduate Degrees (p. 778) section of this catalog.

The clinical psychology doctoral curriculum adheres to the scientist-practitioner model of education and training. Program strengths include research, education, and professional training in health care psychology, with organized areas of concentration in clinical health psychology, clinical child/pediatric psychology, neuropsychology, neurorehabilitation and clinical neuroscience, and cognitive and emotion neuroscience. Education and training experiences are also available in rural psychology.

Interested students can also apply for acceptance into the Public Health Program and obtain dual M.P.H./Ph.D. degrees.

Progress in the program is determined by departmental policies which are consistent with American Psychological Association accreditation standards. The doctoral curriculum has been continuously accredited by the American Psychological Association since 1953.

Admission to the Department is through appropriate application to the Department's admission committee. A bachelor's degree is generally adequate preparation for graduate admission. It should include undergraduate courses in both experimental psychology and statistics, along with at least two courses from the following psychology areas: developmental, social, affective, biological, and cognitive.

For more information, please see the program page below and our website: <http://chp.php.ufl.edu>.

Majors

- Psychology (Clinical and Health Psychology - PHHP) (p. 343)

Faculty

Professor

- Bowers, Dawn
- Janicke, David
- Robinson, Mike E.
- Smith, Glenn Eric

Associate Professor

- Driscoll, Kimberly Ann
- Gabrielli, Joy Lucile
- Pearl, Rebecca
- Pereira, Deidre B.
- Porges, Eric S.
- Price, Catherine Elizabeth

Assistant Professor

- Arias, Franchesca
- Asken, Breton M.
- Gullett, Joseph M.
- Levy, Shellie-Anne
- Queen, Aprinda Indahlastari

Research Associate Professor

- Tanner, Jared J.

Clinical Assistant Professor

- Snyder, Aliyah R.
- Westen, Sarah C.

Clinical Associate Professor

- Ashkanazi, Glenn Steven
- Cascio, Erika Michele
- Durning, Patricia Ellen
- Heaton, Shelley C.

- Holgerson, Allison Amelia
- Payne-Murphy, Jessica
- Rawlinson, Alana Rose
- Wiens, Brenda A.

Clinical Professor

- Waxenberg, Lori B.

Affiliated Faculty

- Anton, Stephen D.
Professor
- Bartley, Emily Jo
Assistant Professor
- Berry, Meredith S.
Assistant Professor
- Marsiske, Michael
Professor
- McNamara, Joseph P.
Clinical Associate Professor
- McNeil, Cheryl Bodiford
Professor
- Ross, Kathryn Marie
Associate Professor
- Williamson, John Bonar
Associate Professor

Psychology (Clinical and Health Psychology - PHHP)

Program Information

The department of Clinical and Health Psychology is an academic and professional unit in the College of Public Health and Health Professions at the Health Science Center on the University of Florida campus in Gainesville. The doctoral program in clinical psychology has been accredited by the American Psychological Association since 1953 and adheres to the Scientist-Practitioner Model of education and training. The Clinical Psychology Doctoral program is unique in the country in that it is housed in an independent department of Clinical and Health Psychology in a major academic health science setting along with an APA accredited internship and postdoctoral program. These features foster program strengths in research, teaching, and professional training in health care psychology.

The **Scientist-Practitioner Model** allows the student to obtain broad clinical, academic, and research training that readies them for careers anywhere along the science-practice continuum. The student obtains focused research mentorship in a faculty member's laboratory and obtains broad training in clinical assessment and intervention both in and outside of their designated area of concentration.

The Doctoral Program provides the student with training in the concepts, tools, roles, and functions of the clinical psychologist. The overall goals of the graduate program are to prepare the student to:

1. investigate meaningful, empirically testable questions in the quest for understanding a behavioral process, a patient's problem, or a professional issue;
2. function as a professional psychologist;

3. practice competently in the applied areas of psychological assessment/diagnosis, intervention/therapy, and consultation; and
4. contribute to the advancement of psychological knowledge through research or other creative scholarly activity.

Through a combination of general and specialized experiences in the classroom, laboratory, and clinic students develop knowledge and skills as scientist-practitioners. Attitudes are developed toward the practice of psychology and toward related professions which enable effective personal interaction and participation in the interdisciplinary approach to problems of research and practice. As students progress in the program, they develop professional identity through acceptance of increased responsibility for professional decisions, through the execution of significant research projects, and through their contributions to the understanding of psychological problems and processes.

For more information please see our website: <http://chp.phhp.ufl.edu>

Degrees Offered

Degrees Offered with a Major in Psychology (Clinical and Health Psychology - PHHP)

- Doctor of Philosophy
 - concentration in Clinical and Health Psychology
 - *optional second concentration in Clinical and Translational Science*
 - concentration in Clinical and Translational Science
 - *optional second concentration in Clinical and Health Psychology*
- Master of Arts
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Clinical and Health Psychology Departmental Courses

Code	Title	Credits
CLP 6189	Cultural Humility in Clinical and Health Psychology	3
CLP 6307	Human Higher Cortical Functioning	3
CLP 6407	Psychological Treatment I	3
CLP 6430	Clinical Psychological Assessment	4
CLP 6476	Lifespan Psychopathology	4
CLP 6527C	Measurement, Research Design, and Statistical Analysis in Clinical Psychology I	3-4
CLP 6528C	Measurement, Research Design, and Statistical Analysis in Clinical Psychology II	3-4
CLP 6529	Applied Multivariate Methods in Psychology	3
CLP 6905	Individual Work	1-4
CLP 6910	Supervised Research	1-5
CLP 6940	Supervised Teaching	1-5
CLP 6943	Core Practicum in Clinical Psychology	1-4
CLP 6945	Advanced Practicum in Neuropsychology	1-3
CLP 6946	Advanced Practicum in Applied Medical Psychology	1-3
CLP 6947	Practicum in Intervention	1-4

CLP 6948	Advanced Practicum in Clinical Child Psychology	1-3
CLP 6971	Research for Master's Thesis	1-15
CLP 7317	Advanced Health Psychology and Behavior Medicine	3
CLP 7428C	Neuropsychological Assessment of Adults	3
CLP 7525	Best Methods for Studying Psychological Change	3
CLP 7934	Special Topics In Clinical Psychology	1-9
CLP 7949	Internship	1-2
CLP 7979	Advanced Research	1-12
CLP 7980	Research for Doctoral Dissertation	1-15
PSB 6115C	Clinical and Cognitive Neuroscience: Methods and Theory	3

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Clinical & Health Psychology

SLO 1 Knowledge

Students will analyze and discuss selected topic areas in general clinical psychology and in the student's area of specialization

SLO 2 Skills

Students will deliver a broad variety of assessment, intervention, and consultation service

SLO 3

Students will contribute to the knowledge base of clinical psychology through production of empirical research

SLO 4 Professional Behavior

Students will deliver professional services to patients and conduct professional research in a manner that shows dedication to applicable ethical, professional practice, and legal standards

Environmental and Global Health Department

Chair: T. Sabo-Attwood

Ph.D. Program Director: J. Bisesi

Graduate Coordinator: V. Houghton

The Department of Environmental and Global Health offers graduate work leading to the degrees of Doctor of Philosophy, Master of Health Science, and Master of Public Health. The official minimum requirements for these degrees are listed in the Graduate Degrees (p. 778) section of this catalog.

The Department of Environmental and Global Health conducts cutting edge research at the nexus of human and environmental systems, blending research focused on how emerging pathogens, chemical contaminants, climate change, nutrition, and socio-economic factors influence the health of humans and animals on a global scale. Department faculty, scientists, and students employ numerous disciplines in studying these environmental exposure-health links and prevention/control measures: virology, bacteriology, parasitology, entomology, toxicology, epidemiology, water sciences, veterinary health, environmental engineering, aerosol biology, etc. A central theme for the department is the interdisciplinary thinking called One Health (https://www.youtube.com/watch/?feature=player_embedded&v=u6ewl8Sbypl) which reflects the collaborations necessary to tackle public health's most difficult problems. Faculty, students and staff often perform research in the laboratories in the Emerging Pathogens Institute (<http://www.epi.ufl.edu/>), the Center for Environmental and Human Toxicology (<https://toxicology.vetmed.ufl.edu/>), the Center for African Studies (<https://africa.ufl.edu/>), or the Aquatic Pathobiology Laboratory (<https://aquaticpath.php.ufl.edu/>).

For more information, please see the program pages below and our website: <http://egh.php.ufl.edu>.

Majors

- Environmental and Global Health (M.H.S. - One Health) (p. 345)
- Public Health (Ph.D. - Environmental and Global Health) (p. 346)
- Public Health (Ph.D. - One Health) (p. 346)

Faculty

Professor

- Maurelli, Anthony Thomas

Associate Professor

- Baker, Tracie R.
- Bisesi, Joseph Hopkin

- Kane, Andrew S.
- Lin, Zhoumeng
- von Fricken, Michael E.

Assistant Professor

- Anderson, Benjamin D.
- Applebaum, Jennifer W.
- Colon-Burgos, Jose F.
- Reeves, Lawrence E.

Research Associate Professor

- McKune, Sarah Lindley

Clinical Associate Professor

- Stark, Heather Anne

Affiliated Faculty

- Ali, Afsar
Research Associate Professor
- Becker, Torben Kim
Clinical Associate Professor
- Blue, Amy Victoria
Clinical Professor
- Brown, Mary B.
Professor
- Havelaar, Arie Hendrik
Professor
- Heil, Gary Lee
Research Assistant Professor
- Hendrickx, Saskia Carola
Scientist
- Lascano, Jorge Enrique
Clinical Professor
- Lednicky, John
Research Professor
- Nelson, Eric Jorge
Associate Professor
- Ryan, Sadie Jane
Professor
- Stuchal, Leah D.
Research Associate Professor
- Vittor, Amy Yomiko
Assistant Professor
- Wisely, Samantha M.
Professor

Environmental and Global Health (M.H.S. - One Health)

Degrees Offered

Degrees Offered With a Major in Environmental and Global Health

- Master of Health Science
 - concentration in One Health

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Environmental and Global Health Departmental Courses

Code	Title	Credits
PHC 6301	Aquatic Systems and Environmental Health	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6424	Environmental Policy and Risk Management in Public Health	3
PHC 6445	Global Public Health and Development II	3
PHC 6446	Systems Thinking in One Health	3
PHC 6512	Environmental Management of Vector-Borne Diseases	3
PHC 6515	One Health: Applied Techniques in Public Health Entomology	3
PHC 6702	Environmental Monitoring and Exposure Assessment	3
PHC 6764	Global Public Health and Development I	3
PHC 6900	Environmental and Global Health Journal Club	1
PHC 6937	Special Topics in Public Health	1-6
PHC 6947	Environmental and Global Health Capstone Experience	3-5
PHC 7307	Quantitative Assessment of Environmental Health Impacts	3

College of Public Health and Health Professions Courses

Code	Title	Credits
PHC 6001	Principles of Epidemiology in Public Health	3
PHC 6052	Introduction to Biostatistical Methods	3
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6937	Special Topics in Public Health	1-6

Student Learning Outcomes

Environmental & Global Health (MHS)

SLO 1 Knowledge

Students discuss the One Health concept and how it is used to tackle complex public health problems

SLO 2 Skills

Students will apply problem-solving skills analyzing and synthesizing content knowledge in One Health concept

SLO 3 Professional Behavior

Students will display professional behavior, cultural sensitivity, teamwork and appropriate communication when criticizing or defending scientific research

Public Health (Ph.D. - Environmental and Global Health)

Degrees Offered

Degrees Offered With a Major in Public Health

- Doctor of Philosophy
 - concentration in Environmental Health
 - *optional secondary concentration in Clinical and Translational Science*

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Environmental and Global Health Departmental Courses

Code	Title	Credits
PHC 6301	Aquatic Systems and Environmental Health	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6424	Environmental Policy and Risk Management in Public Health	3
PHC 6445	Global Public Health and Development II	3
PHC 6446	Systems Thinking in One Health	3
PHC 6512	Environmental Management of Vector-Borne Diseases	3
PHC 6515	One Health: Applied Techniques in Public Health Entomology	3
PHC 6702	Environmental Monitoring and Exposure Assessment	3
PHC 6706	Scientific Communication in Public Health	3
PHC 6722	Environmental and Global Health Research Methods Rotation	1-4
PHC 6764	Global Public Health and Development I	3
PHC 6900	Environmental and Global Health Journal Club	1
PHC 6937	Special Topics in Public Health	1-6
PHC 7307	Quantitative Assessment of Environmental Health Impacts	3
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15

College of Public Health and Health Professions Courses

Code	Title	Credits
HSA 6114	Health Care System and Policy	3
PHC 6000	Epidemiology Methods I	3
PHC 6001	Principles of Epidemiology in Public Health	3

PHC 6050	Statistical Methods for Health Sciences Research I	3
PHC 6052	Introduction to Biostatistical Methods	3
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6059	Introduction to Applied Survival Analysis	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6410	Designing & Implementing Public Health Solutions	3
PHC 6716	Survey Research Methods	3
PHC 7427	Ethics in Population Science	2
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
RSD 6900	College Classroom: Teaching Process and Practice	3

Public Health (Ph.D. - One Health)

Degrees Offered

Degrees Offered With a Major in Public Health

- Doctor of Philosophy
 - concentration in One Health
 - *optional secondary concentration in Clinical and Translational Science*

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Environmental and Global Health Departmental Courses

Code	Title	Credits
PHC 6301	Aquatic Systems and Environmental Health	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6424	Environmental Policy and Risk Management in Public Health	3
PHC 6445	Global Public Health and Development II	3
PHC 6446	Systems Thinking in One Health	3
PHC 6512	Environmental Management of Vector-Borne Diseases	3
PHC 6515	One Health: Applied Techniques in Public Health Entomology	3
PHC 6702	Environmental Monitoring and Exposure Assessment	3
PHC 6706	Scientific Communication in Public Health	3
PHC 6722	Environmental and Global Health Research Methods Rotation	1-4
PHC 6764	Global Public Health and Development I	3
PHC 6900	Environmental and Global Health Journal Club	1
PHC 6937	Special Topics in Public Health	1-6
PHC 7307	Quantitative Assessment of Environmental Health Impacts	3
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15

College of Public Health and Health Professions Courses

Code	Title	Credits
HSA 6114	Health Care System and Policy	3
PHC 6000	Epidemiology Methods I	3
PHC 6001	Principles of Epidemiology in Public Health	3
PHC 6050	Statistical Methods for Health Sciences Research I	3
PHC 6052	Introduction to Biostatistical Methods	3
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6059	Introduction to Applied Survival Analysis	3
PHC 6313	Environmental Health Concepts in Public Health	2-3
PHC 6410	Designing & Implementing Public Health Solutions	3
PHC 6716	Survey Research Methods	3
PHC 7427	Ethics in Population Science	2
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
RSD 6900	College Classroom: Teaching Process and Practice	3

Epidemiology Department

Chair: S. Kimmel

Ph.D. Program Director: C. Prins

M.S. Program Director: H. Stark

The Department of Epidemiology – jointly governed by the College of Public Health and Health Professions and the College of Medicine – offers the Doctor of Philosophy degree in epidemiology, Master of Science degree in epidemiology (MSE), the Certificate in Psychiatric Epidemiology (CPE), and the Master of Public Health degree with a concentration in epidemiology (described here (p. 331)). Minimum requirements for these degrees are described in the Graduate Degrees (p. 778) section of this catalog. The programs in the department are designed to prepare students for careers in academic research environments, public health agencies and health-related institutions, and consultation, especially in the biomedical fields.

More information on these programs is available at the program page below and at the department website: <http://epidemiology.phhp.ufl.edu>.

Majors

- Epidemiology (PHHP) (p. 348)

Faculty

Professor

- Benos, Panagiotis
- Braithwaite, Dejana
- Cottler, Linda B.
- Kimmel, Stephen

Associate Professor

- Mai, Volker
- Wang, Yan
- Yaghjyan, Lusine

Assistant Professor

- Canidate, Shantrel S.
- Chichetto, Natalie E.
- Liu, Jinling
- Liu, Yiyang
- Lopez-Quintero, Catalina
- Malin, Ashley
- Marini, Simone
- Westmoreland, Drew Anne
- Zhang, Sai

Research Associate Professor

- Striley, Catherine L.

Lecturer

- Shapiro, Jerne J.

Research Assistant Professor

- Varma, Deepthi Satheesa

Affiliated Faculty

- Canales, Muna Thalji
Assistant Professor
- Cook, Robert L.
Professor
- Cruz-Almeida, Yenisel
Associate Professor
- Cummings, Derek Adam
Professor
- Kwara, Awewura
Professor
- Lauzardo, Michael
Research Associate Professor
- Longini, Ira M.
Professor
- Louis-Jacques, Adetola Fadeyibi
Clinical Assistant Professor
- Maldonado Molina, Mildred Merisa
Professor
- Manini, Todd M.
Professor
- Prosperi, Mattia
Professor
- Rasmussen, Sonja A.
Professor
- Seraphin, Marie Nancy
Assistant Professor
- Shorr, Ronald I.
Research Professor

- Staras, Stephanie Ann
Professor
- Stark, Heather Anne
Clinical Associate Professor
- Vaddiparti Ananth, Srinivasa Krishna
Clinical Assistant Professor
- Winterstein, Almut Gertrud
Distinguished Professor

Epidemiology (PHHP)

Program Information

The **Ph.D. in Epidemiology program** is in the Department of Epidemiology, which is jointly governed by the College of Public Health and Health Professions and the College of Medicine. The program requires a minimum of 90 semester credits beyond the bachelor's degree. All students must complete at least 36 credits of epidemiology core courses, 6 credits of statistics electives, 18 credits of epidemiology electives, 15 credits of general electives, and 15 credits of dissertation research. Students may also apply to graduate with one or two concentrations selected from one of seven concentration areas. All entering students who do not hold MPH or equivalent degrees are also required by the College of Public Health and Health Professions to complete an Introduction to Public Health course.

All students admitted to the Ph.D. program in Epidemiology are fully funded for four years, including a tuition waiver and a stipend. Depending on a student's source of funding, the student may work for up to 20 hours per week as a research assistant, a teaching assistant, or some combination of the both. Funding sources for students may include the student's research mentor, the department, the college, the Graduate School, or external fellowships or scholarships pursued by the student.

The core course work is designed to incorporate competencies recommended in the report of the 2002 workshop on doctoral education in epidemiology from the American College of Epidemiology and the Association of Schools and Programs of Public Health, and criteria for applied epidemiology competencies. The overall outcomes expected of all graduates are as follows:

1. Apply epidemiological methods to address critical and/or emerging public health issues through the use of:
 - Appropriate epidemiological research designs
 - Advanced statistical analysis methods for health studies
 - Data structures and measurement methods for health research
 - Depth of knowledge in an area of specialization
2. Apply ethical thinking to a questionable ethics case from the current news
3. Develop grant proposals and manage research projects
4. Write scientific papers for publication in peer-reviewed journals, and communicate research results to scientists, policy makers, and the public

Students in the Ph.D. program in Epidemiology may apply to graduate with a concentration in up to two of the following areas:

- Cancer Epidemiology
- Genetic Epidemiology
- Gero-Epidemiology
- Infectious Disease Epidemiology

- Psychiatric Epidemiology
- Clinical and Translational Science

Concentrations allow PhD students to focus their elective coursework toward specialized content areas that interest them. All concentrations offered by the Department of Epidemiology are completely optional, and students may enroll in up to two concentrations. Enrollment in a concentration requires the approval of the student's academic advisor, research mentor, PhD Program Director, and Curriculum Committee Chair.

All concentrations require that students submit either (a) dissertation aims or (b) a first-authored publication that documents research in the area of the concentration in addition to the required courses.

The overarching goal of each concentration is to provide learners with advanced training in each respective field. This training will help prepare researchers for the frontlines of interdisciplinary team science targeted towards improving the quality of life, health, and society using epidemiologic tools and methods.

Details of the Ph.D. in Epidemiology program and application information are available at our website: <http://epidemiology.phhp.ufl.edu/about/ph-d-in-epidemiology-2> (<http://epidemiology.phhp.ufl.edu/about/ph-d-in-epidemiology-2/>).

The **Master of Science in Epidemiology (MSE) program** is a 36-credit program that prepares students for careers in the public health arena that are focused on the surveillance and prevention of illnesses among diverse populations around the world. Students will be trained in the foundational aspects of epidemiology, including person, place, and time; risk and protective factors; and the social determinants of health. Areas of focus may include chronic disease, infectious disease, geriatric, environmental, psychiatric, social, cancer, and maternal and child health epidemiology.

The thesis is required to demonstrate skill in independent inquiry and investigation, under the tutelage of a mentor. All students must complete at least 15 credits of epidemiology core courses, 8 credits of biostatistics courses, 4 credits of professional development courses, 5 credits of electives, and 4 credits of thesis research.

Graduates of the MS in Epidemiology program will be able to:

- Apply surveillance, assessment, evaluation, and other foundational epidemiological research designs to all areas of interest,
- Choose appropriate measurement and analytic methods to study health and disease in a population,
- Utilize biological, behavioral and social theory to understand how to prevent and intervene to promote the public health.

Details of the Master of Science in Epidemiology program and application information are available at our website: <https://epidemiology.phhp.ufl.edu/academics/mse/>.

Degrees Offered

Degrees Offered with a Major in Epidemiology

- Doctor of Philosophy
 - without a concentration
 - concentration in Cancer Epidemiology

- optional second concentration in Data Sciences Epidemiology
- optional second concentration in Genetic Epidemiology
- optional second concentration in Gero-Epidemiology
- optional second concentration in Infectious Disease Epidemiology
- optional second concentration in Psychiatric Epidemiology
- concentration in Clinical and Translational Science
 - optional second concentration in Cancer Epidemiology
 - optional second concentration in Data Sciences Epidemiology
 - optional second concentration in Genetic Epidemiology
 - optional second concentration in Gero-Epidemiology
 - optional second concentration in Infectious Disease Epidemiology
 - optional second concentration in Psychiatric Epidemiology
- concentration in Data Sciences Epidemiology
- concentration in Genetic Epidemiology
 - optional second concentration in Cancer Epidemiology
 - optional second concentration in Data Sciences Epidemiology
 - optional second concentration in Gero-Epidemiology
 - optional second concentration in Infectious Disease Epidemiology
 - optional second concentration in Psychiatric Epidemiology
- concentration in Gero-Epidemiology
 - optional second concentration in Cancer Epidemiology
 - optional second concentration in Data Sciences Epidemiology
 - optional second concentration in Genetic Epidemiology
 - optional second concentration in Infectious Disease Epidemiology
 - optional second concentration in Psychiatric Epidemiology
- concentration in Infectious Disease Epidemiology
 - optional second concentration in Cancer Epidemiology
 - optional second concentration in Data Sciences Epidemiology
 - optional second concentration in Genetic Epidemiology
 - optional second concentration in Gero-Epidemiology
 - optional second concentration in Psychiatric Epidemiology
- concentration in Psychiatric Epidemiology
 - optional second concentration in Cancer Epidemiology
 - optional second concentration in Data Sciences Epidemiology
 - optional second concentration in Genetic Epidemiology
 - optional second concentration in Gero-Epidemiology
 - optional second concentration in Infectious Disease Epidemiology
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Epidemiology (PHHP/COM) Departmental Courses

Code	Title	Credits
GMS 7858	Causal Artificial Intelligence for Health Research	3
PHC 6000	Epidemiology Methods I	3
PHC 6002	Epidemiology of Infectious Diseases	3

PHC 6003	Epidemiology of Chronic Diseases and Disability	3
PHC 6009	Biology and Epidemiology of HIV/AIDS	3
PHC 6011	Epidemiology Methods II	3
PHC 6016	Social Epidemiology in Public Health	3
PHC 6041	Landmarks in Psychiatric Epidemiology	2
PHC 6194	Spatial Epidemiology	3
PHC 6517	Public Health Concepts in Infectious Diseases	3
PHC 6591	Maternal and Child Health Epidemiology	3
PHC 6598	Foundations in Precision Medicine: Genetic Epidemiology	1
PHC 6711	Measurement in Epidemiology and Outcomes Research	3
PHC 6717	Public Health Surveillance	3
PHC 6932	Psychiatric Epidemiology Online Seminar Series	1
PHC 6937	Special Topics in Public Health	1-6
PHC 6939	CPE Psychiatric Grand Rounds	1
PHC 6971	Research for Master's Thesis	1-4
PHC 7000	Epidemiology Seminar II: Critical Evaluation, Research Proposals, and Methods	2
PHC 7007	Cancer Epidemiology	3
PHC 7017	Advanced Epidemiologic Methods III	3
PHC 7038	Psychiatric Epidemiology	3
PHC 7065	Advanced Skills in Epidemiological Data Management	2
PHC 7083	Artificial Intelligence and Data Science for Epidemiology and Population Health	3
PHC 7199	Topics in Precision Medicine and Public Health Informatics	1
PHC 7427	Ethics in Population Science	2
PHC 7594	Genetic Epidemiology	3
PHC 7595	Introduction to Molecular Epidemiology	3
PHC 7727	Grant Writing for Population Health Research	3
PHC 7744	Causal Artificial Intelligence for Health Research	3
PHC 7901	Epidemiology Literature Review and Critique (Journal Club)	1
PHC 7902	Scientific Writing for Peer Reviewed Publications for Popular Science	3
PHC 7910	International Field Epidemiology	3
PHC 7916	National Field Epidemiology	1-3
PHC 7918	Epidemiology Independent Study	1-3
PHC 7934	Seminar I: Epidemiology Past, Present, and Future	2
PHC 7979	Advanced Research	1-12
PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15
PHC 7980	Research for Doctoral Dissertation	1-15

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/ Geriatrics	1-2

HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Epidemiology (PHD)

SLO 1 Skills

Design epidemiologic research studies and analyze data to answer health-related research questions that are currently relevant to the population.

SLO 2 Skills

Prepare to become an independent researcher in the field of Epidemiology.

SLO 3 Knowledge

Illustrate a thorough understanding of epidemiology concepts.

SLO 4: Professional Behavior

Display ethical behaviors, cultural sensitivity, teamwork, professional conduct and communication, and build academic skills such as grant writing.

Epidemiology (MS)

SLO 1 Knowledge

Apply surveillance, assessment, evaluation, and other foundational epidemiological research designs to all areas of interest.

SLO 2 Skills

Choose appropriate measurement and analytic methods to study health and disease in a population.

SLO 3 Skills

Utilize biological, behavioral and social theory to understand how to prevent and intervene to promote the public health.

SLO 4 Professional Behavior

Display ethical behavior, cultural sensitivity, integrity in research conduct, honesty, and teamwork.

Faculty

Professor

- Benos, Panagiotis
- Braithwaite, Dejana
- Cottler, Linda B.
- Kimmel, Stephen

Associate Professor

- Mai, Volker
- Wang, Yan
- Yaghjian, Lusine

Assistant Professor

- Canidate, Shantrel S.
- Chichetto, Natalie E.
- Liu, Jinling
- Liu, Yiyang
- Lopez-Quintero, Catalina
- Malin, Ashley
- Marini, Simone
- Westmoreland, Drew Anne
- Zhang, Sai

Research Associate Professor

- Striley, Catherine L.

Lecturer

- Shapiro, Jerne J.

Research Assistant Professor

- Varma, Deepthi Satheesa

Affiliated Faculty

- Canales, Muna Thalji
Assistant Professor
- Cook, Robert L.
Professor
- Cruz-Almeida, Yenisel
Associate Professor
- Cummings, Derek Adam
Professor
- Kwara, Awewura
Professor
- Lauzardo, Michael
Research Associate Professor
- Longini, Ira M.
Professor
- Louis-Jacques, Adetola Fadeyibi
Clinical Assistant Professor
- Maldonado Molina, Mildred Merisa
Professor

- Manini, Todd M.
Professor
- Prosperi, Mattia
Professor
- Rasmussen, Sonja A.
Professor
- Seraphin, Marie Nancy
Assistant Professor
- Shorr, Ronald I.
Research Professor
- Staras, Stephanie Ann
Professor
- Stark, Heather Anne
Clinical Associate Professor
- Vaddiparti Ananth, Srinivasa Krishna
Clinical Assistant Professor
- Winterstein, Almut Gertrud
Distinguished Professor

Health Services Research, Management and Policy Department

Chair: L. Revere

Graduate Coordinator: B. Crown

The Department of Health Services Research, Management and Policy offers degree programs at the master's level. The Master of Health Administration (M.H.A.) prepares individuals for management positions in the health care field. The Department also participates in the Master of Public Health (M.P.H.) degree by offering a concentration in Public Health Management and Policy (more information available here (p. 331)). Health services research is a multidisciplinary field that examines the delivery, organization, financing, and outcomes of health care services.

Minimum requirements for these degrees are available in the Graduate Degrees (p. 778) section of this catalog.

For more information, please see the degree program pages listed on the following tab and our website: <http://hsrmp.php.ufl.edu>.

Majors

- Health Administration (p. 351)

Faculty

Professor

- Mainous, Arch G.
- Revere, Frances Lee
- Virnig, Beth A.

Associate Professor

- Jacobs, Molly M.

Assistant Professor

- Hammarlund, Noah Evan
- Strekalova, Yulia A.
- Walker, Ashby Farmer

Clinical Assistant Professor

- Dixon-Daniel, Brittney Nicole
- Zori, Gaia Lynn

Clinical Associate Professor

- Datta, Santanu K.
- Jo, Ara
- Kates, Frederick Richard
- King, Lindsey Marie

Clinical Professor

- Benson, Keith

Research Assistant Professor

- Beau De Rochars, Valery E.
- Marlow, Nicole Marguerite
- Zhu, Yenan

Affiliated Faculty

- Harle, Christopher Albert William
Courtesy Professor

Health Administration

Program Information

The Master of Health Administration (M.H.A.) is a two-year, lock-step program with a summer internship between the first and second years. Small class size permits individual attention and guidance from faculty members. The program prepares qualified individuals motivated by a social mission and responsibility to the community for various management positions in the health services industry. Organizations seek individuals who have the ability to solve business problems and build strategic relationships in a climate of continuous change.

The UF M.H.A. program develops engaged early health care careerists to use evidence-based strategies to improve healthcare quality, affordability, and access. We provide students with fundamental knowledge using a cohort model in a campus-based setting that emphasizes experiential learning and data-driven problem solving both in the classroom and in the practice environment. Students will develop proficiency to detect, analyze, manage and respond to critical administrative issues in both provider and non-provider healthcare organizations. Our program embraces ethical conduct and professionalism, diversity and inclusion, practitioner involvement and team-based learning. Faculty inform practice with research and service to the community.

Applicants from any undergraduate major are considered. For more information about our program, please see our website: <http://hsrmp.php.ufl.edu/academic-programs/master-of-health-administration> (<http://hsrmp.php.ufl.edu/academic-programs/master-of-health-administration/>).

Degrees Offered**Degrees Offered with a Major in Health Administration**

- Master of Health Administration

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses**Health Services Research, Management, and Policy Departmental Courses**

Code	Title	Credits
HSA 5174	Fundamentals of Health Care Finance	3
HSA 6105	Professional Skills Seminar	1
HSA 6114	Health Care System and Policy	3
HSA 6115	Introduction to Management of Health Services Organizations	3
HSA 6126	U.S. Health Insurance System	3
HSA 6152	Overview of U.S. Health Policy	3
HSA 6177	Health Care Finance	3
HSA 6188	Strategic Management in Health Administration	3
HSA 6196	Healthcare Data Analytics	3
HSA 6198	Information Management in Health Administration	3
HSA 6342	Human Resource Management for Health Services Managers	3
HSA 6385	Performance Management for Health Care Managers	3
HSA 6395	Healthcare Data Analytics I	3
HSA 6427	Legal and Ethical Issues in Health Administration	3
HSA 6436	Health Economics	3
HSA 6855	Internship in Health Administration	1
HSA 6905	Individual Study in Health Administration	1-3
HSA 6910	Supervised Research	1-5
HSA 6911	Research Seminar in Health Services Research	1
HSA 6930	Special Topics in Health Services Administration	1-3
HSA 6939	Capstone Seminar in Health Administration	3
HSA 6940	Supervised Teaching	1-5
HSA 7106	Seminar in Health Care Access and Utilization	3
HSA 7116	Health Services Organizational Research	3
HSA 7437	Advanced Health Economics	3
HSA 7706	Health Services Research Methods I	3
HSA 7708	Health Services Research Methods II	3
HSA 7759	Quality and Outcomes in Health Services Research	3
HSA 7905	Advanced Individual Study in Health Services Research	1-3
HSA 7936	Seminar in Health Care Costs and Financing	3
HSA 7938	Advanced Seminar in Health Services Research	3
HSA 7979	Advanced Research	1-4
HSA 7980	Research for Doctoral Dissertation	1-15
PHC 6641	Social Stratification & Health	3

PHC 7979	Advanced Research	1-12
PHC 7980	Research for Doctoral Dissertation	1-15

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes**Health Administration (MHA)****SLO 1 Knowledge and Skill**

Students will apply in-depth knowledge and skill in the healthcare delivery, organization, and financing, and management

SLO 2 Skills

Students will exhibit mastery of a set of 16 competencies in 4 domains (healthcare environment and community; healthcare organizations and performance; business analysis and techniques; leadership and professionalism)

SLO 3 Professional Behavior

Students will gain experience in healthcare management and develop professional behavior skills in a summer internship

Speech, Language, and Hearing Sciences Department

Chair: C. Ellis

Graduate Coordinators: K. J. Logan and J. Raney

Graduate programs in the Department lead to Master of Arts and Doctor of Philosophy degrees in Communication Sciences and Disorders and to the Doctor of Audiology degree. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The Master of Arts in Communication Sciences and Disorders and the Doctor of Audiology degrees are accredited by the Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA) of the American Speech-Language-Hearing Association.

The **Master of Arts (M.A.) Program** offers comprehensive academic and clinical training for students who are interested in a career in speech-language pathology. The five-semester program culminates in the completion of either a clinical externship or a Master's thesis, and it provides graduates with entry level knowledge and skills for obtaining employment in a variety of professional work settings. Students have the opportunity to complete clinical practica at sites within the University of Florida's Health Science Center and at other medical, rehabilitative, and educational facilities on or near the campus. These sites allow students to gain experience with providing clinical services to a range of patient populations.

Applicants to the Master's program must demonstrate successful completion of pre-requisite coursework in both normal bases of communication and introductory concepts in communication disorders. Additional information about these pre-requisites is available on the Department website. Graduates of the program are eligible for the Certificate of Clinical Competence in Speech-Language Pathology (CCC-SLP) from the American Speech-Language-Hearing Association as well as state licensure in speech-language pathology. For more information, contact Kenneth J. Logan, Ph.D. (klogan@ufl.edu).

The **Doctor of Audiology (Au.D.) Program** in the Department of Speech, Language, and Hearing Sciences is a four-year graduate degree. Graduate students take course work in theoretical and applied audiologic sciences and research. There are no specific undergraduate courses required for admission to the Au.D. degree program, although applicants with a strong science background are encouraged to apply. Graduates of this program are eligible for the Certificate of Clinical Competence in Audiology (CCC-A) administered by the American Speech-Language-Hearing Association, Board Certification in Audiology administered by the American Academy of Audiology, and for state licensure in audiology. For more information, contact Jill Raney, Ph.D. (jraney@phhp.ufl.edu (<http://gradcatalog.ufl.edu/graduate/colleges-departments/public-health-professions/speech-language-hearing-sciences/jraney@phhp.ufl.edu>)).

The **Ph.D. Program in Rehabilitation Sciences:** Communication and Swallowing Sciences and Disorders (CSSD) concentration

focuses on the scientific investigation of all aspects of communication and swallowing disorders and their rehabilitation. This concentration includes a range of interdisciplinary, conceptually broad subfields, unified by the anatomical and neurophysiological structures they share. Students may focus on the mechanisms and rehabilitation of swallowing and the upper aerodigestive tract, and/or speech, language, and hearing sciences and disorders. The required courses in the concentration reflect broad conceptual frame underlying CSSD as well as the wide range of

science being conducted by the Graduate Faculty from Departments and Institutes across the University of Florida. Students may choose from a variety of courses to fulfill their core requirements to create a unique program preparing them to do research in their field of interest.

For more information about the **PhD in Rehabilitation Science: Concentration in Communication and Swallowing Sciences and Disorders**, see the degree program website:

<https://rehabsci.phhp.ufl.edu/programs/course-requirements/communication-and-swallowing-sciences-and-disorders/> (<https://nam12.safelinks.protection.outlook.com/?url=https%3A%2F%2Frehabsci.phhp.ufl.edu%2Fprograms%2Fcourse-requirements%2Fcommunication-and-swallowing-sciences-and-disorders%2F&data=02%7C01%7C%7Cea59b375d5124a8ecaf308d804074ac9%7C84df9e7fe9f640afb435aaaaaaaaaaaa%7C1%7C0%7C637263776643969099&sdata=61JoAfgxRDyFYIGOPgybCPLVw7euXV>)

Majors

- Audiology (p. 353)
- Communication Sciences and Disorders (p. 355)

Faculty

Professor

- Ellis, Charles
- Nitttrouer, Susan N.

Associate Professor

- Centanni, Tracy Michelle
- Hegland, Karen W.

Assistant Professor

- Mir, Michela J.

Clinical Associate Professor

- Gauger, Laurie Mercado

Affiliated Faculty

- Antonelli, Patrick J.
Professor
- Lombardino, Linda J.
Professor
- Someya, Shinichi
Associate Professor

Audiology Program Information

The Department of Speech, Language, and Hearing Sciences offers the Doctor of Audiology degree. The official minimum requirements for the degree are available in the Graduate Degrees (p. 778) section of this catalog.

The Doctor of Audiology degree program is a campus-based program that:

- Prepares students for a professional career in audiology.
- Provides a wide array of experiences in the practice of diagnostic and rehabilitative audiology.
- Provides students with complex and diverse skills necessary to meet the challenges of the rapidly changing hearing health care field.

The clinical and academic curriculum includes coursework in the basic sciences, applied audiology, clinical research, statistics, audiologic rehabilitation, medical neuroscience, neuro-otology, cochlear implants, health care administration, programmable hearing aids, counseling, and aging. Graduates of this program are eligible for the Certificate of Clinical Competence in Audiology (CCC-A) administered by the American Speech-Language-Hearing Association, Board Certification in Audiology administered by the American Academy of Audiology, and for state licensure in audiology.

The on-campus program for bachelors-level applicants is a four-year graduate degree totaling 110 semester hours. The curriculum includes 78 hours of coursework in basic sciences, applied audiology, clinical research, statistics, audiologic rehabilitation, medical neuroscience, neuro-otology, cochlear implants, pharmacology, health care administration, programmable and digital hearing aids, counseling, communication and aging, and speech-language pathology.

In the remaining 32 hours of the on-campus program, students gain extensive clinical practicum experience. These practicum experiences utilize various resources at the University of Florida Health Science Center and affiliated hospitals in the North Florida area, as well as the Veterans Administration Medical Center. The final clinical training hours occur during the fourth year of the program as part of an audiology externship placement.

Degrees Offered

Degrees Offered with a Major in Audiology

- Doctor of Audiology

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Speech, Language and Hearing Sciences Departmental Courses

Code	Title	Credits
LIN 5741	Applied English Grammar	3
LIN 6720	Second Language Acquisition	3
SPA 5051	Clinical Observation in Audiology	1
SPA 5102	Auditory Anatomy and Physiology	2
SPA 5204	Phonological Disorders	3
SPA 5211	Voice Disorders	3
SPA 5225	Principles of Speech Pathology: Stuttering	3
SPA 5254	Neurocognitive Language Disorders	3
SPA 5304	Principles of Audiological Evaluation	3
SPA 5401	Speech Pathology Language Disorder	3
SPA 6010	Basic Auditory Sciences	3
SPA 6133L	Hearing Aid Analysis Laboratory	1
SPA 6233	Speech Motor Control Disorders	3
SPA 6270	Auditory Processing Disorders	3
SPA 6305	Pediatric Audiology	3
SPA 6311	Medical Audiology	3
SPA 6317	Vestibular Disorders	2

SPA 6323	Audiologic Rehabilitation for Adults	2
SPA 6324	Audiologic Rehabilitation for Children	2
SPA 6340	Amplification I	2
SPA 6341	Amplification II	2
SPA 6390	Proseminar: Speech-Language Pathology and Audiology	3
SPA 6410	Adult Language Disorders	3
SPA 6506	Clinical Clerkship in Audiology	1
SPA 6524	Practicum in Speech-Language Therapy: UFSHC	1-6
SPA 6531	Clinical Practice in Hearing Assessment	1-6
SPA 6564	Communication and Aging	3
SPA 6581	Special Clinical	1-9
SPA 6805	Introduction to Graduate Research	3
SPA 6905	Individual Study	1-3
SPA 6910	Supervised Research	1-5
SPA 6930	Proseminar in Speech-Language Pathology and Audiology	1
SPA 6935	Applied Reading Disabilities: Diagnosis and Treatment	3
SPA 6936	Special Topics	3
SPA 6940	Supervised Teaching	1-5
SPA 6942	Externship in Speech-Language Pathology	7-12
SPA 6971	Research for Master's Thesis	1-15
SPA 7306	Audiologic Assessment in a Medical Setting	5
SPA 7318	Clinical Auditory Electrophysiology	5
SPA 7319	Balance Disorders: Evaluation and Treatment	5
SPA 7325	Audiologic Rehabilitation	5
SPA 7343	Cochlear Implants and Assistive Devices	5
SPA 7348	Principles of Amplification	5
SPA 7353	Environmental Hearing Conservation	5
SPA 7354	Seminar in Audiology: Hearing Conservation and Noise Control	3
SPA 7391	Business and Professional Issues in Audiology	5
SPA 7566	Counseling Individuals with Hearing Losses	5
SPA 7945	Graduate Practicum in Audiology	3-6
SPA 7958	Clinical Externship	3-12
SPA 7979	Advanced Research	1-12
SPA 7980	Research for Doctoral Dissertation	1-15

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3

PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3
RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Audiology (Aud)

SLO 1 Knowledge

Identifies, describes, explains and applies acoustic, anatomical, psychological, developmental and social aspects of normal and disordered hearing

SLO 2 Knowledge

Identifies, plans, and applies the range of appropriate management steps for persons with hearing and balance disorders and the methods for determining the effectiveness of each

SLO 3 Skills

Through advanced professional practice obtains accurate information about hearing and balance function, including via case history interview, and through the appropriate selection and completion of behavioral, electrophysiological and psycho-social assessments

SLO 4 Skills

Applies clinical decision making and problem-solving skills in a clinical audiology context

SLO 5 Professional Behavior

Critically evaluates research relevant to audiology practice

SLO 6 Professional Behavior

Communicates critical, clinically relevant information verbally and/or in writing

Communication Sciences and Disorders

Program Information

The Department of Speech, Language, and Hearing Sciences offers a Master of Arts in Communication Sciences and Disorders. A Doctor of Philosophy (Ph.D.) degree is offered through the Rehabilitation Sciences Doctor of Philosophy Program: Communication and Swallowing Sciences and Disorders (CSSD) concentration. For more information about a Ph.D. in Speech Pathology and Audiology related topics, see <https://rehabsci.phphp.ufl.edu/programs/course-requirements/communication-and-swallowing-sciences-and-disorders-track/>

The **Master of Arts program** is designed to prepare students for entry-level professional practice in speech-language pathology. The program offers students a comprehensive learning experience – one that combines active classroom-based learning with an assortment of “hands on” learning opportunities at the many clinical sites available on or near the University of Florida campus. Graduates of the program can expect to develop the knowledge and skills that are needed to deliver evidence-based clinical services to a wide range of populations in a variety of clinical settings. The Master of Arts program is primarily oriented toward developing students’ clinical competence; however, students who elect to enter the “thesis track” of the program have the opportunity to conduct original research in laboratory and real-world settings under the mentorship of faculty who are widely recognized for their research contributions.

For more information, please see the department website: <http://slhs.phphp.ufl.edu/academics> (<http://slhs.phphp.ufl.edu/academics/>).

Degrees Offered

Degrees Offered with a Major in Communication Sciences and Disorders

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Speech, Language and Hearing Sciences Departmental Courses

Code	Title	Credits
LIN 5741	Applied English Grammar	3
LIN 6720	Second Language Acquisition	3
SPA 5051	Clinical Observation in Audiology	1
SPA 5102	Auditory Anatomy and Physiology	2
SPA 5204	Phonological Disorders	3
SPA 5211	Voice Disorders	3
SPA 5225	Principles of Speech Pathology: Stuttering	3
SPA 5254	Neurocognitive Language Disorders	3
SPA 5304	Principles of Audiological Evaluation	3
SPA 5401	Speech Pathology Language Disorder	3
SPA 6010	Basic Auditory Sciences	3
SPA 6133L	Hearing Aid Analysis Laboratory	1
SPA 6233	Speech Motor Control Disorders	3
SPA 6270	Auditory Processing Disorders	3
SPA 6305	Pediatric Audiology	3
SPA 6311	Medical Audiology	3
SPA 6317	Vestibular Disorders	2
SPA 6323	Audiologic Rehabilitation for Adults	2
SPA 6324	Audiologic Rehabilitation for Children	2
SPA 6340	Amplification I	2
SPA 6341	Amplification II	2
SPA 6390	Proseminar: Speech-Language Pathology and Audiology	3
SPA 6410	Adult Language Disorders	3
SPA 6506	Clinical Clerkship in Audiology	1
SPA 6524	Practicum in Speech-Language Therapy: UFSHC	1-6
SPA 6531	Clinical Practice in Hearing Assessment	1-6

SPA 6564	Communication and Aging	3
SPA 6581	Special Clinical	1-9
SPA 6805	Introduction to Graduate Research	3
SPA 6905	Individual Study	1-3
SPA 6910	Supervised Research	1-5
SPA 6930	Proseminar in Speech-Language Pathology and Audiology	1
SPA 6935	Applied Reading Disabilities: Diagnosis and Treatment	3
SPA 6936	Special Topics	3
SPA 6940	Supervised Teaching	1-5
SPA 6942	Externship in Speech-Language Pathology	7-12
SPA 6971	Research for Master's Thesis	1-15
SPA 7306	Audiologic Assessment in a Medical Setting	5
SPA 7318	Clinical Auditory Electrophysiology	5
SPA 7319	Balance Disorders: Evaluation and Treatment	5
SPA 7325	Audiologic Rehabilitation	5
SPA 7343	Cochlear Implants and Assistive Devices	5
SPA 7348	Principles of Amplification	5
SPA 7353	Environmental Hearing Conservation	5
SPA 7354	Seminar in Audiology: Hearing Conservation and Noise Control	3
SPA 7391	Business and Professional Issues in Audiology	5
SPA 7566	Counseling Individuals with Hearing Losses	5
SPA 7945	Graduate Practicum in Audiology	3-6
SPA 7958	Clinical Externship	3-12
SPA 7979	Advanced Research	1-12
SPA 7980	Research for Doctoral Dissertation	1-15

College of Public Health and Health Professions Courses

Code	Title	Credits
GEY 5935	Topics in Gerontology	3
GEY 6220	Overview of Geriatric Care Management	3
GEY 6306	Interpersonal Communication Within the Aging Network	3
GEY 6646	Issues and Concepts in Gerontology	3
GEY 6936	Professional Development in Gerontology/Geriatrics	1-2
HSC 6905	Independent Study	1-3
HSC 6910	Supervised Research	1-5
HSC 6940	Supervised Teaching	1-5
PHC 6053	Regression Methods for the Health and Life Sciences	3
PHC 6193	Qualitative Data Analysis	3
PHC 6195	Health information for Diverse Populations: Theory & Methods	3
PHC 6447	Ecology of HIV/Aids in the Rural South	3
PHC 6726	Integrated Mixed Methods Research in Epidemiology	3
PHC 6917	Supervised Research Project	1-6
PHC 6945	Public Health Practicum	1-6
PHC 6946	Public Health Internship	1-9
PHC 7587	Theory Development and Testing in Behavioral & Community Public Health	2
PHC 7907	Social and Behavioral Science Journal Club	1
RCS 6036	Or to Forensic Vt P	3
RCS 6601	Forensic Rehabilitation Consultation I	3
RSD 6110	Rehabilitation Science Theory and Application I	3

RSD 6905	Individual Work	1-4
RSD 6910	Supervised Research	1-5
RSD 6930	Special Topics in Rehabilitation Science	1-4
RSD 6940	Supervised Teaching	1-3
RSD 7979	Advanced Research	1-12
RSD 7980	Research for Doctoral Dissertation	1-15

Student Learning Outcomes

Communication Sciences & Disorders (Ph.D.)

SLO1

Communicate theoretical understanding

Students communicate theoretical understandings and the evidence for them to audiences which may include members with varying degrees of experience and/or expertise

SLO2

Evaluate and discuss research

Students critically evaluate research design and discuss the impact of research findings on relevant theory.

SLO3

Supervised Teaching

Students teach an undergraduate class.

SLO4

Grantsmanship

Students understand the grant mechanisms available to our field and how to write proposals to secure grant funding.

SLO5

Publications

Students produce original data-based research papers suitable for publication in top-tier, peer-reviewed journals.

Communication Sciences & Disorders (M.A.)

SLO 1

Knowledge

Students will demonstrate knowledge of speech, language, hearing, and swallowing processes, including their biological, neurological, acoustic, psychological, developmental, linguistic, and cultural bases in academic and clinical settings

SLO 2

Knowledge

Students will demonstrate knowledge of the principles and methods of prevention, assessment, and intervention for people with communication and swallowing disorders, including consideration of anatomical/physiological, psychological, developmental, social, linguistic and cultural correlates of the disorders, in academic and clinical settings

SLO 3

Skills

Students will display clinical skills needed to assess and diagnose speech, language, and swallowing disorders

SLO 4

Skills

Students will apply clinical skills needed to provide efficacious and appropriate intervention for individuals with speech, language, and swallowing disorders

SLO 5

Professional Behavior

Students will demonstrate ethical behavior and compliance with the University's rules and policies during interactions with program faculty and staff, clients/patients and their families/caregivers, as well as with other professionals

SLO 6

Professional Behavior

Students will apply professional knowledge and skills to implement evidence-based assessment and intervention practices that incorporate the needs, values, and cultural/linguistic background of the client/patient and/or their caregivers

College of the Arts

Interim Dean: J. Setlow

Interim Associate Dean: M. Haning

The arts program at UF began in the 1920s to serve the state of Florida's needs. Meeting these needs over the past 80 years has propelled the college to excel on a national and international level and has defined its mission to provide instruction for students seeking professional careers in the arts. In addition to providing rich educational experiences and programs in the arts, the college brings national and international recognition to the university through the high-level professionalism associated with the faculty and alumni, and the competence of students and graduates.

For more information about the College of the Arts, please see our website: <http://www.arts.ufl.edu>. (<http://www.arts.ufl.edu>)

Departments

- College of the Arts Interdisciplinary Program (p. 357)
 - Arts in Medicine (p. 357)
- Digital Worlds Institute (p. 358)
 - Digital Arts and Sciences (Arts) (p. 359)
- School of Art and Art History (p. 360)
 - Art (p. 360)
 - Art Education (p. 362)
 - Art History (p. 364)
 - Design and Visual Communications (p. 366)
 - Museology (p. 368)
- School of Music (p. 369)
 - Music (p. 370)
 - Music Education (p. 374)
- School of Theatre and Dance (p. 376)
 - Theatre (p. 377)

Faculty

For listings of affiliate faculty, please see each of the faculty tabs on the departmental listings for the units within the College of the Arts.

Arts in Medicine (Program)

Majors

- Arts in Medicine (p. 357)

Arts in Medicine Program Information

Center for Arts in Medicine Director: F. Carytsas

Center for Arts in Medicine Graduate Advisor: E. K. Sommer

The Center for Arts in Medicine is committed to advancing research, education, and practice in the arts in healthcare, locally and globally. The Center offers an online Master of Arts (MA) in Arts in Medicine. Minimum requirements for the degree are available in the Graduate Degrees (p. 778) section of this catalog.

Prerequisites and Requirements

Admission to the MA in Arts in Medicine program requires a bachelor's degree in an arts, health, or related field of study; a GRE exam score (no minimum score is required) or previous graduate degree; and completion of one of the following prerequisites: the Introduction to Arts in Medicine in a Global Context course at UF; completion of an Arts in Medicine Summer Intensive, completion of the online course Creating for the Health of It, or a minimum of one year of professional experience as an artist or administrator in the arts in health field. Requirements of the degree include completion of 35 credits of coursework with a 3.0 or higher GPA.

Commitment of Time

The MA in Arts in Medicine is designed to be completed in two years when students are enrolled in two classes per 16-week semester (most of the courses are offered in 8-week terms). Students should expect to dedicate 16 hours per week to each 8-week, 3-credit-hour course and 8 hours per week for 16-week courses.

The College participates in a combination degree between the Bachelor of Music and the Master of Arts with a major in Arts in Medicine,

For more information, please go the Center for Arts in Medicine website: <http://www.arts.ufl.edu/cam> (<http://www.arts.ufl.edu/cam/>).

Degrees Offered

Degrees Offered with a Major in Arts in Medicine

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Arts in Medicine Courses

Practicum

Code	Title	Credits
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6596	Arts in Medicine Capstone	4
HUM 6942	Arts in Medicine Graduate Practicum	3

Core Curriculum

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6597	Research and Evaluation in Arts in Medicine	3

Electives

Code	Title	Credits
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3
MVV 6651	Vocal Pedagogy	3
PHC 6104	Evidence-Based Management of Public Health Programs	3

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6359	Arts in Medicine Capstone	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6596	Arts in Medicine Capstone	4
HUM 6597	Research and Evaluation in Arts in Medicine	3
HUM 6886	Coding and Narrative Analysis in Arts in Health	2
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6942	Arts in Medicine Graduate Practicum	3
HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3

Student Learning Outcomes

Arts in Medicine (Master of Arts)

SLO1
Knowledge

Students will be able to identify and articulate the theoretical foundations, ethical frameworks, core issues, and contemporary trends that inform the field and practice of arts in health.

SLO2
Skills

Demonstrate professional-level skills in using the arts to safely facilitate the arts in healthcare and community settings.

SLO3

Professional Behavior

Identify and articulate conceptual and procedural knowledge to develop, administer, and evaluate arts in health programming.

Digital Worlds Institute

Director: T. Difato

Graduate Coordinator: J. Marlin

The Digital Worlds Institute exists to nurture leading edge education between the arts, communications, engineering and the sciences, utilizing advanced media systems and digital culture. By bringing together the diverse talents of University of Florida faculty, students, and staff in a multifaceted collaborative environment, the Institute serves as a platform for interdisciplinary research and teaching that would not have occurred within the confines of any one college or department. Through the use of interactive tools and technologies, the Institute promotes transdisciplinary creativity across classrooms, continents and cultures.

For more information, please see the program page below and our website: <http://www.digitalworlds.ufl.edu>.

Majors

- Digital Arts and Sciences (Arts) (p. 359)

Faculty

Professor

- Oliverio, James Charles

Associate Professor

- Barmpoutis, Angelos
- Suvajdzic, Marko
- Winger-Bearskin, Amelia

Assistant Professor

- Kang, Hyo Jeong

Assistant In

- Jang, Seung Hyuk

Affiliated Faculty

- Bozia, Eleni
Associate Professor
- Tremura, Welson Alves
Professor

Digital Arts and Sciences (Arts)

Program Information

The Master of Arts in Digital Arts & Sciences (DAS) degree seeks to allow students from diverse academic backgrounds the opportunity to develop fluency in the technologies, design practices and collaborative interdisciplinary teamwork increasingly required by the media, communications and entertainment industries. Graduates holding the M.A. in DAS degree would typically seek employment in the creative services sector, applying digital techniques and technologies in a variety of professions. Opportunities range from traditional cinema to interactive games; from broadcast media to online international networks to emergent industries.

Although this is a thesis degree, students usually produce a creative project in lieu of thesis. Students should see the graduate coordinator for the requirements for the creative project, which are also provided in the DAS Student Handbook.

Students seeking admission are expected to have an undergraduate background including:

- A degree in one of the fine arts or liberal arts
- A body of work that demonstrates accomplishment in the intended area
- A body of work that can clearly be enhanced with skills to be acquired in the DAS program.

Deficiencies may be corrected before beginning graduate study. In addition to appropriate academic credentials and prior scholastic achievement, admission into the program requires a well-constructed Statement of Purpose and media-related support material (i.e. samples of design, programming, video, web, writing, etc.) that demonstrates both prior interest and/or achievement in New Media/Digital Arts & Sciences.

Degrees Offered

Degrees Offered with a Major in Digital Arts and Sciences

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Digital Worlds Departmental Courses

Code	Title	Credits
DIG 5541	Managing Emerging Technology Projects	2
DIG 5555C	Digital Media Projection Design I	3
DIG 5930	Special Topics	3
DIG 5931C	Special Topics	1-4
DIG 6027	Digital Storytelling	1-4
DIG 6028	Roots of Digital Culture	1-3
DIG 6050C	Entertainment Technology	1-4
DIG 6125C	Digital Design & Visualization	1-3
DIG 6126C	Interaction Design	1-3
DIG 6256C	Audio Design For Digital Production	1-3
DIG 6358C	Applied 3D Modeling and Animation	2
DIG 6719	Videogame Theory and Analysis	2-4
DIG 6744C	Movement, Media and Machines	1-4

DIG 6751C	Protocols for Multimedia Interfaces	2-4
DIG 6788C	Digital Production & Game Design	1-4
DIG 6837C	Digital Tools for Arts and Humanities	3
DIG 6840	Interdisciplinary Research Seminar in Digital Arts & Sciences	1-4
DIG 6850	Digital Arts & Sciences Convergence	1-4
DIG 6906	Independent Study - Graduate Level	1-4
DIG 6931C	Special Topics	1-3
DIG 6950C	Digital Performance Production	1-4
DIG 6971	Research for Master's Thesis	1-3
DIG 6972C	Capstone Project	2-4
DIG 6973	Capstone Project in Lieu of Thesis	1-6

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6359	Arts in Medicine Capstone	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6596	Arts in Medicine Capstone	4
HUM 6597	Research and Evaluation in Arts in Medicine	3
HUM 6886	Coding and Narrative Analysis in Arts in Health	2
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6942	Arts in Medicine Graduate Practicum	3
HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3

Student Learning Outcomes

Digital arts and sciences (MA)

SLO 1 Knowledge
Explains the sociotechnical academic domain of Digital Arts & Sciences (DAS), and describes the transdisciplinary foundations of DAS design, inquiry and expression

SLO 2 Knowledge
Identifies the principles involved in the creation of interactive digital media artifacts

SLO 3 Skills
Solves problems and integrates systems thinking skills necessary to develop advanced media systems

SLO 4 Skills
Collaborates in cross-functional design and development teams

SLO 5 Professional Behavior

Exhibits the professional behaviors required in the field

Digital arts and sciences (MS)

SLO 1 Knowledge

Students identify, formulate, and solve computer science and engineering problems.

SLO 2 Knowledge

Students can critically read computer science and engineering literature.

SLO 3 Skills

Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level.

SLO 4 Professional Behavior

an understanding of professional and ethical responsibility.

SLO 5 Professional Behavior

Students can communicate effectively.

School of Art and Art History

Director: E. Ross

Graduate Coordinator: P. Grigsby

The School of Art and Art History offers the M.F.A. degree in art with specializations in art + technology, ceramics, creative photography, drawing, graphic design, painting, printmaking, and sculpture. The school also offers Master of Arts degrees in art education, art history, and museology (museum studies) and the Doctor of Philosophy degree in art history. Requirements for these degrees can be found in the Graduate Degrees (p. 778) section of this catalog, and information about each of these graduate programs can be found at the links below.

For more information, please see our website: <http://arts.ufl.edu/academics/art-and-art-history/>.

Majors

- Art (p. 360)
- Art Education (p. 362)
- Art History (p. 364)
- Design and Visual Communications (p. 366)
- Museology (p. 368)

Faculty

Professor

- Hyde, Melissa L.
- Morrisroe, Julia M.
- Rogal, Maria K.
- Stanfield-Mazzi, Maya
- Tugger, Fatimah
- Vega, Sergio G.

Associate Professor

- Behm, Anthea Christina
- Gladdys, Katerie Helaine
- Griffin, Dorothy L.
- Jones, Ashley Elizabeth

- Miller, Sean Owen
- Powell, Heidi C.
- Ross, Elizabeth
- Slawson, Brian L.
- Smith, Craig
- Taylor, Bethany Leighanne
- Tillander, Michelle D.
- Van Amstel, Frederick M.

Assistant Professor

- Briccetti, Rose
- Burdette, Derek S.
- Carney, Sean
- Gabriel, Douglas Colin
- Gonzalez, Adrian A.
- Han, Suckzoo
- Lima, Alvaro Luis
- Mervin, Marquiese
- Micieli-Voutsinas, Jacquelyn
- Santoso, Markus
- Segal, Eric Jefferson
- Silveri, Rachel Carmel
- Williams, Antoine

Other

- Grigsby, Patrick A.

Affiliated Faculty

- Defrance, Susan D.
Professor
- Ennes, Megan E.
Assistant Curator
- Feller, Yaniv
Assistant Professor
- Moore, Porchia
Assistant Professor
- Ortiz, Paul Andrew
Professor
- Santamaria-Wheeler, L
Associate In
- Yin, Tongyun
Curator

Art

Program Information

Master of Fine Arts degree: The school offers the M.F.A. degree in art with specializations in art + technology, ceramics, creative photography, drawing, graphic design, painting, printmaking, and sculpture. Enrollment is competitive and limited. Candidates for admission should have adequate undergraduate training in art. Deficiencies may be corrected before beginning graduate study. Applicants must submit a portfolio for admission consideration (for comprehensive admission information: <http://www.arts.ufl.edu/programs/grad.aspx>). A minimum of 3 years

residency is normally needed to complete the requirements for this degree, which for studio students culminates with an M.F.A. exhibition.

The M.F.A. requires a minimum of 60 credit hours:

- 24 hours must be in an area of specialization.
- Normal course requirements include:
 - 12 hours of studio electives outside the area of specialization
 - 6 hours of art history electives
 - 3 hours of outside SA+AH electives (research/discipline appropriate)
 - 6 hours of electives
 - 6 hours of individual project or thesis research.

Although the M.F.A. is a thesis degree, students usually produce a creative project in lieu of thesis. Students should see the graduate program adviser for the School's requirements for the creative project.

Degrees Offered

Degrees Offered with a Major in Art

- Master of Fine Arts
- Master of Arts
 - *without a concentration*
 - *concentration in Digital Arts and Sciences*

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Art and Art History Departmental Courses

Code	Title	Credits
ARE 6049	History of Teaching Art	3
ARE 6148	Curriculum in Teaching Art	3
ARE 6246C	Principles of Teaching Art	3
ARE 6247C	Teaching Art: The Study of Practice	3
ARE 6386	Teaching Art in Higher Education	3
ARE 6641	Issues in Art Education	3
ARE 6746	Methods of Research in Art Education	3
ARE 6905	Individual Study	1-5
ARE 6910	Capstone Project	3
ARE 6933	Special Topics in Art Education	1-3
ARE 6944	Internship in Teaching Art	3
ARE 6971	Research for Master's Thesis	1-15
ARE 6973	Individual Project	1-10
ARH 5420	Art in the Age of Revolution	3
ARH 5667	Colonial Andean Art	3
ARH 5816	Methods of Research and Bibliography	3
ARH 5877	Gender, Representation, and the Visual Arts: 1600-1900	3
ARH 5905	Individual Study	1-6
ARH 6141	Greek Art Seminar	3
ARH 6292	Medieval Art Seminar	3
ARH 6394	Renaissance Art Seminar	3
ARH 6422	Beginnings of Modernism. Realism to Post-Impressionism 1848-1890	3
ARH 6477	Eighteenth-Century European Art Seminar	3
ARH 6481	Contemporary Art Seminar	3
ARH 6496	Modern Art Seminar	3

ARH 6596	Chinese Art Seminar	3
ARH 6597	African Art Seminar	3
ARH 6654	Pre-Columbian Art Seminar	3
ARH 6666	Colonial Latin American Art Seminar	3
ARH 6696	American Art Seminar	3
ARH 6797	Museum Education	3
ARH 6836	Exhibitions Seminar	3
ARH 6895	Collections Management Seminar	3
ARH 6900	Independent Study in Museology	1-6
ARH 6910	Supervised Research	1-5
ARH 6911	Advanced Study	3-4
ARH 6914	Independent Study in Ancient Art History	3-4
ARH 6915	Independent Study in Medieval Art History	3-4
ARH 6916	Independent Study in Renaissance and Baroque Art History	3-4
ARH 6917	Independent Study in Modern Art History	3-4
ARH 6918	Independent Study in Non-Western Art History	3-4
ARH 6930	Special Topics in Museology	3
ARH 6931	Seminar in Curatorial Studies	3
ARH 6938	Seminar in Museum Studies	3
ARH 6941	Supervised Internship	1-6
ARH 6946	Museum Practicum	1-6
ARH 6948	Gallery Practicum	1-6
ARH 6971	Research for Master's Thesis	1-15
ARH 7979	Advanced Research	1-12
ARH 7980	Research for Doctoral Dissertation	1-15
ART 5674C	Digital Fabrication	3
ART 5905C	Directed Study	1-5
ART 5930C	Special Topics	3
ART 6410C	Printmaking Seminar: Mastering Process and Content	3
ART 6411C	Printmaking Seminar: Transformation and Change	3
ART 6412C	Printmaking Seminar: Ideation, Studies, and Completed Works	3
ART 6413C	Printmaking Seminar: Interdisciplinary Studio	3
ART 6671C	Advanced Experiments in Digital Art	3
ART 6672	Hypermedia	3
ART 6673C	Video Art	3
ART 6675C	Digital Art and Animation	3
ART 6691	Digital Art Studio	4
ART 6794C	Vessel Aesthetic 1	3
ART 6795C	Vessel Aesthetic 2	3
ART 6797C	Ceramic Sculpture 2	3
ART 6835C	Research in Methods and Materials of the Artist	3-4
ART 6849C	Reactive Environments	3
ART 6897	Professional Practices for the Visual Artist	3
ART 6910C	Supervised Research	1-5
ART 6925C	Art + Technology Workshop	3
ART 6926C	Advanced Study I	2-4
ART 6927C	Advanced Study II	2-4
ART 6928C	Advanced Study III	2-4
ART 6929C	Advanced Study IV	2-4
ART 6933	Area Methods: Rotating Topics	1-4
ART 6971	Research for Master's Thesis	1-15
ART 6973C	Individual Project	1-10
DIG 5930	Special Topics	3
DIG 6746C	Graduate Seminar in Sensors and Electronics	3
GRA 5905	Individual Directed Study	1-3
GRA 6930	Seminar: Rotating Topics	3

GRA 6931C	Research and Practice	3
GRA 6944	Practicum	1-6
GRA 6973	Project in Lieu of Thesis	1-9
IDC 6505C	Programming for Artists	3

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6359	Arts in Medicine Capstone	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6596	Arts in Medicine Capstone	4
HUM 6597	Research and Evaluation in Arts in Medicine	3
HUM 6886	Coding and Narrative Analysis in Arts in Health	2
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6942	Arts in Medicine Graduate Practicum	3
HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3

Student Learning Outcomes

Art (MFA)

SLO 1 Knowledge

Develop a body of artwork or design that reflects conceptual cohesiveness, creativity/originality, and contribution to the field.

SLO 2 Skills

Solve creative problems within their field of art and design, including research and synthesis of technical, aesthetic, and conceptual knowledge.

SLO 3 Professional Behavior

Organize and communicate their ideas and work products at a professional level with their intended audience using visual, oral, and written skills.

SLO 4 Skills

Execute technical, aesthetic, and conceptual decisions based on an understanding of art and design principles within a student's stated intention.

SLO 5 Knowledge

Describes and explains the relevance of the student's work to major cultural and/or aesthetic models.

Art Education

Program Information

Master of Arts degree in Art Education: The School offers the M.A. in art education. In addition to meeting requirements of the Graduate School for admission, prospective students should:

- Hold a degree in studio art, art history, design, or art education
- Send up to 10 images of original works of art (on CD or in slide form) and a research paper, article, or other sample of academic writing
- Official transcripts from all colleges/universities previously attended
- Statement of professional goals for attending graduate school and earning an M.A. degree in art education
- Current Curriculum Vitae or Resume
- Submit three current letters of recommendation.

The M.A. in art education requires a minimum of 36 credit hours.

Code	Title	Credits
Required		
ARE 6049	History of Teaching Art	3
ARE 6148	Curriculum in Teaching Art	3
ARE 6641	Issues in Art Education	3
Basic Plan of Study		
Approved art education elective		3
Studio courses		9
Art history		3
Art history, studio, art education, or education electives		6
ARE 6746	Methods of Research in Art Education	3
ARE 6971	Research for Master's Thesis	3
or ARE 6973	Individual Project	
Total Credits		36

To be admitted to candidacy, students must pass a comprehensive examination at the beginning of the second year. The program culminates in an oral examination on the thesis or project in lieu of thesis.

Degrees Offered

Degrees Offered with a Major in Art Education

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Art and Art History Departmental Courses

Code	Title	Credits
ARE 6049	History of Teaching Art	3
ARE 6148	Curriculum in Teaching Art	3
ARE 6246C	Principles of Teaching Art	3
ARE 6247C	Teaching Art: The Study of Practice	3
ARE 6386	Teaching Art in Higher Education	3
ARE 6641	Issues in Art Education	3
ARE 6746	Methods of Research in Art Education	3
ARE 6905	Individual Study	1-5
ARE 6910	Capstone Project	3

ARE 6933	Special Topics in Art Education	1-3	ART 6797C	Ceramic Sculpture 2	3
ARE 6944	Internship in Teaching Art	3	ART 6835C	Research in Methods and Materials of the Artist	3-4
ARE 6971	Research for Master's Thesis	1-15	ART 6849C	Reactive Environments	3
ARE 6973	Individual Project	1-10	ART 6897	Professional Practices for the Visual Artist	3
ARH 5420	Art in the Age of Revolution	3	ART 6910C	Supervised Research	1-5
ARH 5667	Colonial Andean Art	3	ART 6925C	Art + Technology Workshop	3
ARH 5816	Methods of Research and Bibliography	3	ART 6926C	Advanced Study I	2-4
ARH 5877	Gender, Representation, and the Visual Arts: 1600-1900	3	ART 6927C	Advanced Study II	2-4
ARH 5905	Individual Study	1-6	ART 6928C	Advanced Study III	2-4
ARH 6141	Greek Art Seminar	3	ART 6929C	Advanced Study IV	2-4
ARH 6292	Medieval Art Seminar	3	ART 6933	Area Methods: Rotating Topics	1-4
ARH 6394	Renaissance Art Seminar	3	ART 6971	Research for Master's Thesis	1-15
ARH 6422	Beginnings of Modernism. Realism to Post-Impressionism 1848-1890	3	ART 6973C	Individual Project	1-10
ARH 6477	Eighteenth-Century European Art Seminar	3	DIG 5930	Special Topics	3
ARH 6481	Contemporary Art Seminar	3	DIG 6746C	Graduate Seminar in Sensors and Electronics	3
ARH 6496	Modern Art Seminar	3	GRA 5905	Individual Directed Study	1-3
ARH 6596	Chinese Art Seminar	3	GRA 6930	Seminar: Rotating Topics	3
ARH 6597	African Art Seminar	3	GRA 6931C	Research and Practice	3
ARH 6654	Pre-Columbian Art Seminar	3	GRA 6944	Practicum	1-6
ARH 6666	Colonial Latin American Art Seminar	3	GRA 6973	Project in Lieu of Thesis	1-9
ARH 6696	American Art Seminar	3	IDC 6505C	Programming for Artists	3
ARH 6797	Museum Education	3	College of the Arts Courses		
ARH 6836	Exhibitions Seminar	3			
ARH 6895	Collections Management Seminar	3	Code	Title	Credits
ARH 6900	Independent Study in Museology	1-6	HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
ARH 6910	Supervised Research	1-5	HUM 5366	Foundations of Arts in Public Health	3
ARH 6911	Advanced Study	3-4	HUM 5367	Arts in Public Health Practice	3
ARH 6914	Independent Study in Ancient Art History	3-4	HUM 5595	Arts in Medicine in Practice	3
ARH 6915	Independent Study in Medieval Art History	3-4	HUM 6308	Arts and Compassion	3
ARH 6916	Independent Study in Renaissance and Baroque Art History	3-4	HUM 6350	The Art of Self-Care	3
ARH 6917	Independent Study in Modern Art History	3-4	HUM 6352	Art and Design in the Environment of Care	3
ARH 6918	Independent Study in Non-Western Art History	3-4	HUM 6353	Arts in Medicine Professional Seminar	3
ARH 6930	Special Topics in Museology	3	HUM 6354	Arts in Medicine Advanced Professional Seminar	3
ARH 6931	Seminar in Curatorial Studies	3	HUM 6355	Arts in Medicine Summer Intensive	3
ARH 6938	Seminar in Museum Studies	3	HUM 6358	Arts in Medicine Capstone Proposal	2
ARH 6941	Supervised Internship	1-6	HUM 6359	Arts in Medicine Capstone	3
ARH 6946	Museum Practicum	1-6	HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
ARH 6948	Gallery Practicum	1-6	HUM 6375	The Arts and Human Development	3
ARH 6971	Research for Master's Thesis	1-15	HUM 6596	Arts in Medicine Capstone	4
ARH 7979	Advanced Research	1-12	HUM 6597	Research and Evaluation in Arts in Medicine	3
ARH 7980	Research for Doctoral Dissertation	1-15	HUM 6886	Coding and Narrative Analysis in Arts in Health	2
ART 5674C	Digital Fabrication	3	HUM 6930	Special Topics in Fine Arts	1-3
ART 5905C	Directed Study	1-5	HUM 6942	Arts in Medicine Graduate Practicum	3
ART 5930C	Special Topics	3	HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
ART 6410C	Printmaking Seminar: Mastering Process and Content	3	HUM 6947	Arts and Public Health Professional Seminar	3
ART 6411C	Printmaking Seminar: Transformation and Change	3	HUM 6948	Arts and Public Health Practicum	3
ART 6412C	Printmaking Seminar: Ideation, Studies, and Completed Works	3	Student Learning Outcomes		
ART 6413C	Printmaking Seminar: Interdisciplinary Studio	3			
ART 6671C	Advanced Experiments in Digital Art	3	Art education (MA)		
ART 6672	Hypermedia	3			
ART 6673C	Video Art	3	SLO 1	Professional Behavior	
ART 6675C	Digital Art and Animation	3	Demonstrates how the project is personally relevant and contributes to the field of art education.		
ART 6691	Digital Art Studio	4	SLO 2	Knowledge	
ART 6794C	Vessel Aesthetic 1	3			
ART 6795C	Vessel Aesthetic 2	3			

The student describes and executes the project proposal, making appropriate adjustments as necessary.

SLO 3 Skills

Synthesizes knowledge obtained in art education literature courses in planning and executing the project.

SLO 4 Skills

Explains and supports their thesis or project and the project's underlying ideas.

SLO 5 Professional Behavior

Connects the thesis or capstone project to current or past art education scholarship.

Art History

Program Information

The School of Art & Art History offers graduate programs leading to the M.A. and Ph.D. degrees. Minimum requirements for these degrees are available in the Graduate Degrees (p. 778) section of this catalog. For complete details of the M.A. and Ph.D. degree requirements, see the Director of Graduate Studies—Art History. Art History students may participate in courses offered by the State University System's programs in Paris, London, and Florence. Other study-abroad programs may be approved by the director of graduate studies.

For the M.A. degree, the School offers areas of emphasis in Ancient, Medieval, Renaissance/Baroque, Modern, and non-Western art history (including African, Asian, and Oceanic). A minimum of 36 credit hours is required:

Code	Title	Credits
Required Courses		
ARH 5816	Methods of Research and Bibliography	3
ARH 6971	Research for Master's Thesis	6
Required Coursework		
Coursework		6
Select a graduate seminar in each of the following areas		12
Ancient		
Renaissance/Baroque		
Modern/Contemporary		
Non-West		
Select 9 credits in related areas with the graduate program adviser's approval		9
Total Credits		36

Reading proficiency in a foreign language appropriate to the major area of study must be demonstrated before thesis research is begun. Language courses cannot apply toward degree credit.

For the Ph.D. degree, the School offers the same areas of specialization as for the M.A. degree. Up to 30 credits from the M.A. degree may apply toward the 90 credit Ph.D. degree. A program of 60 credit hours beyond the M.A. degree is required. Core courses will consist of a minimum of 30 hours in art history:

- 18 hours in a primary area (5000-level or above)
- 9 hours in a secondary area (5000-level or above)
- 3 hours of theory/methodology of art history (if ARH 5816 Methods of Research and Bibliography (3 cr.) or its equivalent has not been taken as part of the M.A.)

- An additional 12 hours of outside electives taken in other schools or departments are required in a discipline(s) related to the primary area of study
- Finally, 27 hours of dissertation research and writing is required.

By the end of the second semester or equivalent full-time study, students should form their supervisory committee that must include a minimum of four Graduate Faculty members; one of whom must agree to serve as primary dissertation adviser and supervisory committee chair. The supervisory committee will also act as the qualifying examination committee. Normally students will take the qualifying examination during the spring term of the third year in residence. The examination is both written and oral. It will cover the major and minor art history areas of emphasis as well as the student's preliminary formulation of a dissertation topic and provisional statement of the approaches to that topic as expressed in the dissertation prospectus. On successful completion of the qualifying examination, the approval by the supervisory committee of the dissertation prospectus, and fulfilling all other course and language requirements, the student makes formal application for a change of status to Ph.D. candidacy. Normally, a student will be expected to present the completed dissertation and defend it at an oral defense conducted by the supervisory committee by the end of the sixth year in the program. For Ph.D. students, reading knowledge of two research languages other than English must be demonstrated by the end of the second year of course work, or by the end of the first semester in the case of transfer students. Language courses are not applicable toward degree credit.

For more information, please see our website: <http://arts.ufl.edu/academics/art-and-art-history> (<http://arts.ufl.edu/academics/art-and-art-history/>).

Degrees Offered

Degrees Offered with a Major in Art History

- Doctor of Philosophy
- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Art and Art History

Departmental Courses

Code	Title	Credits
ARE 6049	History of Teaching Art	3
ARE 6148	Curriculum in Teaching Art	3
ARE 6246C	Principles of Teaching Art	3
ARE 6247C	Teaching Art: The Study of Practice	3
ARE 6386	Teaching Art in Higher Education	3
ARE 6641	Issues in Art Education	3
ARE 6746	Methods of Research in Art Education	3
ARE 6905	Individual Study	1-5
ARE 6910	Capstone Project	3
ARE 6933	Special Topics in Art Education	1-3
ARE 6944	Internship in Teaching Art	3
ARE 6971	Research for Master's Thesis	1-15
ARE 6973	Individual Project	1-10
ARH 5420	Art in the Age of Revolution	3

ARH 5667	Colonial Andean Art	3	ART 6910C	Supervised Research	1-5
ARH 5816	Methods of Research and Bibliography	3	ART 6925C	Art + Technology Workshop	3
ARH 5877	Gender, Representation, and the Visual Arts: 1600-1900	3	ART 6926C	Advanced Study I	2-4
ARH 5905	Individual Study	1-6	ART 6927C	Advanced Study II	2-4
ARH 6141	Greek Art Seminar	3	ART 6928C	Advanced Study III	2-4
ARH 6292	Medieval Art Seminar	3	ART 6929C	Advanced Study IV	2-4
ARH 6394	Renaissance Art Seminar	3	ART 6933	Area Methods: Rotating Topics	1-4
ARH 6422	Beginnings of Modernism. Realism to Post-Impressionism 1848-1890	3	ART 6971	Research for Master's Thesis	1-15
ARH 6477	Eighteenth-Century European Art Seminar	3	ART 6973C	Individual Project	1-10
ARH 6481	Contemporary Art Seminar	3	DIG 5930	Special Topics	3
ARH 6496	Modern Art Seminar	3	DIG 6746C	Graduate Seminar in Sensors and Electronics	3
ARH 6596	Chinese Art Seminar	3	GRA 5905	Individual Directed Study	1-3
ARH 6597	African Art Seminar	3	GRA 6930	Seminar: Rotating Topics	3
ARH 6654	Pre-Columbian Art Seminar	3	GRA 6931C	Research and Practice	3
ARH 6666	Colonial Latin American Art Seminar	3	GRA 6944	Practicum	1-6
ARH 6696	American Art Seminar	3	GRA 6973	Project in Lieu of Thesis	1-9
ARH 6797	Museum Education	3	IDC 6505C	Programming for Artists	3
ARH 6836	Exhibitions Seminar	3	College of the Arts Courses		
ARH 6895	Collections Management Seminar	3	Code	Title	Credits
ARH 6900	Independent Study in Museology	1-6	HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
ARH 6910	Supervised Research	1-5	HUM 5366	Foundations of Arts in Public Health	3
ARH 6911	Advanced Study	3-4	HUM 5367	Arts in Public Health Practice	3
ARH 6914	Independent Study in Ancient Art History	3-4	HUM 5595	Arts in Medicine in Practice	3
ARH 6915	Independent Study in Medieval Art History	3-4	HUM 6308	Arts and Compassion	3
ARH 6916	Independent Study in Renaissance and Baroque Art History	3-4	HUM 6350	The Art of Self-Care	3
ARH 6917	Independent Study in Modern Art History	3-4	HUM 6352	Art and Design in the Environment of Care	3
ARH 6918	Independent Study in Non-Western Art History	3-4	HUM 6353	Arts in Medicine Professional Seminar	3
ARH 6930	Special Topics in Museology	3	HUM 6354	Arts in Medicine Advanced Professional Seminar	3
ARH 6931	Seminar in Curatorial Studies	3	HUM 6355	Arts in Medicine Summer Intensive	3
ARH 6938	Seminar in Museum Studies	3	HUM 6358	Arts in Medicine Capstone Proposal	2
ARH 6941	Supervised Internship	1-6	HUM 6359	Arts in Medicine Capstone	3
ARH 6946	Museum Practicum	1-6	HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
ARH 6948	Gallery Practicum	1-6	HUM 6375	The Arts and Human Development	3
ARH 6971	Research for Master's Thesis	1-15	HUM 6596	Arts in Medicine Capstone	4
ARH 7979	Advanced Research	1-12	HUM 6597	Research and Evaluation in Arts in Medicine	3
ARH 7980	Research for Doctoral Dissertation	1-15	HUM 6886	Coding and Narrative Analysis in Arts in Health	2
ART 5674C	Digital Fabrication	3	HUM 6930	Special Topics in Fine Arts	1-3
ART 5905C	Directed Study	1-5	HUM 6942	Arts in Medicine Graduate Practicum	3
ART 5930C	Special Topics	3	HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
ART 6410C	Printmaking Seminar: Mastering Process and Content	3	HUM 6947	Arts and Public Health Professional Seminar	3
ART 6411C	Printmaking Seminar: Transformation and Change	3	HUM 6948	Arts and Public Health Practicum	3
ART 6412C	Printmaking Seminar: Ideation, Studies, and Completed Works	3	Student Learning Outcomes		
ART 6413C	Printmaking Seminar: Interdisciplinary Studio	3	Art History (PHD)		
ART 6671C	Advanced Experiments in Digital Art	3	SLO 1	Knowledge	
ART 6672	Hypermedia	3	Identifies, describes, and explains the historiography, methodology, and theory of art		
ART 6673C	Video Art	3	SLO 2	Skills	
ART 6675C	Digital Art and Animation	3	Selects area of specialization and identifies scholarly resources for original advanced art historical research		
ART 6691	Digital Art Studio	4	SLO 3	Professional Behavior	
ART 6794C	Vessel Aesthetic 1	3			
ART 6795C	Vessel Aesthetic 2	3			
ART 6797C	Ceramic Sculpture 2	3			
ART 6835C	Research in Methods and Materials of the Artist	3-4			
ART 6849C	Reactive Environments	3			
ART 6897	Professional Practices for the Visual Artist	3			

Produces written scholarly research that conforms to academic publishing conventions

SLO 4 Skill

Verbally describes thesis research, relevant historiography, and theory

Art history (MA)

SLO 1 Knowledge

Recalls and describes historiography, methodology, and theory of art

SLO 2 Skills

Identifies a thesis project that contributes to the state of the field

SLO 3 Professional Behavior

Produces written scholarly research that synthesizes the primary and secondary source materials

SLO 4 Skills

Student is engaging primary and secondary resource materials

SLO 5 Professional Behavior

Student verbally communicates the claims of the thesis

Design and Visual Communications

Director of Graduate Studies: M. Rogal

Program Coordinator: P. Grigsby

Summary: The Master of Fine Arts degree in Design and Visual Communications is a terminal degree with the goal of preparing designers to address complex problems through an expanded design framework. The curriculum envisions design as an integrated activity, emphasizing co-design and horizontal practices in its teaching and application of research, theory, methods, and practice. A key aspect of the program is to design with people in context in order to address complex problems that matter to people and the environment and we believe Florida is an excellent laboratory to explore pressing problems of our time. Students benefit from Florida's complexity and diversity. As the third largest US state and gateway to Latin America and the Caribbean, the state offers a unique lab to explore collaborative design interventions in context. Through this program, we use design as a catalyst for change and sustainable development to make Florida, and the world, better through design. We also encourage students to consider how what they learn is transferrable to other contexts and environments. Students will encounter the world through a framework that is respectful of context and culture and that values collaboration and many knowledges as ways of making design that is responsible and meaningful.

Admissions: Enrollment is competitive and limited. Applicants should have the background and proficiency in communication design or a related field and demonstrate potential for successful study at the graduate level. This includes the ability to craft appropriate communication design artifacts, excellent verbal and written articulation of ideas, and an understanding of and interest in this program specifically rather than design more generally. Preferred applicants will have professional practice experience in design or a design-related field. Certain deficiencies, such as some formal technical competencies, may be corrected before beginning graduate study. Applicants must submit a portfolio and other materials for admission consideration (for comprehensive admission information: <https://arts.ufl.edu/academics/art-and-art-history/programs/mxd/>). (<https://arts.ufl.edu/academics/art-and-art-history/programs/mxd/>).html)

Enrollment Options: This program offers two-and three-year residency tracks. Students on a three-year track will enroll in 9 credits each semester and students on the two-year track will enroll in 12–15 credits during the academic year and both tracks require summer coursework. Students who wish to obtain teaching experience should pursue the three-year track and apply for a graduate assistantship (teaching assignments are based on faculty recommendation and availability).

Curriculum: We offer a design-centered curriculum that allows you to dive deep into research, theory, methods, practice, and designing in and with communities. Our curriculum, built on our 20+ year history of graduate education and research in design, allows you to learn from diverse knowledges, approaches, experiences, and modalities. We emphasize culture, inclusivity, social justice, and sustainability so we make design matter. We recognize the value of exploring other disciplinary knowledges, particularly at such a comprehensive university. The program, known as the MXD, allows you to inform your design practice by identifying and exploring other interests (the "x") to inform your design trajectory, making your studies at the University of Florida even more rewarding.

The M.F.A. requires a minimum of 60 credit hours for the terminal degree. Normal course requirements include the following: 24 hours of design and visual communications courses (12 hours of seminar, 12 hours of research and practice); 6 hours of practica; 15 hours of project-in-lieu-of-thesis research; and 15 hours of elective coursework.

All major coursework is designed to provide opportunities for professional development in design. Students develop knowledge in design theory, methods, discourse, and issues in the seminar courses, while the research & practice courses provide frameworks to apply this learning in context. Students will study and use a range of methods appropriate for an expanded design practice. Their use is addressed and applied through discussions, case studies, writing, fieldwork, project work, deliverables, and presentations. Projects will engage students to design in a complex environment for diverse audiences and explore the many aspects necessary to design for 'real world problems' and constraints. Throughout the program, students will be mentored in ways to disseminate research at conferences and in publications in order to share their work and build their careers. Six hours of practicum provide an opportunity to conduct research and practice with an approved entity; and elective courses are intended to support an area of interest and expertise. In consultation with program faculty, the program director may recommend specific courses to support the student's knowledge-base (for example, in design, writing, subject matter knowledge, and/or teaching). The program culminates with a 15-credit project-in-lieu-of-thesis, which is selected, researched, and carried out under the direction of the supervisory chair and committee. This committee is formed in consultation with and approval from the program's director of graduate studies during the first year for students on the two-year track and during the second year for students on the three-year track. The objective is to contribute original research and disseminate it to the field.

Expected Outcomes: Every student in the program will develop a body of work that includes design and visual communication artifacts, systems, and strategies, that reflect original contributions to the discipline; demonstrate the ability to frame and incorporate research methods and related research activities and findings into tangible outcomes; create a dossier that organizes and communicates research (including creative activity), findings, proposals, and work products at a professional level; demonstrate the ability to collaborate and work effectively in interdisciplinary/multidisciplinary teams to develop approaches and solutions to complex problems; be prepared to present project work

at professional conferences and publish in professional venues; and demonstrate the ability to design with people, in context.

Assessment: Student achievement is assessed in multiple ways from admission through graduation. University and program regulations state that a student must achieve a 3.0 GPA in order to graduate from the program, which is the result of assessment in courses. In addition, students must present their work product at the end of each semester to a faculty review committee who determines if the student, on the whole, is making sufficient progress towards candidacy and completion. Reviews consider the momentum, direction, and performance as a whole. Outcomes of semester reviews include continuation based on appropriate progress; recommendations for improvement; and recommendation of dismissal for continued performance below expectations.

Futures: With this credential, program graduates will be prepared to enter leadership positions in design consultancies, non-profit organizations, government agencies, and corporations, as well as form their own consultancies and studios, within design proper and in a range of industries. They will also be eligible to teach at universities and colleges in the US and abroad.

More information can be found at our website: <https://arts.ufl.edu/academics/art-and-art-history/programs/mxd/>. (<https://arts.ufl.edu/academics/art-and-art-history/programs/mxd/>)

Degrees Offered

Degrees Offered with a Major in DESIGN AND VISUAL COMMUNICATIONS

- Master of Fine Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Art and Art History Departmental Courses

Code	Title	Credits
ARE 6049	History of Teaching Art	3
ARE 6148	Curriculum in Teaching Art	3
ARE 6246C	Principles of Teaching Art	3
ARE 6247C	Teaching Art: The Study of Practice	3
ARE 6386	Teaching Art in Higher Education	3
ARE 6641	Issues in Art Education	3
ARE 6746	Methods of Research in Art Education	3
ARE 6905	Individual Study	1-5
ARE 6910	Capstone Project	3
ARE 6933	Special Topics in Art Education	1-3
ARE 6944	Internship in Teaching Art	3
ARE 6971	Research for Master's Thesis	1-15
ARE 6973	Individual Project	1-10
ARH 5420	Art in the Age of Revolution	3
ARH 5667	Colonial Andean Art	3
ARH 5816	Methods of Research and Bibliography	3
ARH 5877	Gender, Representation, and the Visual Arts: 1600-1900	3
ARH 5905	Individual Study	1-6
ARH 6141	Greek Art Seminar	3
ARH 6292	Medieval Art Seminar	3

ARH 6394	Renaissance Art Seminar	3
ARH 6422	Beginnings of Modernism. Realism to Post-Impressionism 1848-1890	3
ARH 6477	Eighteenth-Century European Art Seminar	3
ARH 6481	Contemporary Art Seminar	3
ARH 6496	Modern Art Seminar	3
ARH 6596	Chinese Art Seminar	3
ARH 6597	African Art Seminar	3
ARH 6654	Pre-Columbian Art Seminar	3
ARH 6666	Colonial Latin American Art Seminar	3
ARH 6696	American Art Seminar	3
ARH 6797	Museum Education	3
ARH 6836	Exhibitions Seminar	3
ARH 6895	Collections Management Seminar	3
ARH 6900	Independent Study in Museology	1-6
ARH 6910	Supervised Research	1-5
ARH 6911	Advanced Study	3-4
ARH 6914	Independent Study in Ancient Art History	3-4
ARH 6915	Independent Study in Medieval Art History	3-4
ARH 6916	Independent Study in Renaissance and Baroque Art History	3-4
ARH 6917	Independent Study in Modern Art History	3-4
ARH 6918	Independent Study in Non-Western Art History	3-4
ARH 6930	Special Topics in Museology	3
ARH 6931	Seminar in Curatorial Studies	3
ARH 6938	Seminar in Museum Studies	3
ARH 6941	Supervised Internship	1-6
ARH 6946	Museum Practicum	1-6
ARH 6948	Gallery Practicum	1-6
ARH 6971	Research for Master's Thesis	1-15
ARH 7979	Advanced Research	1-12
ARH 7980	Research for Doctoral Dissertation	1-15
ART 5674C	Digital Fabrication	3
ART 5905C	Directed Study	1-5
ART 5930C	Special Topics	3
ART 6410C	Printmaking Seminar: Mastering Process and Content	3
ART 6411C	Printmaking Seminar: Transformation and Change	3
ART 6412C	Printmaking Seminar: Ideation, Studies, and Completed Works	3
ART 6413C	Printmaking Seminar: Interdisciplinary Studio	3
ART 6671C	Advanced Experiments in Digital Art	3
ART 6672	Hypermedia	3
ART 6673C	Video Art	3
ART 6675C	Digital Art and Animation	3
ART 6691	Digital Art Studio	4
ART 6794C	Vessel Aesthetic 1	3
ART 6795C	Vessel Aesthetic 2	3
ART 6797C	Ceramic Sculpture 2	3
ART 6835C	Research in Methods and Materials of the Artist	3-4
ART 6849C	Reactive Environments	3
ART 6897	Professional Practices for the Visual Artist	3
ART 6910C	Supervised Research	1-5
ART 6925C	Art + Technology Workshop	3
ART 6926C	Advanced Study I	2-4
ART 6927C	Advanced Study II	2-4
ART 6928C	Advanced Study III	2-4
ART 6929C	Advanced Study IV	2-4
ART 6933	Area Methods: Rotating Topics	1-4

ART 6971	Research for Master's Thesis	1-15
ART 6973C	Individual Project	1-10
DIG 5930	Special Topics	3
DIG 6746C	Graduate Seminar in Sensors and Electronics	3
GRA 5905	Individual Directed Study	1-3
GRA 6930	Seminar: Rotating Topics	3
GRA 6931C	Research and Practice	3
GRA 6944	Practicum	1-6
GRA 6973	Project in Lieu of Thesis	1-9
IDC 6505C	Programming for Artists	3

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6359	Arts in Medicine Capstone	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6596	Arts in Medicine Capstone	4
HUM 6597	Research and Evaluation in Arts in Medicine	3
HUM 6886	Coding and Narrative Analysis in Arts in Health	2
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6942	Arts in Medicine Graduate Practicum	3
HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3

Museology

Program Information

Master of Arts degree in Museology (Museum Studies): The School offers this interdisciplinary program that consists of both academic and practical work. The curriculum allows students to do graduate work in a disciplinary emphasis (art history, anthropology, history, education, or the natural sciences, for example) and at the same time complete a concentrated study in professional museum practice. The M.A. degree in museology requires 48 credit hours including:

- 15 credits of museum studies courses (museology seminar, 3 credits; collections management, 3 credits; museum education, 3 credits; exhibitions, 3 credits; special topics, 3 credits)
- 15 graduate credits in a disciplinary focus
- 6 credits of internship
- 6 credits of electives
- 6 credits of individual credit.

Several on-campus sites provide the program with laboratories for training students in museum work, including the University Galleries, Harn Museum of Art, Florida Museum of Natural History, and the gallery at the Reitz Union. Students must complete a 6-credit internship of at least 320 hours at an approved museum. In this experience, students undertake specific projects in which they gain first-hand experience in museum work. The Harn Museum of Art or the Florida Museum of Natural History may be able to oversee a few interns, but students are encouraged to apply for internships at other U.S. institutions or abroad.

A project-in-lieu-of-thesis (or thesis) is selected, researched, and carried out under the direction of a supervisory committee.

Degrees Offered

Degrees Offered with a Major in Museology

- Master of Arts
 - without a concentration
 - concentration in Historic Preservation

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Art and Art History Departmental Courses

Code	Title	Credits
ARE 6049	History of Teaching Art	3
ARE 6148	Curriculum in Teaching Art	3
ARE 6246C	Principles of Teaching Art	3
ARE 6247C	Teaching Art: The Study of Practice	3
ARE 6386	Teaching Art in Higher Education	3
ARE 6641	Issues in Art Education	3
ARE 6746	Methods of Research in Art Education	3
ARE 6905	Individual Study	1-5
ARE 6910	Capstone Project	3
ARE 6933	Special Topics in Art Education	1-3
ARE 6944	Internship in Teaching Art	3
ARE 6971	Research for Master's Thesis	1-15
ARE 6973	Individual Project	1-10
ARH 5420	Art in the Age of Revolution	3
ARH 5667	Colonial Andean Art	3
ARH 5816	Methods of Research and Bibliography	3
ARH 5877	Gender, Representation, and the Visual Arts: 1600-1900	3
ARH 5905	Individual Study	1-6
ARH 6141	Greek Art Seminar	3
ARH 6292	Medieval Art Seminar	3
ARH 6394	Renaissance Art Seminar	3
ARH 6422	Beginnings of Modernism. Realism to Post-Impressionism 1848-1890	3
ARH 6477	Eighteenth-Century European Art Seminar	3
ARH 6481	Contemporary Art Seminar	3
ARH 6496	Modern Art Seminar	3
ARH 6596	Chinese Art Seminar	3
ARH 6597	African Art Seminar	3
ARH 6654	Pre-Columbian Art Seminar	3
ARH 6666	Colonial Latin American Art Seminar	3
ARH 6696	American Art Seminar	3

ARH 6797	Museum Education	3
ARH 6836	Exhibitions Seminar	3
ARH 6895	Collections Management Seminar	3
ARH 6900	Independent Study in Museology	1-6
ARH 6910	Supervised Research	1-5
ARH 6911	Advanced Study	3-4
ARH 6914	Independent Study in Ancient Art History	3-4
ARH 6915	Independent Study in Medieval Art History	3-4
ARH 6916	Independent Study in Renaissance and Baroque Art History	3-4
ARH 6917	Independent Study in Modern Art History	3-4
ARH 6918	Independent Study in Non-Western Art History	3-4
ARH 6930	Special Topics in Museology	3
ARH 6931	Seminar in Curatorial Studies	3
ARH 6938	Seminar in Museum Studies	3
ARH 6941	Supervised Internship	1-6
ARH 6946	Museum Practicum	1-6
ARH 6948	Gallery Practicum	1-6
ARH 6971	Research for Master's Thesis	1-15
ARH 7979	Advanced Research	1-12
ARH 7980	Research for Doctoral Dissertation	1-15
ART 5674C	Digital Fabrication	3
ART 5905C	Directed Study	1-5
ART 5930C	Special Topics	3
ART 6410C	Printmaking Seminar: Mastering Process and Content	3
ART 6411C	Printmaking Seminar: Transformation and Change	3
ART 6412C	Printmaking Seminar: Ideation, Studies, and Completed Works	3
ART 6413C	Printmaking Seminar: Interdisciplinary Studio	3
ART 6671C	Advanced Experiments in Digital Art	3
ART 6672	Hypermedia	3
ART 6673C	Video Art	3
ART 6675C	Digital Art and Animation	3
ART 6691	Digital Art Studio	4
ART 6794C	Vessel Aesthetic 1	3
ART 6795C	Vessel Aesthetic 2	3
ART 6797C	Ceramic Sculpture 2	3
ART 6835C	Research in Methods and Materials of the Artist	3-4
ART 6849C	Reactive Environments	3
ART 6897	Professional Practices for the Visual Artist	3
ART 6910C	Supervised Research	1-5
ART 6925C	Art + Technology Workshop	3
ART 6926C	Advanced Study I	2-4
ART 6927C	Advanced Study II	2-4
ART 6928C	Advanced Study III	2-4
ART 6929C	Advanced Study IV	2-4
ART 6933	Area Methods: Rotating Topics	1-4
ART 6971	Research for Master's Thesis	1-15
ART 6973C	Individual Project	1-10
DIG 5930	Special Topics	3
DIG 6746C	Graduate Seminar in Sensors and Electronics	3
GRA 5905	Individual Directed Study	1-3
GRA 6930	Seminar: Rotating Topics	3
GRA 6931C	Research and Practice	3
GRA 6944	Practicum	1-6
GRA 6973	Project in Lieu of Thesis	1-9
IDC 6505C	Programming for Artists	3

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6359	Arts in Medicine Capstone	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6596	Arts in Medicine Capstone	4
HUM 6597	Research and Evaluation in Arts in Medicine	3
HUM 6886	Coding and Narrative Analysis in Arts in Health	2
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6942	Arts in Medicine Graduate Practicum	3
HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3

Student Learning Outcomes

Museology (MA)

SLO 1 Knowledge

Indicates broad knowledge of the responsibilities of museum departments and how they function together

SLO 2 Skills

Constructs coherent written articulation about specific knowledge of a specialized area of museum work

SLO 3 Professional Development

Assembles skills needed for a specific museum job.

SLO 4 Skills

Appraises pertinent issues raised by the project and evaluates them.

SLO 5 Professional Behavior

Produces a coherent verbal presentation.

School of Music

Director: K. Orr

Graduate Coordinator: C. Pickeral

The School of Music offers programs leading to the Master of Music degree in music and music education. Program concentrations in music include choral conducting, composition, instrumental conducting, musicology, ethnomusicology, music theory, performance, and sacred music. In addition, the School of Music offers the Doctor of Philosophy degree in music and in music education.

The Ph.D. program in music education emphasizes college music teaching. The Ph.D. program in music includes concentrations in:

- Music history and literature, with options in traditional musicology and ethnomusicology
- Composition, with options in acoustic and electroacoustic specialization

All Ph.D. students are encouraged to find opportunities to teach and lecture in their specializations; and with the assistance of their principal professors, to prepare papers, workshops, and clinics for presentation at professional conferences, in the public schools, and at colleges and universities. Students also are encouraged to publish their research in appropriate journals. Minimum requirements for the M.M. and Ph.D. degrees are given in the General Information section of this catalog. The week before classes begin, students must take placement examinations in music history and in music theory. Students wanting to study privately in a performance studio must be auditioned and accepted by the appropriate area faculty. Voice students must demonstrate appropriate skills in language and diction. All deficiencies must be remedied.

For more information, please see the program pages below and our website: <http://www.arts.ufl.edu/welcome/music> (<http://www.arts.ufl.edu/welcome/music/>).

Majors

- Music (p. 370)
- Music Education (p. 374)

Faculty

Professor

- Basler, Paul D.
- Bauer, William
- Broadway, Kenneth Lee
- Brophy, Timothy S.
- Ellis, Laura
- Estrin, Mitchell S.
- Helton, Jonathan A.
- Kesling, Willard Ray
- Lower, Janna L.
- Orr, Kevin R.
- Richards, Paul S.
- Sain, James P.
- Stoner, Kristen Lia
- Thomas, Steven Francis
- Tremura, Welson Alves
- Waybright, David Allen

Associate Professor

- Arakawa, Mariko Jasmin
- Birkner, Archie Grover
- Dos Santos, Silvio
- Haning, Marshall A.
- Hodges, Lauren
- Lowe, Shannon Rae
- Offerle, Anthony

- Pellegrin, Richard
- Pfund, Christopher William
- Robertson, Jemmie Howard
- Ruiz-Resto, Jose V.
- Smith, Brenda Jo
- Watkins, John M.
- Wilson, Scott T.

Assistant Professor

- Adams, George
- Beucher, Colleen
- Ciulei, Silviu O.
- Davitt, Megan Maureen Sheridan
- Duron-VanTuinen, Danielle
- Hart, Emily
- Hartz, Barry Chris
- Lee, Scott F.
- Lu, Tiffany Shaw-Jing
- Mitchell, Evan William
- Mosley, Imani
- Pershounin, Alexander
- Rogers, Jillian
- Rorick, Laura Dallman
- Scanlon, Christopher
- Tu, Hsiang
- Yousefi, Payam

Senior Lecturer

- Pickeral, Charles Wilkins

Music

Program Information

The Master of Music (M.M.) degree is offered in music or music education. The music program offers the following concentrations: choral conducting, composition, electronic music, ethnomusicology, instrumental conducting, music education, music history and literature, music theory, performance, and sacred music. The M.M. degree prepares students for careers as teachers in studios, schools, and universities; performers; music historians; music critics; church musicians; composers; conductors; and accompanists. There is also an available online master's program (<https://musiceducation.arts.ufl.edu/>).

For more information, please see our website: <http://www.arts.ufl.edu/welcome/music> (<http://www.arts.ufl.edu/welcome/music/>).

Degrees Offered

Degrees Offered with a Major in Music

- Doctor of Musical Arts
 - without a concentration
 - concentration in Choral Conducting
 - concentration in Composition
 - concentration in Instrumental Conducting
 - concentration in Performance

- [illegible]

- concentration in Performance
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music Education*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Piano Pedagogy*
 - *optional second concentration in Sacred Music*
- concentration in Sacred Music
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music Education*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Music Courses

Code	Title	Credits
MUC 5315	Introduction to Electroacoustic Music	3
MUC 6444	Composition of Electronic Music	3
MUC 6445	Electroacoustic Music Composition: Digital I	3
MUC 6446	Electroacoustic Music Composition—Digital II	3
MUC 6625	Jazz Composition and Arranging	3
MUC 6930	Graduate Composition	3
MUC 6932	Composition Seminar	1-3
MUC 7447	Advanced Seminar in Electroacoustic Music	3
MUC 7931	Advanced Graduate Composition	3
MUC 7938	Seminar in Digital Sound Processing, Control, and Composition	3
MUE 5336C	Teaching Secondary Choral Music	3
MUE 5338C	Teaching Instrumental Music	3
MUE 5941L	Internship in Music Teaching	3
MUE 6080	Historical and Philosophical Foundations of Music Education	3
MUE 6385	Music in Higher Education	3
MUE 6399	Creative Thinking in Music	3
MUE 6444	Materials and Methods of String Class Teaching	2
MUE 6497	Public School Orchestral Literature	2
MUE 6647	Trends in Teaching and Learning Music	3
MUE 6696	Technology Assisted Music Learning	3
MUE 6747	Assessing Music Learning	3

MUE 6785	Research in Music Education	3
MUE 6790	Capstone Project for Music Education	3
MUE 6931	Instructional Design in Music Education	3
MUE 7045	Seminar in Music Teacher Education	3
MUE 7046	Sociology of Music Education	3
MUE 7746	Measurement and Evaluation of Music	3
MUE 7784	Quantitative Research Methods	3
MUE 7786	Qualitative Research in Music Education	3
MUE 7924	Doctoral Colloquium in Music Education	0
MUE 7938	Music Education Seminar	3
MUG 6105	Graduate Conducting	3
MUG 6227	Advanced Choral Rehearsal Techniques	3
MUG 7106	Advanced Graduate Conducting	3
MUH 5219	Graduate Music History Review	3
MUH 5505	Introduction to Ethnomusicology	3
MUH 5684	Introduction to Historical Musicology	3
MUH 6515	Musics of the World	3
MUH 6526	American Vernacular Music	3
MUH 6535	African Popular Music and Globalization	3
MUH 6538	Jazz, Hip Hop, and African Connections	3
MUH 6545	The Guitar in Latin American Culture	3
MUH 6548	Seminar in Caribbean Music	3
MUH 6549	Seminar in Brazilian Music	3
MUH 6635	Seminar in American Music	3
MUH 6665	History of Opera	3
MUH 6671	Seminar in Renaissance Music	3
MUH 6672	Seminar in Baroque Music	3
MUH 6673	Seminar in Classical Music	3
MUH 6674	Seminar in Nineteenth-Century Music	3
MUH 6675	Seminar in Twentieth-Century Music	3
MUH 6725	Timbre: Critical Discussions	3
MUH 6726	Music and Audience	3
MUH 6931	Nationalism in Music	3
MUH 6935	Special Topics in Music History	3
MUH 7411	Medieval and Renaissance Notation	3
MUH 7938	Musicology Seminar	3
MUL 6486	Piano Literature	3
MUL 6495	Graduate Organ Literature	3
MUL 6505	Symphonic Literature	3
MUL 6555	Survey of Wind Literature	3
MUL 6565	Chamber Music Literature	3
MUL 6645	Choral Literature	3
MUM 6007	Strategic Music Entrepreneurship Development	3
MUM 6008	Foundations of Music Business	3
MUM 6501	Music Production in Commercial Media	3
MUM 6502C	Music Production in Commercial Media	3
MUM 6565C	Multimedia Production for the Music Industry	3
MUN 6010	Graduate Ensemble	1
MUN 6019	Ensemble Participation	0
MUN 6125	Concert Band	1
MUN 6135	Symphonic Band	1
MUN 6145	Symphonic Wind Ensemble	1
MUN 6215	University Orchestra	1
MUN 6315	Concert Choir	1
MUN 6325	Chorale	1
MUN 6335	Glee Club	1
MUN 6345	Chamber Singers	1
MUN 6385	Choral Union	1
MUN 6445	Percussion Ensemble	1
MUN 6496	World Music Ensemble	1
MUN 6497	New Music Ensemble	1

MUN 6649	Musical Theatre Instrumental Ensemble	1	HUM 6355	Arts in Medicine Summer Intensive	3
MUN 6715	Jazz Band	1	HUM 6358	Arts in Medicine Capstone Proposal	2
MUN 6816	Steel Drum Ensemble	1	HUM 6359	Arts in Medicine Capstone	3
MUN 6835	World Music Ensemble - African Popular Music Ensemble	1	HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
MUR 6206	Survey of Hymnody	3	HUM 6375	The Arts and Human Development	3
MUR 6705	Sacred Music Literature	3	HUM 6596	Arts in Medicine Capstone	4
MUS 6685	Psychology of Music	3	HUM 6597	Research and Evaluation in Arts in Medicine	3
MUS 6716	Methods of Musical Research and Bibliography	3	HUM 6886	Coding and Narrative Analysis in Arts in Health	2
MUS 6905	Projects and Problems	1-3	HUM 6930	Special Topics in Fine Arts	1-3
MUS 6910	Supervised Research	1-5	HUM 6942	Arts in Medicine Graduate Practicum	3
MUS 6940	Supervised Teaching	1-5	HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
MUS 6971	Research for Master's Thesis	1-15	HUM 6947	Arts and Public Health Professional Seminar	3
MUS 6973	Individual Project	1-10	HUM 6948	Arts and Public Health Practicum	3
MUS 7656	Teaching Music and the Creative Process	3			
MUS 7905	Projects and Problems	1-3			
MUS 7941	Internship	1-12			
MUS 7951	Individual Project	1-6			
MUS 7955	Preparation for Doctoral Project	1-6			
MUS 7956	Doctoral Project	1-6			
MUS 7979	Advanced Research	1-12			
MUS 7980	Research for Doctoral Dissertation	1-15			
MUT 6051	Graduate Music Theory Review	3			
MUT 6177	Graduate Jazz Theory	3			
MUT 6445	Advanced Counterpoint	3			
MUT 6531	Figured Bass and Continuo Performance	3			
MUT 6565	Late Nineteenth- and Twentieth-Century Styles	3			
MUT 6576	Contemporary Styles	3			
MUT 6617	Approaches to Theoretical Analysis in Music Education	3			
MUT 6627	Seminar in Reductive Analysis	3			
MUT 6629	Analytical Techniques	3			
MUT 6751	Pedagogy of Music Theory	3			
MUT 6936	Music Theory Seminar	1-3			
MUT 7316	Advanced Orchestration	3			
MUT 7585	Seminar in Musical Style	3			
MUT 7760	History of Music Theory	3			
MVK 5156	Improvisational Keyboard Skills and Related Technology	2			
MVK 6605	Organ Pedagogy	3			
MVO 6250	Secondary Music Performance	1-3			
MVO 6460	Music Performance-MM	3			
MVO 7461	Music Performance-DMA	3			
MVS 6651	String Pedagogy I	3			
MVV 6651	Vocal Pedagogy	3			

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3

Student Learning Outcomes

MUSIC (D.M.A.)

SLO 1

Knowledge

Identify, describe and explain appropriate research methodologies.

SLO 2

Skills

Master essential methods of research relevant to their area of expertise within the performance area and outside cognate area.

SLO 3

Professional Behavior

Orally present integrated research of performance and cognate areas at an advanced level.

Music (PH.D.)

SLO 1

Knowledge

Identify, describe and explain appropriate research methodologies.

SLO 2

Skills

Master essential methods of research relevant to their area of expertise within the discipline.

SLO 3

Professional Behavior

Orally present musical research at an advanced level.

Music (M.M.)

SLO1

Knowledge

Utilize appropriate research methodologies.

SLO2

Skills

Master techniques of formal musical analysis.

SLO3

Professional Behavior

Communicate appropriately in oral format.

Music Education

Program Information

The Master of Music (M.M.) degree is offered in music or music education. The music education program offers the following concentrations: choral conducting, composition, electronic music, ethnomusicology, instrumental conducting, music history and literature, music theory, performance, and piano pedagogy. The M.M. degree prepares students for careers as teachers in studios, schools, and universities; performers; music historians; music critics; church musicians; composers; conductors; and accompanists.

For more information, please see our website: <http://www.arts.ufl.edu/welcome/music> (<http://www.arts.ufl.edu/welcome/music/>)

Degrees Offered

Degrees Offered with a Major in Music Education

- Doctor of Philosophy
- Master of Music
 - Without a Concentration
 - Concentration in Choral Conducting
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*
 - Concentration in Composition
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*
 - Concentration in Electronic Music
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*
- Concentration in Ethnomusicology
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*
- Concentration in Instrumental Conducting
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*
- Concentration in Music History and Literature
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music Theory*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*
- Concentration in Music Theory
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Performance*
 - *optional second concentration in Piano Pedagogy*
- Concentration in Performance
 - *optional second concentration in Choral Conducting*
 - *optional second concentration in Composition*
 - *optional second concentration in Electronic Music*
 - *optional second concentration in Ethnomusicology*
 - *optional second concentration in Instrumental Conducting*
 - *optional second concentration in Music Business and Entrepreneurship*
 - *optional second concentration in Music History and Literature*
 - *optional second concentration in Music Theory*

- optional second concentration in Piano Pedagogy
- optional second concentration in Sacred Music
- Concentration in Piano Pedagogy
 - optional second concentration in Choral Conducting
 - optional second concentration in Composition
 - optional second concentration in Electronic Music
 - optional second concentration in Ethnomusicology
 - optional second concentration in Instrumental Conducting
 - optional second concentration in Music Business and Entrepreneurship
 - optional second concentration in Music History and Literature
 - optional second concentration in Music Theory
 - optional second concentration in Performance

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

School of Music Courses

Code	Title	Credits
MUC 5315	Introduction to Electroacoustic Music	3
MUC 6444	Composition of Electronic Music	3
MUC 6445	Electroacoustic Music Composition: Digital I	3
MUC 6446	Electroacoustic Music Composition—Digital II	3
MUC 6625	Jazz Composition and Arranging	3
MUC 6930	Graduate Composition	3
MUC 6932	Composition Seminar	1-3
MUC 7447	Advanced Seminar in Electroacoustic Music	3
MUC 7931	Advanced Graduate Composition	3
MUC 7938	Seminar in Digital Sound Processing, Control, and Composition	3
MUE 5336C	Teaching Secondary Choral Music	3
MUE 5338C	Teaching Instrumental Music	3
MUE 5941L	Internship in Music Teaching	3
MUE 6080	Historical and Philosophical Foundations of Music Education	3
MUE 6385	Music in Higher Education	3
MUE 6399	Creative Thinking in Music	3
MUE 6444	Materials and Methods of String Class Teaching	2
MUE 6497	Public School Orchestral Literature	2
MUE 6647	Trends in Teaching and Learning Music	3
MUE 6696	Technology Assisted Music Learning	3
MUE 6747	Assessing Music Learning	3
MUE 6785	Research in Music Education	3
MUE 6790	Capstone Project for Music Education	3
MUE 6931	Instructional Design in Music Education	3
MUE 7045	Seminar in Music Teacher Education	3
MUE 7046	Sociology of Music Education	3
MUE 7746	Measurement and Evaluation of Music	3
MUE 7784	Quantitative Research Methods	3
MUE 7786	Qualitative Research in Music Education	3
MUE 7924	Doctoral Colloquium in Music Education	0
MUE 7938	Music Education Seminar	3
MUG 6105	Graduate Conducting	3
MUG 6227	Advanced Choral Rehearsal Techniques	3
MUG 7106	Advanced Graduate Conducting	3
MUH 5219	Graduate Music History Review	3
MUH 5505	Introduction to Ethnomusicology	3
MUH 5684	Introduction to Historical Musicology	3
MUH 6515	Musics of the World	3
MUH 6526	American Vernacular Music	3
MUH 6535	African Popular Music and Globalization	3
MUH 6538	Jazz, Hip Hop, and African Connections	3
MUH 6545	The Guitar in Latin American Culture	3
MUH 6548	Seminar in Caribbean Music	3
MUH 6549	Seminar in Brazilian Music	3
MUH 6635	Seminar in American Music	3
MUH 6665	History of Opera	3
MUH 6671	Seminar in Renaissance Music	3
MUH 6672	Seminar in Baroque Music	3
MUH 6673	Seminar in Classical Music	3
MUH 6674	Seminar in Nineteenth-Century Music	3
MUH 6675	Seminar in Twentieth-Century Music	3
MUH 6725	Timbre: Critical Discussions	3
MUH 6726	Music and Audience	3
MUH 6931	Nationalism in Music	3
MUH 6935	Special Topics in Music History	3
MUH 7411	Medieval and Renaissance Notation	3
MUH 7938	Musicology Seminar	3
MUL 6486	Piano Literature	3
MUL 6495	Graduate Organ Literature	3
MUL 6505	Symphonic Literature	3
MUL 6555	Survey of Wind Literature	3
MUL 6565	Chamber Music Literature	3
MUL 6645	Choral Literature	3
MUM 6007	Strategic Music Entrepreneurship Development	3
MUM 6008	Foundations of Music Business	3
MUM 6501	Music Production in Commercial Media	3
MUM 6502C	Music Production in Commercial Media	3
MUM 6565C	Multimedia Production for the Music Industry	3
MUN 6010	Graduate Ensemble	1
MUN 6019	Ensemble Participation	0
MUN 6125	Concert Band	1
MUN 6135	Symphonic Band	1
MUN 6145	Symphonic Wind Ensemble	1
MUN 6215	University Orchestra	1
MUN 6315	Concert Choir	1
MUN 6325	Chorale	1
MUN 6335	Glee Club	1
MUN 6345	Chamber Singers	1
MUN 6385	Choral Union	1
MUN 6445	Percussion Ensemble	1
MUN 6496	World Music Ensemble	1
MUN 6497	New Music Ensemble	1
MUN 6649	Musical Theatre Instrumental Ensemble	1
MUN 6715	Jazz Band	1
MUN 6816	Steel Drum Ensemble	1
MUN 6835	World Music Ensemble - African Popular Music Ensemble	1
MUR 6206	Survey of Hymnody	3
MUR 6705	Sacred Music Literature	3
MUS 6685	Psychology of Music	3
MUS 6716	Methods of Musical Research and Bibliography	3
MUS 6905	Projects and Problems	1-3
MUS 6910	Supervised Research	1-5
MUS 6940	Supervised Teaching	1-5
MUS 6971	Research for Master's Thesis	1-15
MUS 6973	Individual Project	1-10

MUS 7656	Teaching Music and the Creative Process	3
MUS 7905	Projects and Problems	1-3
MUS 7941	Internship	1-12
MUS 7951	Individual Project	1-6
MUS 7955	Preparation for Doctoral Project	1-6
MUS 7956	Doctoral Project	1-6
MUS 7979	Advanced Research	1-12
MUS 7980	Research for Doctoral Dissertation	1-15
MUT 6051	Graduate Music Theory Review	3
MUT 6177	Graduate Jazz Theory	3
MUT 6445	Advanced Counterpoint	3
MUT 6531	Figured Bass and Continuo Performance	3
MUT 6565	Late Nineteenth- and Twentieth-Century Styles	3
MUT 6576	Contemporary Styles	3
MUT 6617	Approaches to Theoretical Analysis in Music Education	3
MUT 6627	Seminar in Reductive Analysis	3
MUT 6629	Analytical Techniques	3
MUT 6751	Pedagogy of Music Theory	3
MUT 6936	Music Theory Seminar	1-3
MUT 7316	Advanced Orchestration	3
MUT 7585	Seminar in Musical Style	3
MUT 7760	History of Music Theory	3
MVK 5156	Improvisational Keyboard Skills and Related Technology	2
MVK 6605	Organ Pedagogy	3
MVO 6250	Secondary Music Performance	1-3
MVO 6460	Music Performance-MM	3
MVO 7461	Music Performance-DMA	3
MVS 6651	String Pedagogy I	3
MVV 6651	Vocal Pedagogy	3

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6359	Arts in Medicine Capstone	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6596	Arts in Medicine Capstone	4
HUM 6597	Research and Evaluation in Arts in Medicine	3
HUM 6886	Coding and Narrative Analysis in Arts in Health	2
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6942	Arts in Medicine Graduate Practicum	3
HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3

HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3

Student Learning Outcomes

music education (Ph.D.)

SLO 1

Knowledge

Describe, analyze, apply, and discuss, orally and in writing, content knowledge related to music education, music teacher education, and music education research.

SLO 2

Skills

Examine questions in music education through the collection and analysis of data that results in informed conclusions communicated in writing.

SLO 3

Professional Behavior

Effectively communicate through a prepared and purposeful oral presentation designed to increase knowledge, foster understanding, and inform listeners' attitudes, values, beliefs, or behaviors.

MUSIC EDUCATION (M.M.)

SLO 1

Research Project

Identify and carry out a research project that is appropriate and contributes to the discipline of music education.

SLO 2

Synthesis & Application

Synthesize and apply knowledge from the major area of emphasis, as well as from any pertinent secondary and cognate areas.

SLO 3

Practical Application

Translate knowledge into practical application in teaching, research, and written scholarship.

SLO 4

Essential Techniques

Identify and apply essential techniques of research and theory relevant to their area of expertise within the discipline.

SLO 5

Professional Behavior

Employ ethical behaviors, cultural sensitivity, teamwork skills, collegiality, and communication skills relevant to working in the music education profession.

School of Theatre and Dance

Director: T. Garland

Graduate Performance Program Coordinator: T. Altmeyer

Graduate Design Program Coordinator: J. Dasher

The graduate program offered by the School of Theatre and Dance leads to the degree of Master of Fine Arts in Theatre. Minimum requirements for this degree are given in the *General Information* section of this catalog.

The M.F.A. degree prepares students for professional entry in acting, production, or teaching. Placement in the M.F.A. program is determined

by audition/portfolio review, academic credentials, and personal interview. Candidates for admission should have adequate training in theatre. Deficiencies may be corrected before beginning graduate study.

The program emphasizes the study and practice of theatre as an art and discipline. Students of acting and design study concepts of theatre together while working in their areas of specialization. Focus is on the collaboration and synthesis of theatre artistry. Each incoming class is composed of approximately 12 to 18 students in acting and all design areas.

The student's artistic and academic progress will be reviewed at the end of each semester. The *School of Theatre Handbook* gives details on the form and focus of each review. This information is online at <https://arts.ufl.edu/academics/theatre-and-dance/forms-manuals-handbooks/>

During the final year of study, each student must successfully complete the comprehensive examination and oral defense. The project in lieu of thesis includes research, analysis, rehearsal process, and evaluation. Development and execution of the project includes public performance (acting or design). The written document and oral defense of the project which follow must demonstrate the ability to communicate the creative process.

Graduate acting students audition for all departmental productions.

Majors

- Theatre (p. 377)

Faculty

Professor

- Frosch, Joan D.
- Mata, Tony
- Ozuzu, Onyekwere P.
- Soledade, Augusto Cesar

Associate Professor

- Altmeyer, Timothy
- Ciupe, Mihai A.
- Dasher, Jennifer Elizabeth
- Garland, Christina
- Johnson, Elizabeth
- Mitchell, Charles P.
- Rua, Colleen
- Schuld, Susan
- Setlow, Jennifer
- Williams, Trent Dwight

Assistant Professor

- Boisvert, Heidi
- Burley, Alexandra H.
- Carrico, Rachel
- Dumbutshena, Rujeko
- Henderson, Kaitlin
- Lei, Yu
- Sen, Jashodhara
- Simons, Brian Manuel

- Springer, Alexander B.
- Travis, Ryan H.

Associate In

- Clark, Michael

Senior Lecturer

- Goelz, Jenny
- Zhao, Jing

Theatre

Degrees Offered

Degrees Offered with a Major in Theatre

- Master of Fine Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Theatre and Dance Departmental Courses

Code	Title	Credits
DAA 6905	Graduate Dance Project	1-3
DAN 6949	Dance Clinical Practice	1-3
THE 5287	History of Decor and Architecture for the Stage	3
THE 6265	Costume History	3
THE 6525	History, Literature, and Criticism I	3
THE 6526	History, Literature, and Criticism II	3
THE 6565	Seminar in Creative Process	3
THE 6905	Individual Study	1-9
THE 6930	Special Topics	1-6
THE 6940	Supervised Teaching	1-5
THE 6941	Internship	1-9
THE 6950	Applied Theatre	1-3
THE 6955	Summer Repertory Theatre	3-9
THE 6971	Research for Master's Thesis	1-15
THE 6973C	Project in Lieu of Thesis	1-9
TPA 5025	Lighting Design I	3
TPA 5035C	Lighting Specialties	3
TPA 5047	Costume Design I	3
TPA 5067	Scene Design I	3
TPA 5079	Graduate Scene Painting	3
TPA 5082	Advanced Theatre Graphics	3
TPA 5236	Costume Technologies Workshop	3
TPA 6009	Design Studio	3
TPA 6019	Prof Sem Design	3
TPA 6026	Lighting Design II	3
TPA 6048	Costume Design II	3
TPA 6054	Detail Design for Costume Designers	3
TPA 6069	Scene Design II	3
TPA 6235	Costume Construction	3
TPA 6237	Pattern Making: Flat Patterning	3
TPA 6243	Pattern Making: Draping	3
TPA 6258	Computer Drafting 2D	3
TPA 6357	Programming and Presentation for the Lighting Designer	3
TPA 6930	Special Topics	1-6

TPP 6115	Graduate Acting I: Modern Acting Theory and Practice	2-3
TPP 6116	Graduate Acting II: Shakespeare and High Style	2-3
TPP 6145	Graduate Acting III: Period Styles	2-3
TPP 6149	Acting IV: Contemporary Realism	2-3
TPP 6237	MFA Company Acting Workshop	1-6
TPP 6266	Acting for the Camera	2-3
TPP 6285	Voice and Movement I	2-3
TPP 6286	MFA Voice and Speech II: Shakespeare and High Styles	2-3
TPP 6297	The Alexander Technique I	2
TPP 6298	The Alexander Technique II	2
TPP 6385	Directing	3
TPP 6515	Graduate Movement Training	2-3
TPP 6536	Graduate Stage Combat	2-3
TPP 6717	MFA Voice and Speech III: Period Styles	2-3
TPP 6718	MFA Voice and Speech IV: Advanced Vocal Training for the Actor	2-3
TPP 6930	Special Topics	1-6
TPP 6946	Performance Practicum	3

College of the Arts Courses

Code	Title	Credits
HUM 5357	Creativity and Health: Foundations of the Arts in Medicine	3
HUM 5366	Foundations of Arts in Public Health	3
HUM 5367	Arts in Public Health Practice	3
HUM 5595	Arts in Medicine in Practice	3
HUM 6308	Arts and Compassion	3
HUM 6350	The Art of Self-Care	3
HUM 6352	Art and Design in the Environment of Care	3
HUM 6353	Arts in Medicine Professional Seminar	3
HUM 6354	Arts in Medicine Advanced Professional Seminar	3
HUM 6355	Arts in Medicine Summer Intensive	3
HUM 6358	Arts in Medicine Capstone Proposal	2
HUM 6359	Arts in Medicine Capstone	3
HUM 6365	Collaborating Across Disciplines: The Arts Therapies	3
HUM 6375	The Arts and Human Development	3
HUM 6596	Arts in Medicine Capstone	4
HUM 6597	Research and Evaluation in Arts in Medicine	3
HUM 6886	Coding and Narrative Analysis in Arts in Health	2
HUM 6930	Special Topics in Fine Arts	1-3
HUM 6942	Arts in Medicine Graduate Practicum	3
HUM 6944	Arts in Action: Consulting Project in Performing Arts Management	3
HUM 6947	Arts and Public Health Professional Seminar	3
HUM 6948	Arts and Public Health Practicum	3

Student Learning Outcomes

Theatre (MFA)

SLO 1 Knowledge

Explain, summarize and critique subject matter relevant to the discipline of performance or design, including theory, history, and practice in theatre

SLO 2 Skills

Translate knowledge into practical application in the context of live performance

SLO 3 Professional Behavior

Employ ethical behaviors, cultural sensitivity, teamwork skills, collegiality, and communication skills relevant to working in professional theatre and related fields

College of Veterinary Medicine

Dean: D. N. Zimmer

The UF College of Veterinary Medicine is the state's only veterinary college. UF's College of Veterinary Medicine offers comprehensive services to the public through teaching, research, extension and state-of-the-art patient care.

For more information, please see our website: <http://www.vetmed.ufl.edu>

Departments

- College of Veterinary Medicine Interdisciplinary Majors (p. 380)
 - Comparative Biomedical Sciences (p. 380)
 - Preventive Veterinary Medicine (p. 381)
 - Veterinary Medical Sciences (p. 383)

Faculty

Professor

- Adin, Christopher A.
- Bolser, Donald Clementz
- Brown, Mary B.
- Butcher, Gary D.
- Case, Joseph Bradly
- Chebel, Ricardo C.
- Curtiss, Roy
- Dinglasan, Rhoel David
- Estrada, Amara H.
- Francis-Floyd, Ruth
- Freeman, David E.
- Galvao, Klibs Neblan
- Hernandez, Jorge A.
- Hill, Richard C.
- Isaza, Ramiro
- Johnson, Richard D.
- Kariyawasam, Subhashinie
- Kim, Stanley E.
- Marsella, Rosanna
- McFarlane, Dianne
- Mergia, Ayalew
- Milner, Rowan J.
- Mohammed, Sulma
- Moore, Julie M.
- Plummer, Caryn E.
- Robishaw, Janet
- Sanchez, Linda C.
- Stern, Adam Wayne

- Vite, Charles H.
- Vulpe, Christopher Dillon
- Wellehan, James F.
- Yamamoto, Janet K.
- Zhou, Liang

Associate Professor

- Bechtel, Sandra Marie
- Biedrzycki, Adam Henry
- Bisinotto, Rafael Sisconeto
- Bowden, John A.
- Gilor, Chen
- Heard, Darryl J.
- Nguyen, Cuong
- Portela, Diego Angel
- Rodrigues Hoffmann, Aline
- Santoro, Domenico
- Tuanyok, Apichai
- Walden, Heather D.

Assistant Professor

- Allison, Andrew J.
- Bertran, Judit
- Bowie, Michael V.
- Eshraghi, Aria
- Harris, Autumn Nourse
- Jabur Bittar, Joao Henrique
- Kim, Jong Hyuk
- Lee, Che Yu
- Maxwell, Elizabeth A.
- Monteiro, Pedro Leopoldo Jeronimo
- Moore, Bret A.
- Paiva Moreno Goncalves, Ronald
- Schachner, Emma
- Scheuermann, Logan Michael
- Seven, Yasin Baris
- Stevenson Salinas, Valentina Beatriz
- Takada, Marilia

Research Associate Professor

- Sahay, Bikash
- Stuchal, Leah D.
- Subramaniam, Kuttichantran
- Wang, Shifeng

Clinical Assistant Professor

- Aherne, Michael
- Campos Krauer, Juan Manuel
- Denagamage, Thomas N.
- Garcia, Lawrence N.
- Johnson, Alanna L.
- Lanier, Christopher J.

- Martinez, Paoul Sean
- Miscioscia, Erin L.
- Pellissery, Abraham Joseph
- Williams, Rachel W.

Assistant Scientist

- Nance, Rebecca L.

Distinguished Professor

- Davenport, Paul W.
- Levy, Julie K.

Clinical Associate Professor

- Alexander, Amanda B.
- Buckley, Gareth J.
- Carrera-Justiz, Sheila C.
- Chiavaccini, Ludovica
- Cooke, Kirsten L.
- Crawford, Patti C.
- Dark, Michael James
- Ham, Kathleen Marie
- Hawkins, Ian K.
- Johnson, Matthew D.
- Kelleman, Audrey A.
- Maunsell, Fiona P.
- Ossiboff, Robert J.
- Porter, Erin G.
- Romano, Marta
- Stacy, Nicole Indra
- Vilar Saavedra, Paulo
- Walsh, Michael T.
- Winter, Matthew D.

Clinical Professor

- Adin, Darcy Brittain
- Farina, Lisa Lee
- House, Amanda M.
- Morton, Alison J.
- Shmalberg, Justin William
- Sleeper, Margaret Mary
- Specht, Andrew J.
- Zimmer, Dana N.

Research Assistant Professor

- Swain, Banikalyan

Senior Lecturer

- Larkin, Iskande V.

Affiliated Faculty

- Aguirre, Jose I.
Associate Professor
- Baker, Tracie R.

Associate Professor

- Bauck, Anje G.
Clinical Assistant Professor
- Byrd, Jason H.
Clinical Professor
- Campbell Thompson, Martha
Research Professor
- Chapman, Frank A.
Associate Professor
- Cooke, Paul S.
Professor
- Cummings, Derek Adam
Professor
- Debiazi Zomer, Helena
Research Assistant Professor
- DeNotta, Sally Anne Lenore
Clinical Associate Professor
- Fatica III, Lawrence Martin
Lecturer
- Fox, Stacey A.
Clinical Assistant Professor
- Fuller, David
Professor
- Gallastegui Menoyo, Aitor
Clinical Associate Professor
- Hansen, Peter J.
Distinguished Professor
- Holbrook, Todd Chadwell
Clinical Professor
- Jobin, Christian Bernard
Distinguished Professor
- Martyniuk, Christopher
Professor
- Martynyuk, Anatoly Eugeny
Research Professor
- Mickle, Aaron
Assistant Professor
- Rathore, Mobeen H.
Professor
- Reznikov, Leah R.
Associate Professor
- Stone, Amy E.
Clinical Associate Professor
- Tevosian, Sergei G.
Associate Professor
- Vilaplana Grosso, Federico Rafael
Clinical Associate Professor
- Vittor, Amy Yomiko
Assistant Professor
- Weisbrod, Tatiana
Clinical Assistant Professor

Interdisciplinary Department

College of Veterinary Medicine

Interdisciplinary Majors

- Comparative Biomedical Sciences (p. 380)
- Preventive Veterinary Medicine (p. 381)
- Veterinary Medical Sciences (p. 383)

Majors

- Comparative Biomedical Sciences (p. 380)
- Preventive Veterinary Medicine (p. 381)
- Veterinary Medical Sciences (p. 383)

Comparative Biomedical Sciences

Overview

Program Information

The College of Veterinary Medicine strengths and areas of emphasis in research graduate training include, but are not limited to discovery and translational solutions for (i) infectious diseases and immunology, (ii) physiological sciences, (iii) forensic sciences, (iv) microbiology, virology, and parasitology, (v) zoo medicine (vi) aquatic animals and ecosystem health, (vii) livestock and wildlife population health, (viii) equine gastroenterology; (ix) orthopedic bioengineering using animal models, (x) clinical and translational research in selected disciplines such as cardiology, dermatology, oncology, and ophthalmology, and (xi) novel diagnostic and therapeutic applications to improve human and animal health using artificial intelligence. UF CVM is uniquely situated to pursue these investigations with emphasis on non-human species, and in comparative medicine in animals and humans.

The Doctor of Philosophy (Ph.D.) with a major in Comparative Biomedical Sciences is structured to be completed (in-residence) in four to five years. PhD students will take 90 credits of coursework, including 14 credits in required courses: VME 6937L VMS Graduate Seminar Series or equivalent (6 credits), VME 6767 Responsible Conduct in Research or equivalent (1), Grant Writing (1), Statistics (3), Biochemistry or Molecular Biology (3). The Qualifying Exam will be completed within seven terms after enrollment. At the end of the graduating semester, the PhD candidate must successfully complete a final examination or defense.

The Master of Science with a major in Comparative Biomedical Sciences is structured to be completed (in-residence) in two years. Master's students will take 30 credits of coursework. At least 12 of the 30 credits must be in the major, including 8 credits in required courses: VME 6937L VMS Graduate Seminar Series or equivalent (1 credit), VME 6767 Responsible Conduct in Research or equivalent (1), Statistics (3), and Biochemistry or Molecular Biology (3). At the end of the graduating semester, the student must successfully complete a final defense of the thesis.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN Comparative Biomedical Sciences

- Doctor of Philosophy (Ph.D.)
- Master of Science (M.S.)

Preventive Veterinary Medicine

Overview

Program Information

The Master of Preventive Veterinary Medicine (M.P.V.M.) program will prepare veterinarians for leadership roles in management or research of diseases in livestock, poultry, and wildlife populations in Florida, USA, and globally. Areas of emphasis are: (a) health and reproduction in livestock populations (b) food safety; (c) health in wildlife populations. The M.P.V.M. is a non-thesis program and is structured to be completed in 1 or 2 years. Only veterinarians (DVM degree or equivalent) will be eligible to enroll in the program.

M.P.V.M. students will complete, in residence, 12 credits of required graduate coursework in veterinary epidemiology (3 credits), biostatistics (3 credits), department/college graduate seminars (2 credits), responsible conduct of research (1 credit), and a special project addressing a health problem in livestock, poultry, and wildlife populations in Florida, USA, or globally (3 credits), as well as 18 credits in elective coursework. The total number of credit hours is 30 (including 15 credits in the major).

M.P.V.M. graduates will have epidemiologic and diagnostic tools to solve complex health problems in livestock and wildlife populations at the state, national, or international levels (e.g., mastitis in dairy cattle, abortion in beef cattle, enhanced surveillance and enhanced biosecurity for management of diseases in livestock, and poultry populations, outbreak investigation of foodborne pathogens, contamination of animal products, diseases and mortality in wildlife). In addition, M.P.V.M. graduates will be better prepared to pursue PhD research training opportunities for future success in research-related positions in industry or in research-intensive positions in academia.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN Preventive Veterinary Medicine

- Master of Preventive Veterinary Medicine

Courses

COLLEGE OF VETERINARY MEDICINE COURSES

Code	Title	Credits
VME 6934	Topics in Veterinary Medical Sciences	1-4
VME 6936	Seminar in Pathophysiology	1

Faculty

Professor

- Adin, Christopher A.
- Bolser, Donald Clementz
- Brown, Mary B.
- Butcher, Gary D.
- Case, Joseph Bradley
- Chebel, Ricardo C.
- Curtiss, Roy
- Dinglasan, Rhoel David
- Estrada, Amara H.

- Francis-Floyd, Ruth
- Freeman, David E.
- Galvao, Klibs Neblan
- Hernandez, Jorge A.
- Hill, Richard C.
- Isaza, Ramiro
- Johnson, Richard D.
- Kariyawasam, Subhashinie
- Kim, Stanley E.
- Marsella, Rosanna
- McFarlane, Dianne
- Mergia, Ayalew
- Milner, Rowan J.
- Mohammed, Sulma
- Moore, Julie M.
- Plummer, Caryn E.
- Robishaw, Janet
- Sanchez, Linda C.
- Stern, Adam Wayne
- Vite, Charles H.
- Vulpe, Christopher Dillon
- Wellehan, James F.
- Yamamoto, Janet K.
- Zhou, Liang

Associate Professor

- Bechtel, Sandra Marie
- Biedrzycki, Adam Henry
- Bisinotto, Rafael Sisconeto
- Bowden, John A.
- Gilor, Chen
- Heard, Darryl J.
- Nguyen, Cuong
- Portela, Diego Angel
- Rodrigues Hoffmann, Aline
- Santoro, Domenico
- Tuanyok, Apichai
- Walden, Heather D.

Assistant Professor

- Allison, Andrew J.
- Bertran, Judit
- Bowie, Michael V.
- Eshraghi, Aria
- Harris, Autumn Nourse
- Jabur Bittar, Joao Henrique
- Kim, Jong Hyuk
- Lee, Che Yu
- Maxwell, Elizabeth A.
- Monteiro, Pedro Leopoldo Jeronimo
- Moore, Bret A.
- Paiva Moreno Goncalves, Ronald

- Schachner, Emma
- Scheuermann, Logan Michael
- Seven, Yasin Baris
- Stevenson Salinas, Valentina Beatriz
- Takada, Marilia

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- Sahay, Bikash
- Stuchal, Leah D.
- Subramaniam, Kuttichantran
- Wang, Shifeng

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- Aherne, Michael
- Campos Krauer, Juan Manuel
- Denagamage, Thomas N.
- Garcia, Lawrence N.
- Johnson, Alanna L.
- Lanier, Christopher J.
- Martinez, Paoul Sean
- Miscioscia, Erin L.
- Pellissery, Abraham Joseph
- Williams, Rachel W.

Assistant Scientist

- Nance, Rebecca L.

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- Davenport, Paul W.
- Levy, Julie K.

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- Alexander, Amanda B.
- Buckley, Gareth J.
- Carrera-Justiz, Sheila C.
- Chiavaccini, Ludovica
- Cooke, Kirsten L.
- Crawford, Patti C.
- Dark, Michael James
- Ham, Kathleen Marie
- Hawkins, Ian K.
- Johnson, Matthew D.
- Kelleman, Audrey A.
- Maunsell, Fiona P.
- Ossiboff, Robert J.
- Porter, Erin G.
- Romano, Marta
- Stacy, Nicole Indra
- Vilar Saavedra, Paulo
- Walsh, Michael T.
- Winter, Matthew D.

Clinical Professor

- Adin, Darcy Brittain
- Farina, Lisa Lee
- House, Amanda M.
- Morton, Alison J.
- Shmalberg, Justin William
- Sleeper, Margaret Mary
- Specht, Andrew J.
- Zimmer, Dana N.

Research Assistant Professor

- Swain, Banikalyan

Senior Lecturer

- Larkin, Iskande V.

Affiliated Faculty

- Aguirre, Jose I.
Associate Professor
- Baker, Tracie R.
Associate Professor
- Bauck, Anje G.
Clinical Assistant Professor
- Byrd, Jason H.
Clinical Professor
- Campbell Thompson, Martha
Research Professor
- Chapman, Frank A.
Associate Professor
- Cooke, Paul S.
Professor
- Cummings, Derek Adam
Professor
- Debiazi Zomer, Helena
Research Assistant Professor
- DeNotta, Sally Anne Lenore
Clinical Associate Professor
- Fatica III, Lawrence Martin
Lecturer
- Fox, Stacey A.
Clinical Assistant Professor
- Fuller, David
Professor
- Gallastegui Menoyo, Aitor
Clinical Associate Professor
- Hansen, Peter J.
Distinguished Professor
- Holbrook, Todd Chadwell
Clinical Professor
- Jobin, Christian Bernard
Distinguished Professor
- Martyniuk, Christopher
Professor
- Martynyuk, Anatoly Eugeny
Research Professor

- Mickle, Aaron
Assistant Professor
- Rathore, Mobeen H.
Professor
- Reznikov, Leah R.
Associate Professor
- Stone, Amy E.
Clinical Associate Professor
- Tevosian, Sergei G.
Associate Professor
- Vilaplana Grosso, Federico Rafael
Clinical Associate Professor
- Vittor, Amy Yomiko
Assistant Professor
- Weisbrod, Tatiana
Clinical Assistant Professor

Veterinary Medical Sciences Program Information

Chair: C. Risco

Graduate Coordinator (Large Animals): I. Larkin

Graduate Coordinator (Small Animals): D. Lewis

Complete faculty listing by department: Follow this link (<https://www.vetmed.ufl.edu/about-the-college/directory/>).

The College of Veterinary Medicine offers graduate study leading to the Master of Science and Doctor of Philosophy degrees in veterinary medical sciences. The College also offers certification and a non-thesis concentration in forensic toxicology via web-based distance education. Minimum requirements for the Master of Science and Doctor of Philosophy degrees are described in the *Graduate Degrees* section of this catalog.

The program provides extensive training in basic and applied research for qualified students with a baccalaureate degree or a D.V.M. or equivalent degree. Applicants are expected to have a background in the biological sciences, mathematics, chemistry, and physics. Particular attention is paid to the advanced education of veterinarians, those interested solely in research, and those interested in combining their graduate study with residency training in a clinical specialty. The College offers three areas of specialization within the veterinary medical sciences program:

Large and Small Animal Clinical Sciences: Physiology, endocrinology, aquatic animal health, fish diseases, gastroenterology, immunology, vision sciences, perinatology, reproductive biology, pharmacokinetics, veterinary sports medicine, and wildlife and zoological medicine (I. Larkin and D. Lewis Graduate Coordinators).

Physiological Sciences: Comparative anatomy, physiology, pharmacology, biochemistry, neurobiology, nutrition, reproductive biology, and toxicology (R. Johnson, Graduate Coordinator).

Infectious Diseases and Experimental Pathology: Bacteriology, parasitology, virology, immunopathology, molecular mechanisms of disease and host defense, epidemiology, and veterinary public health (M.T. Long, Graduate Coordinator).

The College participates in the interdisciplinary specialization in toxicology, in cooperation with other departments and colleges in both

the Health Science Center and the Institute of Food and Agricultural Sciences and with the Center for Environmental and Human Toxicology (see the Toxicology description under *Interdisciplinary Graduate Studies*).

The following courses in related areas are acceptable for graduate major credit in veterinary medical sciences:

Code	Title	Credits
Physiological Sciences		
ANS 6704	Mammalian Endocrinology	2
ANS 6751	Physiology of Reproduction	3
BCH 5413	Mammalian Molecular Biology and Genetics	3
BCH 6206	Advanced Metabolism	3
BCH 6415	Advanced Molecular and Cell Biology	3
BCH 6740	Physical Biochemistry/Structural Biology	3
GMS 6400C	Principles of Physiology	6
Infectious Disease and Experimental Pathology		
BCH 5413	Mammalian Molecular Biology and Genetics	3
BCH 6415	Advanced Molecular and Cell Biology	3
GMS 6140	Principles of Immunology	4
GMS 6382	Special Topics in Immunology	1-3
GMS 6421	Cell Biology	4
STA 6208	Basic Design and Analysis of Experiments	3
STA 6166	Statistical Methods in Research I	3
Large and Small Animal Clinical Sciences		
All of the above		

Degrees Offered

Degrees Offered with a Major in Veterinary Medical Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Animal Molecular and Cellular Biology
 - concentration in Clinical and Translational Science
 - concentration in Domestic Animal Genomics
 - concentration in Toxicology
- Master of Science
 - without a concentration
 - concentration in Domestic Animal Genomics
 - concentration in Forensic Toxicology
 - *optional second concentration in Veterinary Forensic Sciences*
 - concentration in Shelter Medicine
 - *optional second concentration in Veterinary Forensic Sciences*
 - concentration in Veterinary Forensic Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Veterinary Medical Sciences PROGRAM Courses

Code	Title	Credits
GMS 6070	Sensory and Motor Systems	3
PHA 5270	Health Care and Patient Safety	3
PHA 5271	Health Care Risk Management	3
PHA 6116	In Vivo and In Vitro Stability of Drugs	3
PHA 6125	Introduction to Quantitative Pharmacology	3
PHA 6170C	Pharmaceutical Product Formulation	3

PHA 6183	Pharmaceutical Gene Delivery	3	VME 6574	Aquatic Animal Pathology and Forensic Science	3
PHA 6185	Life Cycle of a Drug	1	VME 6575	Veterinary Forensic Medicine	3
PHA 6227	Institutional Pharmacy Leadership I	3	VME 6576	Veterinary Forensic Pathology	3
PHA 6228	Institutional Pharmacy Leadership II	3	VME 6577	Practicing Pathology	3
PHA 6264	Pharmaceutical Health Technology Assessment	3	VME 6578	Forensic Veterinary Osteology	3
PHA 6265	Introduction to Pharmaceutical Outcomes and Policy I	3	VME 6579	Veterinary Forensic Radiology and Imaging	3
PHA 6268	Pharmacoepidemiology and Patient Safety	3	VME 6580	Cybercrime in Wildlife Investigations	3
PHA 6269	Pharmaceutical Products and Public Policy	3	VME 6581	Working Dogs in Conservation and Forensic Science	3
PHA 6274	Federal Regulations of Drugs and Pharmacy	3	VME 6602	General Toxicology	3
PHA 6275	Federal Regulations of Controlled Substances	3	VME 6603	Advanced Toxicology	3
PHA 6276	Pharmacy Benefit Design & Management	3	VME 6604	Literature Survey in Toxicology	1-2
PHA 6277	Ethics in Drug Development Production and Use	3	VME 6605	Toxic Substances	3
PHA 6278	State Regulation of Drugs and Pharmacy	3	VME 6607	Human Health Risk Assessment	4
PHA 6279	Pharmaceutical Outcomes and Policy Capstone	3	VME 6613	Forensic Toxicology I	3
PHA 6286	Pharmaceutical Microeconomics	3	VME 6614	Forensic Toxicology II	3
PHA 6287	Pharmaceutical Health Economics	3	VME 6615	Veterinary Forensic Toxicology	3
PHA 6288	Critical Review of Research Methods	3	VME 6616	Veterinary Drug Ecotoxicology	3
PHA 6289	Regulating Clinical Research	3	VME 6617	Environmental Risk Assessment of Veterinary Drugs	3
PHA 6416	Pharmaceutical Analysis I	3	VME 6650	Principles of Mammalian Pharmacology	4
PHA 6417	Pharmaceutical Analysis II	3	VME 6766	Laboratory Quality Assurance/Quality Control	3
PHA 6427	Pharmacogenetics of Drug Metabolism	3	VME 6767	Issues in the Responsible Conduct of Research	1
PHA 6717	Measurement in Pharmaceutical Outcomes and Policy Research	3	VME 6771	Veterinary Epidemiologic Research	3
PHA 6793	Evidentiary Basis of Pharmaceutical Use	3	VME 6800	Welfare and Wellness for Pets and People	1
PHA 6796	Study Design in Pharmaceutical Outcomes & Policy Research	3	VME 6810	Integrating Veterinary Medicine with Shelter Systems	3
PHA 6799	Medication Safety & Quality Program Evaluation	3	VME 6811	Shelter Animal Physical Health	3
PHA 6805	Applied Data Interpretation and Reporting of Findings in Pharmacy	3	VME 6812	Problem-Oriented Approach to Shelter Animal Behavior and Welfare	3
PHA 6891	Introduction to Pharmacoepidemiology	3	VME 6813	Behavioral Health for Shelter Dogs and Cats	3
PHA 6892	Practices and Procedures of the IRB	3	VME 6814	Principles of Teaching for Animal Shelters	3
PHA 6893	Research Ethics	3	VME 6815	Animal Shelter Population Management by the Metrics	3
PHA 6894	Introduction to Graduate Studies	1	VME 6816	The Role of the Animal Shelter in Protecting Community and Public Health	3
PHA 6937	Topics in Pharmaceutical Administration	2	VME 6817	Humane Euthanasia Practices for Animal Shelters	3
VME 5244	Physiology: Organ Systems	4	VME 6818	High Quality High Volume Spay Neuter	3
VME 6010	Aquatic Animal Conservation Issues	3	VME 6820	Introduction to Veterinary Disaster Response	1
VME 6011	Introduction to Aquatic Wildlife Health Issues	3	VME 6905	Problems in Veterinary Medical Sciences	1-4
VME 6017	Manatee Health & Conservation	3	VME 6910	Supervised Research	1-5
VME 6051	Cruelty to Animals and Interpersonal Violence	3	VME 6931	Seminar in Veterinary Medical Sciences	1
VME 6052	Animal Crime Scene Processing	3	VME 6932	Seminar in Physiological Sciences	1
VME 6053	Skeletal Trauma Analysis in Animals	3	VME 6933	Seminar in Infectious Diseases and Experimental Pathology	1
VME 6054	Scientific and Legal Principles of Forensic Evidence	3	VME 6934	Topics in Veterinary Medical Sciences	1-4
VME 6056	Animal Law	3	VME 6936	Seminar in Pathophysiology	1
VME 6140	VMS Graduate Journal Club: Mucosal Immunology	1	VME 6938	Topics in Aquatic Animal Health	1
VME 6430C	Contemporary Issues in Small Animal Surgery	3	VME 6939	Topics in International Shelter Medicine	3
VME 6464	Molecular Pathogenesis	3	VME 6940	Supervised Teaching	1-5
VME 6505	Autoimmunity	1	VME 6950	Capstone Project Presentation	1-3
VME 6570	Wildlife Conservation and Forensic Science	3	VME 6951	Communicating Research About Shelter Medicine	1
VME 6571	Forensic Applied Animal Behavior	3	VME 6971	Research for Master's Thesis	1-15
VME 6572	Forensic Aspects of Agricultural Animal Welfare	3	VME 7979	Advanced Research	1-12
VME 6573	Applications of DNA for Companion Animal and Wildlife Cases	3	VME 7980	Research for Doctoral Dissertation	1-15
			WIS 5562	Conservation Medicine	3
			WIS 6557	International Wildlife Conservation Law, Policy and Ethics	3

WIS 6559	Forensic Science for Conservation Biology	3
WIS 6561	Wildlife Crime Scene Processing	3

VETERINARY MEDICAL SCIENCES

Departmental COURSES

Code	Title	Credits
VME 5101	Comparative Biomedical Sciences and One Health	3
VME 5244	Physiology: Organ Systems	4
VME 6010	Aquatic Animal Conservation Issues	3
VME 6011	Introduction to Aquatic Wildlife Health Issues	3
VME 6017	Manatee Health & Conservation	3
VME 6051	Cruelty to Animals and Interpersonal Violence	3
VME 6052	Animal Crime Scene Processing	3
VME 6053	Skeletal Trauma Analysis in Animals	3
VME 6054	Scientific and Legal Principles of Forensic Evidence	3
VME 6056	Animal Law	3
VME 6070	Systematic Review and Meta-Analysis for Biomedical Research	2
VME 6195	Wildlife Virology: Emerging Wildlife Viruses of Veterinary and Zoonotic Importance	3
VME 6430C	Contemporary Issues in Small Animal Surgery	3
VME 6464	Molecular Pathogenesis	3
VME 6505	Autoimmunity	1
VME 6570	Wildlife Conservation and Forensic Science	3
VME 6571	Forensic Applied Animal Behavior	3
VME 6572	Forensic Aspects of Agricultural Animal Welfare	3
VME 6573	Applications of DNA for Companion Animal and Wildlife Cases	3
VME 6574	Aquatic Animal Pathology and Forensic Science	3
VME 6575	Veterinary Forensic Medicine	3
VME 6576	Veterinary Forensic Pathology	3
VME 6577	Practicing Pathology	3
VME 6578	Forensic Veterinary Osteology	3
VME 6579	Veterinary Forensic Radiology and Imaging	3
VME 6580	Cybercrime in Wildlife Investigations	3
VME 6581	Working Dogs in Conservation and Forensic Science	3
VME 6582	Introduction to Forensic Medicine 1	4
VME 6602	General Toxicology	3
VME 6603	Advanced Toxicology	3
VME 6604	Literature Survey in Toxicology	1-2
VME 6605	Toxic Substances	3
VME 6607	Human Health Risk Assessment	4
VME 6613	Forensic Toxicology I	3
VME 6614	Forensic Toxicology II	3
VME 6615	Veterinary Forensic Toxicology	3
VME 6616	Veterinary Drug Ecotoxicology	3
VME 6617	Environmental Risk Assessment of Veterinary Drugs	3
VME 6620	The Practice of Regulatory Toxicology	3
VME 6621	New Approach Methodologies in Toxicology	3
VME 6650	Principles of Mammalian Pharmacology	4
VME 6651	Seminars in Veterinary Anesthesia and Analgesia	2
VME 6710C	Advanced Small Animal Airway and Thoracic Surgery	1

VME 6711	Small Animal Abdominal Surgery	1
VME 6766	Laboratory Quality Assurance/Quality Control	3
VME 6767	Issues in the Responsible Conduct of Research	1
VME 6771	Veterinary Epidemiologic Research	3
VME 6800	Welfare and Wellness for Pets and People	1
VME 6801	Principles of Management in Animal Shelters	3
VME 6810	Integrating Veterinary Medicine with Shelter Systems	3
VME 6811	Shelter Animal Physical Health	3
VME 6812	Problem-Oriented Approach to Shelter Animal Behavior and Welfare	3
VME 6813	Behavioral Health for Shelter Dogs and Cats	3
VME 6814	Principles of Teaching for Animal Shelters	3
VME 6815	Animal Shelter Population Management by the Metrics	3
VME 6816	The Role of the Animal Shelter in Protecting Community and Public Health	3
VME 6817	Humane Euthanasia Practices for Animal Shelters	3
VME 6818	High Quality High Volume Spay Neuter	3
VME 6819	Principles of Leadership in Animal Shelters	3
VME 6820	Introduction to Veterinary Disaster Response	1
VME 6840	Life-Enhancing Strategies of Animal Welfare Organizations	3
VME 6841	Communications and Marketing for Animal Welfare Organizations	3
VME 6842	Fundraising and Development for Animal Welfare Organizations	3
VME 6905	Problems in Veterinary Medical Sciences	1-4
VME 6910	Supervised Research	1-5
VME 6931	Seminar in Veterinary Medical Sciences	1
VME 6932	Seminar in Physiological Sciences	1
VME 6933	Seminar in Infectious Diseases and Experimental Pathology	1
VME 6934	Topics in Veterinary Medical Sciences	1-4
VME 6936	Seminar in Pathophysiology	1
VME 6937L	VMS Graduate Seminar Series	1
VME 6938	Topics in Aquatic Animal Health	1
VME 6939	Topics in International Shelter Medicine	3
VME 6940	Supervised Teaching	1-5
VME 6950	Capstone Project Presentation	1-3
VME 6951	Communicating Research About Shelter Medicine	1
VME 6971	Research for Master's Thesis	1-15
VME 7979	Advanced Research	1-12
VME 7980	Research for Doctoral Dissertation	1-15

Pharmacodynamics Courses

Code	Title	Credits
PHA 6472	Organic Synthesis of Drug Molecules	3
PHA 6508	Systems Physiology and Pathophysiology I	3
PHA 6509	Systems Physiology and Pathophysiology II	3
PHA 6512L	Experiential Research Training in Pharmacodynamics	1-4
PHA 6521C	Research Techniques in Pharmacodynamics	1
PHA 7939	Journal Club in Pharmaceutical Sciences	1

Pharmacology Courses

Code	Title	Credits
GMS 6590	Seminar in Pharmacology	1
GMS 6592	Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes	1
GMS 6847	Translational Research and Therapeutics: Bench, Bedside, Community, & Policy	3
GMS 7593	Topics in Pharmacology and Toxicology	1-3

College of Pharmacy Courses

Code	Title	Credits
PHA 6356	Structure Determination of Complex Natural Products	3
PHA 6418	Model-Informed Drug Development	3
PHA 6471	Synthetic Medicinal Chemistry	3

College of Veterinary Medicine Courses

Code	Title	Credits
VME 6934	Topics in Veterinary Medical Sciences	1-4
VME 6936	Seminar in Pathophysiology	1

Student Learning Outcomes

Veterinary medical sciences (phd)

SLO 1 Knowledge

Students identify, describe, explain and apply the literature, research, and practices relevant to their area of specialization.

SLO 2 Skills

Students analyze and critically evaluate new information and ideas contained in books and journal articles, as well as information and ideas presented at scientific meetings, seminars and/or informal discussions with other scientists.

SLO 3 Skills

Students apply speaking skills needed to communicate orally in formal and informal settings.

SLO 4 Skills

Students write effectively in a manner appropriate to veterinary medical sciences.

SLO 5 Professional Behavior

Students exhibit ethical and professional behavior throughout their studies and research.

Veterinary Medical Sciences (MS)

SLO 1 Knowledge

- For students in the programs that require a Master's thesis, successful completion of the thesis and thesis defense.
- For students in the non-thesis programs, successful completion of
 - the capstone project (Shelter Medicine)
 - the final comprehensive examination (Veterinary Forensic Science and Forensic Toxicology)

SLO 2 Skills

Students analyze and critically evaluate new information and ideas contained in books and journal articles, as well as information and ideas

presented at scientific meetings, seminars and/or informal discussions with other scientists

SLO 3 Skills

Students apply speaking skills needed to communicate orally in formal and informal settings

SLO 4 Skills

Students write effectively in a manner appropriate to veterinary medical sciences

SLO 5 Professional Behavior

Students exhibit ethical and professional behavior during their studies and research

SLO 6 Professional Behavior

Students exercise the etiquette of constructive criticism and respond appropriately to criticism in a professional manner

Faculty

Professor

- Adin, Christopher A.
- Bolser, Donald Clementz
- Brown, Mary B.
- Butcher, Gary D.
- Case, Joseph Bradley
- Chebel, Ricardo C.
- Curtiss, Roy
- Dinglasan, Rhoel David
- Estrada, Amara H.
- Francis-Floyd, Ruth
- Freeman, David E.
- Galvao, Klibs Neblan
- Hernandez, Jorge A.
- Hill, Richard C.
- Isaza, Ramiro
- Johnson, Richard D.
- Kariyawasam, Subhashinie
- Kim, Stanley E.
- Marsella, Rosanna
- McFarlane, Dianne
- Mergia, Ayalew
- Milner, Rowan J.
- Mohammed, Sulma
- Moore, Julie M.
- Plummer, Caryn E.
- Robishaw, Janet
- Sanchez, Linda C.
- Stern, Adam Wayne
- Vite, Charles H.
- Vulpe, Christopher Dillon
- Wellehan, James F.
- Yamamoto, Janet K.
- Zhou, Liang

Associate Professor

- Bechtel, Sandra Marie
- Biedrzycki, Adam Henry
- Bisinotto, Rafael Sisconeto
- Bowden, John A.
- Gilor, Chen
- Heard, Darryl J.
- Nguyen, Cuong
- Portela, Diego Angel
- Rodrigues Hoffmann, Aline
- Santoro, Domenico
- Tuanyok, Apichai
- Walden, Heather D.

Assistant Professor

- Allison, Andrew J.
- Bertran, Judit
- Bowie, Michael V.
- Eshraghi, Aria
- Harris, Autumn Nourse
- Jabur Bittar, Joao Henrique
- Kim, Jong Hyuk
- Lee, Che Yu
- Maxwell, Elizabeth A.
- Monteiro, Pedro Leopoldo Jeronimo
- Moore, Bret A.
- Paiva Moreno Goncalves, Ronald
- Schachner, Emma
- Scheuermann, Logan Michael
- Seven, Yasin Baris
- Stevenson Salinas, Valentina Beatriz
- Takada, Marilia

Research Associate Professor

- Sahay, Bikash
- Stuchal, Leah D.
- Subramaniam, Kuttichantran
- Wang, Shifeng

Clinical Assistant Professor

- Aherne, Michael
- Campos Krauer, Juan Manuel
- Denagamage, Thomas N.
- Garcia, Lawrence N.
- Johnson, Alanna L.
- Lanier, Christopher J.
- Martinez, Paoul Sean
- Miscioscia, Erin L.
- Pellisery, Abraham Joseph
- Williams, Rachel W.

Assistant Scientist

- Nance, Rebecca L.

Distinguished Professor

- Davenport, Paul W.
- Levy, Julie K.

Clinical Associate Professor

- Alexander, Amanda B.
- Buckley, Gareth J.
- Carrera-Justiz, Sheila C.
- Chiavaccini, Ludovica
- Cooke, Kirsten L.
- Crawford, Patti C.
- Dark, Michael James
- Ham, Kathleen Marie
- Hawkins, Ian K.
- Johnson, Matthew D.
- Kelleman, Audrey A.
- Maunsell, Fiona P.
- Ossiboff, Robert J.
- Porter, Erin G.
- Romano, Marta
- Stacy, Nicole Indra
- Vilar Saavedra, Paulo
- Walsh, Michael T.
- Winter, Matthew D.

Clinical Professor

- Adin, Darcy Brittain
- Farina, Lisa Lee
- House, Amanda M.
- Morton, Alison J.
- Shmalberg, Justin William
- Sleeper, Margaret Mary
- Specht, Andrew J.
- Zimmel, Dana N.

Research Assistant Professor

- Swain, Banikalyan

Senior Lecturer

- Larkin, Iskande V.

Affiliated Faculty

- Aguirre, Jose I.
Associate Professor
- Baker, Tracie R.
Associate Professor
- Bauck, Anje G.
Clinical Assistant Professor
- Byrd, Jason H.
Clinical Professor

- Campbell Thompson, Martha
Research Professor
- Chapman, Frank A.
Associate Professor
- Cooke, Paul S.
Professor
- Cummings, Derek Adam
Professor
- Debiazi Zomer, Helena
Research Assistant Professor
- DeNotta, Sally Anne Lenore
Clinical Associate Professor
- Fatica III, Lawrence Martin
Lecturer
- Fox, Stacey A.
Clinical Assistant Professor
- Fuller, David
Professor
- Gallastegui Menoyo, Aitor
Clinical Associate Professor
- Hansen, Peter J.
Distinguished Professor
- Holbrook, Todd Chadwell
Clinical Professor
- Jobin, Christian Bernard
Distinguished Professor
- Martyniuk, Christopher
Professor
- Martynyuk, Anatoly Eugeny
Research Professor
- Mickle, Aaron
Assistant Professor
- Rathore, Mobeen H.
Professor
- Reznikov, Leah R.
Associate Professor
- Stone, Amy E.
Clinical Associate Professor
- Tevosian, Sergei G.
Associate Professor
- Vilaplana Grosso, Federico Rafael
Clinical Associate Professor
- Vittor, Amy Yomiko
Assistant Professor
- Weisbrod, Tatiana
Clinical Assistant Professor

Herbert Wertheim College of Engineering

Dean: F. J. Masters

The Herbert Wertheim College of Engineering is organized into a number of departments focusing on today's most pressing engineering questions. There is an interdisciplinary culture at the core of Gator Engineering, and

researchers regularly collaborate with colleagues in departments and colleges beyond their own.

For more information, please see our website: <http://www.eng.ufl.edu>

Departments

- Agricultural and Biological Engineering Department (p. 388)
 - Agricultural and Biological Engineering (Engineering) (p. 389)
- Chemical Engineering Department (p. 392)
 - Chemical Engineering (p. 393)
- Civil and Coastal Engineering Department (p. 395)
 - Civil Engineering (p. 396)
 - Coastal and Oceanographic Engineering (p. 398)
- Computer and Information Science and Engineering Department (p. 400)
 - Computer Engineering (p. 402)
 - Computer Science (Engineering) (p. 403)
 - Digital Arts and Sciences (Engineering) (p. 405)
 - Human-Centered Computing (p. 406)
- Electrical and Computer Engineering Department (p. 407)
 - Electrical and Computer Engineering (p. 409)
- Engineering Education Department (p. 411)
 - Applied Data Science (p. 411)
 - Artificial Intelligence Systems (p. 413)
 - Engineering Education (p. 413)
- Environmental Engineering Sciences Department (p. 416)
 - Environmental Engineering Sciences (p. 416)
- Industrial and Systems Engineering Department (p. 419)
 - Industrial and Systems Engineering (p. 419)
- J. Crayton Pruitt Family Department of Biomedical Engineering (p. 421)
 - Biomedical Engineering (p. 422)
- Materials Science and Engineering Department (p. 424)
 - Materials Science and Engineering (p. 425)
 - Nuclear Engineering Sciences (p. 427)
- Mechanical and Aerospace Engineering Department (p. 429)
 - Aerospace Engineering (p. 430)
 - Mechanical Engineering (p. 433)
- Nuclear and Radiological Engineering Department (p. 435)

Faculty

Complete faculty listings: Follow this link (<http://gradschool.ufl.edu/GimsPublic/Acalog/Faculty.aspx>).

Agricultural and Biological Engineering Department

Chair: D. Z. Haman

Graduate Coordinator: G. Kiker

The degrees of Master of Science, Master of Engineering and Doctor of Philosophy are offered with graduate programs in agricultural and biological engineering through the College of Engineering. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

A combination B.S./M.S. program allows up to 12 graduate credits to be double-counted toward fulfillment of both degrees. Contact the graduate coordinator for qualifications and details.

The Master of Science, Master of Engineering, and Doctor of Philosophy degrees are offered in the following areas of research:

Agricultural production engineering includes development and application of precision agriculture concepts and tools, weather and climate risk in agriculture, decision support systems, food security, pesticide application, post-harvest operations, robotics and other machine systems and environmental control systems. Applications to space biology are included in cooperation with NASA at Kennedy Space Center.

Biological engineering includes biocomplexity analysis, ecological modeling, risk and decision analysis, bioprocess design, plant biotechnology, process microbiology, food process engineering, environmental biotechnology, bioreactors, and packaging science.

Information systems includes development and application of GIS and remote sensing, communications, mathematical modeling, data solutions and expert systems techniques to biological and agricultural systems.

Land and water resources includes soil-water-plant relations, irrigation, water quality, watershed hydrology, BMP and TMDL studies, hydrologic modeling, ecological restoration, environmental fate and transport of nanoparticles, waste management, and water reuse.

Students also may choose to participate in interdisciplinary concentrations in hydrologic sciences, geographic information sciences, particle science and technology, and interdisciplinary ecology.

For more information about the program, please visit the program link below and the graduate studies pages on the departmental website at <http://www.abe.ufl.edu>.

Majors

- Agricultural and Biological Engineering (Engineering) (p. 389)

Faculty

Professor

- Burks, Thomas Francis
- Dukes, Michael D.
- Fraisse, Clyde William
- Graham, Wendy Dimbero
- Hoogenboom, Gerrit
- Judge, Jasmeet
- Kiker, Gregory A.
- Lee, Won Suk
- Li, Changying
- Migliaccio, Kati White
- Mukhtar, Saqib
- Muneeppeerakul, Rachata
- Shukla, Sanjay
- Welt, Bruce Ari

Associate Professor

- Ampatzidis, Ioannis
- Bayabil, Haimanote Kebede
- Bean, Eban Zachary
- Bliznyuk, Nikolay A.
- Correll, Melanie J.
- Medeiros, Henry Ponti
- Pullammanappallil, P C.
- Reyes-De-Corcuera, Jose I.

Assistant Professor

- Boz Ozdemir, Ziyet
- Choi, Daeun
- Gorucu, Serap
- Guzman Gutierrez, Sandra Milena
- Hofstetter, Daniel William
- Martin-Ryals, Ana D.
- Najibi, Nasser
- Pavan, Willingthon
- Sharma, Vivek
- Wang, Dengjun
- Wang, Xu
- Watson, Jonathan A.
- Yu, Ziwen
- Zhang, Ying

Distinguished Professor

- Munoz-Carpena, Rafael

Senior Lecturer

- Pelletier, William
- Scholtz, Richard V.

Affiliated Faculty

- De Vries, Albert
Professor
- Her, Young Gu
Associate Professor
- Menezes, Amor
Associate Professor
- Schueller, John Kenneth
Professor
- Zhuang, Yilin
Other

Agricultural and Biological Engineering (Engineering)

Program Information

The degrees of Master of Science, Master of Engineering, and Doctor of Philosophy are offered with graduate programs in agricultural and biological engineering through the College of Engineering. Students must have an undergraduate or graduate degree in Engineering or meet

specific articulation requirements in order to pursue an advanced degree in engineering.

For students without an engineering degree, The Master of Science and Doctor of Philosophy degrees in agricultural and biological engineering are offered in the areas of agricultural operations management and applied science through the College of Agricultural and Life Sciences. Students must have a degree in a related field or meet specific articulation requirements.

A combination B.S./M.S. or B.S./M.E. for Engineering students program allows up to 12 graduate credits to be double-counted toward fulfillment of both degrees. Contact the graduate coordinator for qualifications and details. A 30-credit, nonthesis master's degree program is also available to students interested in completing the requirements in 1 year.

The Master of Science, Master of Engineering, and Doctor of Philosophy (Engineering) degrees are offered in the following areas of research:

Agricultural production engineering includes development and application of precision agriculture concepts and tools, weather and climate risk in agriculture, decision support systems, food security, pesticide application, post-harvest operations robotics and other machine systems and environmental control systems. Applications to space biology are included in cooperation with NASA at Kennedy Space Center.

Biological engineering includes includes biocomplexity analysis, ecological modeling, risk and decision analysis, bioprocess design, plant biotechnology, process microbiology, food process engineering, environmental biotechnology, bioreactors, and packaging science.

Information systems includes development and application of GIS and remote sensing, communications, mathematical modeling, data solutions, and expert systems techniques to biological and agricultural systems.

Land and water resources includes soil-water-plant relations, irrigation, water quality, watershed hydrology, BMP and TMDL studies, hydrologic modeling, ecological restoration, environmental fate and transport of nanoparticles, waste management, and water reuse.

Students also may choose to participate in interdisciplinary concentrations in hydrologic sciences, geographic information sciences, particle science and technology, and interdisciplinary ecology.

The Master of Science and Doctor of Philosophy (CALS) in the **agricultural operations management** area of specialization provide for scientific training and research in technical agricultural management. Typical plans of study focus on advanced training in environmental systems management, production systems management, construction and process management and technical sales management.

In addition, for students with basic science degrees, the Master of Science and Doctor of Philosophy programs with a specialization in **applied sciences** through the College of Agricultural and Life Sciences provides advanced training in problem-solving capabilities, interdisciplinary research, and methods for applying science to real-world problems and issues. Typical emphasis is on:

1. the use of engineering methods and approaches, such as mathematical modeling, optimization, and information technologies, in application of science to problems of various spatial and temporal scales; and
2. an interdisciplinary experience in research at the doctoral level.

The requirements for a master's degree normally take 2 years to complete. The length of time required for the Doctor of Philosophy degree depends partly on the research topic, but normally takes 3 to 4 years.

Additional information can also be found on the graduate studies pages on the department website at www.abe.ufl.edu (<http://www.abe.ufl.edu>).

Degrees Offered

Degrees Offered with a Major in Agricultural and Biological Engineering

- Doctor of Philosophy
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences
- Master of Engineering
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Agricultural and Biological Engineering Courses

Code	Title	Credits
ABE 5038	Recent Developments and Applications in Biosensors	3
ABE 5152	Fluid Power Circuits and Control	3
ABE 5442	Advanced Agricultural Process Engineering	3
ABE 5643C	Biological Systems Modeling	3
ABE 5646	Biological and Agricultural Systems Simulation	3
ABE 5653	Rheology and Mechanics of Agricultural and Biological Materials	3
ABE 5663	Advanced Applied Microbial Biotechnology	3
ABE 5707C	Agricultural Waste Management	3
ABE 5815C	Food and Bioprocess Engineering Design	4
ABE 5936	Writing Grant Proposals for Scholarships and Fellowships	2
ABE 6005	Applied Control for Automation and Robots	3
ABE 6031	Instrumentation in Agricultural Engineering Research	3
ABE 6035	Advanced Remote Sensing: Science and Sensors	3
ABE 6037C	Remote Sensing in Hydrology	3
ABE 6252	Advanced Soil and Water Management Engineering	3
ABE 6254	Simulation of Agricultural Watershed Systems	3

ABE 6265	Vadose Zone Modeling	3
ABE 6266	Nanotechnology in Water Research	3
ABE 6615	Advanced Heat and Mass Transfer in Biological Systems	3
ABE 6644	Agricultural Decision Systems	3
ABE 6645C	Computer Simulation of Crop Growth and Management Responses	3
ABE 6654C	Advanced Bio-Based Products from Renewable Resources	3
ABE 6905	Individual Work in Agricultural and Biological Engineering	1-4
ABE 6910	Supervised Research	1-5
ABE 6931	Seminar	1
ABE 6933	Special Topics in Agricultural and Biological Engineering	1-4
ABE 6940	Supervised Teaching	1-5
ABE 6971	Research for Master's Thesis	1-15
ABE 6972	Research for Engineer's Thesis	1-15
ABE 6974	Nonthesis Project	1-6
ABE 6986	Applied Mathematics in Engineering and Agriculture	3
ABE 7979	Advanced Research	1-12
ABE 7980	Research for Doctoral Dissertation	1-15
AGG 5607	Communicating in Academia	3
AOM 5334C	Agricultural Chemical Application Technology	3
AOM 5431	GIS and Remote Sensing in Agriculture and Natural Resources	3
AOM 5435	Advanced Precision Agriculture	3
AOM 6735	Irrigation Principles and Management	3
AOM 6736	Principles and Issues in Environmental Hydrology	3
AOM 6905	Individual Work in Agricultural Operations Management	1-6
AOM 6932	Special Topics in Agricultural Operations Management	1-6
PKG 5003	Advanced Distribution and Transport Packaging	3
PKG 5006	Advanced Packaging Principles	3
PKG 6100	Advanced Computer Tools for Packaging	3
PKG 6905	Individual Work in Packaging	1-6
PKG 6932	Special Topics in Packaging Sciences	1-6

Agricultural and Biological Engineering Departmental Courses

Code	Title	Credits
ABE 5009	Control Methods in SmartAg Systems	3
ABE 5038	Recent Developments and Applications in Biosensors	3
ABE 5152	Fluid Power Circuits and Control	3
ABE 5310	Advanced Controlled Environment Agriculture Systems Design	3
ABE 5442	Advanced Agricultural Process Engineering	3
ABE 5643C	Biological Systems Modeling	3
ABE 5646	Biological and Agricultural Systems Simulation	3
ABE 5648	Modeling Coupled Natural-Human Systems	3
ABE 5653	Rheology and Mechanics of Agricultural and Biological Materials	3
ABE 5663	Advanced Applied Microbial Biotechnology	3
ABE 5707C	Agricultural Waste Management	3

ABE 5805	Advanced Life Cycle Assessment in Water-Energy-Food Systems	3
ABE 5815C	Food and Bioprocess Engineering Design	4
ABE 5936	Writing Grant Proposals for Scholarships and Fellowships	2
ABE 6005	Applied Control for Automation and Robots	3
ABE 6017	Stochastic Modeling in Ecology and Hydrology	3
ABE 6031	Instrumentation in Agricultural Engineering Research	3
ABE 6035	Advanced Remote Sensing: Science and Sensors	3
ABE 6037C	Remote Sensing in Hydrology	3
ABE 6165	Comp Vis Deep Learn Agri Sys	3
ABE 6252	Advanced Soil and Water Management Engineering	3
ABE 6254	Simulation of Agricultural Watershed Systems	3
ABE 6265	Vadose Zone Modeling	3
ABE 6266	Nanotechnology in Water Research	3
ABE 6615	Advanced Heat and Mass Transfer in Biological Systems	3
ABE 6644	Agricultural Decision Systems	3
ABE 6645C	Computer Simulation of Crop Growth and Management Responses	3
ABE 6649C	Advanced Biological Systems Modeling	3
ABE 6654C	Advanced Bio-Based Products from Renewable Resources	3
ABE 6840	Data Diagnostics	3
ABE 6905	Individual Work in Agricultural and Biological Engineering	1-4
ABE 6910	Supervised Research	1-5
ABE 6931	Seminar	1
ABE 6933	Special Topics in Agricultural and Biological Engineering	1-4
ABE 6940	Supervised Teaching	1-5
ABE 6971	Research for Master's Thesis	1-15
ABE 6972	Research for Engineer's Thesis	1-15
ABE 6974	Nonthesis Project	1-6
ABE 6986	Applied Mathematics in Engineering and Agriculture	3
ABE 7979	Advanced Research	1-12
ABE 7980	Research for Doctoral Dissertation	1-15
AGG 5607	Communicating in Academia	3
AOM 5456	Applied Methods in SmartAg Systems	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3
STA 6348	Bayesian Analysis for Machine Learning and Uncertainty Quantification	3
STA 6703	Statistical Machine Learning	3
STA 6709	Spatial Statistics & Hierarchical Modeling for Dependent Data	3

College of Engineering Courses

Code	Title	Credits
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3

EGN 6642	Engineering Innovation	3
EGN 6913	Engineering Graduate Research	0-3
EGN 6933	Special Topics	1-3
EGN 6937	Engineering Fellowship Preparation	0-1
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6681	Advanced Engineering Leadership	3
EMA 6581	Polymeric Biomaterials	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Agricultural & Biological Engineering (PHD)

SLO 1 Knowledge

Employ mathematics, science and engineering principles to solve problems in the discipline of Agricultural and Biological Engineering

SLO 2 Skills

Apply, analyze, and synthesize content knowledge to plan and conduct scholarly activities that make original contributions to the knowledge base in the field of study by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3 Professional Behavior

Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication.

Agricultural & Biological Engineering (MS and ME)

SLO 1 Knowledge

Identifies, describes, explains, and applies the mathematics, science and engineering principles of the discipline of Agricultural and Biological Engineering.

SLO 2 Skills

Apply, analyze, and synthesize content knowledge to solve problems by identifying components or processes of agricultural and/or biological systems to meet desired needs within realistic economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability constraints.

SLO 3 Professional Behavior

Display ethical behavior, cultural sensitivity, teamwork, professional conduct and effective communication

Chemical Engineering Department

Chair: C. Rinaldi

Graduate Coordinator: K. Ziegler

Master Students Coordinator: Y. Tseng

The Chemical Engineering Department offers the degrees of Doctor of Philosophy, Master of Science (thesis and non-thesis options), and Master of Engineering in Chemical Engineering. Minimum requirements

for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The Ph.D., M.E., and M.S. degrees in chemical engineering require course work in three core areas:

- *The chemical engineering basis* area, consisting of three core courses in the mathematical, the molecular, and the continuum bases of chemical engineering
- *The chemical engineering science and systems* area, consisting of a selection of courses in such areas as transport phenomena, electrochemical engineering, thermodynamics, kinetics, reaction engineering, process control, separation processes, and heat and mass transfer
- *The research specialty* area, consisting of courses designed to build depth in a field of specialization. Courses may be from other academic units, or may be chemical engineering courses such as colloid science, corrosion, polymer science, advanced materials, and biochemical engineering.

For more information, please see the program page below and our website: <http://che.ufl.edu/apply-to-che> (<http://che.ufl.edu/apply-to-che/>).

Majors

- Chemical Engineering (p. 393)

Faculty

Professor

- Angerhofer, Alexander
- Aponick, Aaron
- Bowers, Clifford Russell
- Bruner, Steven Douglas
- Cao, Yunwei Charles
- Castellano, Ronald K.
- Colina, Coray Mariu
- Fanucci, Gail E.
- Guo, Zhongwu
- Harris, Michael
- Kleiman, Valeria Dana
- McElwee-White, Lisa Ann
- Miller, Stephen Albert
- Murray, Leslie Justin
- Richardson, David E.
- Roitberg, Adrian E.
- Seidel, Daniel
- Stewart, Jon Dale
- Sumerlin, Brent S.
- Talham, Daniel R.
- Veige, Adam S.
- Wei, Wei
- Zeng, Yong

Associate Professor

- Brucat, Philip J.
- Butcher, Rebecca Ann

- Grenning, Alexander James
- Loesgen, Sandra
- Savin, Daniel Andrew

Assistant Professor

- Eddy, Matthew T.
- Evans, Austin
- Feng, Kaibo
- Hong, Fan
- Liu, Mingjie
- Miranda Quintana, Ramon Alain
- Narayanan, Amal
- Perez, Alberto
- Prentice, Boone Monroe
- Rudolf, Jeffrey D.
- Searles, Keith
- TANG, FENG
- Zeng, Chenjie

Scientist

- Basso, Kari B.
- Deumens, Erik
- Ghiviriga, Ion

Distinguished Professor

- Christou, George
- Martin, Charles R.

Research Professor

- Omenetto, Nicolo

Courtesy Professor

- Wagener, Kenneth B.

Graduate Research Professor

- Bartlett, Rodney J.

Affiliated Faculty

- Bowden, John A.
Associate Professor
- Garrett, Timothy J.
Associate Professor
- Tanner, David B.
Distinguished Professor

Chemical Engineering Program Information

The Chemical Engineering Department offers the degrees of Doctor of Philosophy, Master of Science (thesis and non-thesis options), and Master of Engineering in Chemical Engineering. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Master of Science Degree – Thesis Option

Completion of the program is possible in 16 months, and its usual duration ranges from 16 to 24 months. The principal requirements for the M.S. degree are 30 semester hours and a research thesis approved by the student's supervisory committee. These credits include:

- Twelve graduate semester hours in the basis of chemical engineering courses (Mathematical Basis, Continuum Basis, Molecular Basis, and Chemical and Bio Lab). Molecular Basis can be replaced with an Elective for students on Applied Track.
- Six credits of Chemical Engineering Science courses, including at least one course in reaction engineering, bioengineering, or kinetics.
- Up to six semester hours of supervised research.

Students must submit a final thesis and pass an oral thesis-defense examination.

Master of Science Degree – Non-Thesis Option

This program is designed for completion in 12 months, although some students prefer longer durations. The M.S.-Non-Thesis provides an opportunity to develop an in-depth knowledge of chemical engineering fundamentals, to emphasize a specific specialization area, and to acquire basic experience in research or industrial practice through a short internship. The principal requirements are 30 credits of courses including an option for 7 credits of research work in a laboratory or of work in an industrial internship. The core course requirements for this program are identical to that for the M.S.-Thesis. A final thesis document is not required but a written report on a project, internship or a contemporary Chemical Engineering topic is required for graduation.

All new students for the M.S. program are admitted to the non-thesis option at the time of admission, and some are converted to the thesis option upon approval by the Research Advisor and the Director of Graduate Programs.

Master of Engineering Degree

A student with a B.S. degree in biology, chemistry, physics, mathematics, or another branch of engineering may obtain a graduate degree in Chemical Engineering by meeting the necessary academic requirements and taking selected undergraduate courses. Students intending to obtain a professionally oriented M.E. degree would normally complete their undergraduate requirements in 1-2 semesters. The graduate course requirements of 30 credits of coursework require another 3-4 semesters. The M.E. students can apply for conversion to the M.S.-NT or M.S.-Thesis program after satisfactory completion of the undergraduate courses.

Ph.D. Degree

The Ph.D. degree plan is primarily a research program. The granting of the degree is based essentially on general proficiency and distinctive attainments in Chemical Engineering and particularly on the demonstrated ability to conduct an independent investigation as exhibited in the doctoral dissertation. Briefly, the formal requirements for the Ph.D. degree are:

- Maintaining a GPA of 3.0 or higher with B- or higher in all Basis courses.
- Successful completion of written and oral examinations for advancement to candidacy. The written examination is comprised of the candidate's objectives and achievements towards their doctoral dissertation. The oral examination is based on the written part and related areas. The oral section also includes the Qualifying

Examination to test the student's breadth of knowledge in Chemical Engineering fundamentals.

- Preparing a dissertation based on original research.
- Passing the final examination based on the dissertation.
- The graduation requirements include 90 credits including at least 30 credits in coursework. Details and minor changes in any of these requirements will be given upon the student's arrival.

The department offers a combination bachelor's/master's degree program. Contact graduate coordinator for information.

For more information, please see our website: <https://www.che.ufl.edu/apply-to-che/#1518393029582-95412685-f4f2>.

Degrees Offered

Degrees Offered with a Major in Chemical Engineering

- Doctor of Philosophy
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Chemical Engineering Departmental Courses

Code	Title	Credits
BME 6221	Biomolecular Cell Mechanics	3
BME 6322	Dynamics of Cellular Processes	3
BME 6644	Pharmacokinetics	3
CHM 5275	The Organic Chemistry of Polymers	2
CHM 5511	Physical Chemistry of Polymers	2
ECH 5938	Topics in Colloid Science	3
ECH 6052	Research Methods in Chemical Engineering	1
ECH 6126	Thermodynamics of Reaction and Phase Equilibria	3
ECH 6225	Electron Transport Phenomena in Semiconductors	3
ECH 6270	Continuum Basis of Chemical Engineering	3
ECH 6272	Molecular Thermodynamics of Chemical Engineering	3
ECH 6275	Nanoscale Transport	3
ECH 6285	Transport Phenomena	3
ECH 6326	Computer Control of Processes	3
ECH 6506	Chemical Engineering Kinetics	3
ECH 6526	Reactor Design and Optimization	3
ECH 6537	Molecular Understanding of Catalysis	3
ECH 6538	Surface Science	3
ECH 6709	Electrochemical Engineering Fundamentals and Design	3
ECH 6716	Managing Safety in the Chemical Industry	3
ECH 6726	Interfacial Phenomena I	3
ECH 6727	Interfacial Phenomena II	3
ECH 6728	Material Self-Assembly Over All Length Scales	3
ECH 6828	Polymer Science & Engineering for Chemical Engineers	3

ECH 6829	Polymer Processing	3
ECH 6836	Semiconductor Device Fabrication Principles for Chemical Engineers	3
ECH 6837	Complex Fluids	3
ECH 6843	Design and Analysis of Chemical Engineering Experiments	3
ECH 6845	Chemical Process Data Science	3
ECH 6847	Advanced Mathematics for Chemical Engineering	3
ECH 6851	Impedance Spectroscopy	3
ECH 6905	Individual Work	1-6
ECH 6910	Supervised Research	1-5
ECH 6926	Graduate Seminar	1
ECH 6937	Topics in Chemical Engineering I	1-4
ECH 6939	Topics in Chemical Engineering III	1-4
ECH 6940	Supervised Teaching	1-5
ECH 6971	Research for Master's Thesis	1-15
ECH 7938	Advanced Special Chemical Engineering Topics for Doctoral Candidates	1-4
ECH 7979	Advanced Research	1-12
ECH 7980	Research for Doctoral Dissertation	1-15
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3
EGN 6913	Engineering Graduate Research	0-3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Chemical Engineering (Phd)

SLO 1 Knowledge

- a. Ability to identify a problem
- b. Ability to formulate a problem
- c. Ability to solve engineering problems
- d. Ability to critically read engineering literature

SLO 2 Skills

Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level

SLO 3 Professional Behavior

Ability to communicate effectively

Chemical Engineering (ME & MS)

SLO 1 Knowledge

- a. Ability to identify a problem
- b. Ability to formulate a problem
- c. Ability to solve engineering problems
- d. Ability to critically read engineering literature

SLO 2 Skills

Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level

SLO 3 Professional Behavior

Ability to communicate effectively

Civil and Coastal Engineering Department

Chair: K. Hatfield

Graduate Coordinator: D. Hiltunen

The Department of Civil and Coastal Engineering offers two distinct graduate programs: civil engineering and coastal and oceanographic engineering. All degrees except the Ph.D. are available in a thesis or nonthesis option.

Civil and Coastal Engineering degree programs include areas of specialization in: Coastal & Oceanographic Engineering, Coastal Ecosystem Dynamics, Geosystems Engineering, Materials & Pavements, Public Works, Structural Engineering, Sustainable Construction Engineering, Transportation Engineering and Water Systems

Minor or supporting work is encouraged from a variety of related or allied fields of study. Ph.D. students are required to take a preliminary examination. Requirements for the M.S., M.E., and Ph.D. degrees are given in the Graduate Degrees (p. 778) section of this catalog.

For information about our Graduate Admissions process and deadlines, please go to https://www.essie.ufl.edu/student_resources/admissions/graduate/.

Majors

- Civil Engineering (p. 396)
- Coastal and Oceanographic Engineering (p. 398)

Faculty

Professor

- Consolazio, Gary R.
- Du, Jing
- Gurley, Kurtis R.
- Hatfield, Kirk
- Hiltunen, Dennis R.
- Krauthammer, Theodor
- Masters, Forrest J.
- Najafi, Fazil T.
- Olabarrieta Lizaso, Maitane
- Prevatt, David
- Riding, Kyle Austin
- Sheremet, Alexandru Aurica
- Simmons, Denise R.
- Srinivasan, Sivaramakrishnan
- Tia, Mang
- Tran, Khiem T.
- Valle-Levinson, Arnaldo
- Washburn, Scott Stuart

Associate Professor

- Bridge, Jennifer Anne
- Du, Lili
- Ferraro, Christopher Charles
- Phillips, Brian M.
- Song, Xiaoyu
- Stark, Nina
- Yu, Xiao

Assistant Professor

- Canestrelli, Alberto
- Ou, Ge
- Subgranon, Arthriya
- Yan, Xiang
- Zhao, Xilei

Lecturer

- Guo, Rui

Distinguished Professor

- Elefteriadou, Ageliki

Assistant Engineer

- Sagar, Shraddha

Research Professor

- Smith, Jane

Research Assistant Scientist

- Catarelli, Ryan A.
- Davis, Justin R.

- Rodgers, Michael B.
- Zou, Jian

Associate Engineer

- Agarwal, Nithin K.
- Rawlinson, Taylor A.

Senior Lecturer

- Mohseni, Ana Paula
- Newman, Mark A.

Affiliated Faculty

- Costin, Aaron M.
Associate Professor
- Gilbert, Juan Eugene
Distinguished Professor
- Waisome, Jeremy Alexis Magruder
Assistant Professor
- Wang, Chaofeng
Assistant Professor

Civil Engineering

Program Information

The civil engineering program is offered through the Department of Civil and Coastal Engineering with the following degrees:

- Doctor of Philosophy
- Master of Engineering
- Master of Science

The master's degree in civil engineering is also offered through the Electronic Delivery of Graduate Engineering (EDGE) program, which is a distance learning program delivered either via streaming video or DVD directly to the students. Subject to approval by the supervisory committee, graduate-level courses taken through the College of Engineering (EGN), Departments of Environmental Engineering Sciences, Geological Sciences, and Mechanical and Aerospace Engineering are considered as major credit.

For courses taken through the Department of Civil and Coastal Engineering, credit hours graded S/U will not count toward graduation except for

- 6 hours of CGN 6971 Research for Master's Thesis (1-15 cr.) or EOC 6971 Research for Master's Thesis (1-15 cr.) for thesis students
- 3 hours of CGN 6974 Master of Engineering or Engineer Degree Report (1-6 cr.) for students working on the M.E. report
- CGN 7979 Advanced Research (1-12 cr.) or EOC 7979 Advanced Research (1-12 cr.)
- CGN 7980 Research for Doctoral Dissertation (1-15 cr.) or EOC 7980 Research for Doctoral Dissertation (1-15 cr.)

The department offers a combination bachelor's/master's degree program for current UF undergraduate students who intend to complete a graduate degree at UF. Please contact the undergraduate coordinator for information.

Degrees Offered

Degrees Offered with a Major in Civil Engineering

- Doctor of Philosophy
 - without a concentration
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences
- Master of Engineering
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Structural Engineering
 - concentration in Transportation Leadership
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Structural Engineering
 - concentration in Transportation Leadership
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Hydrology / Water Resources Shared Courses

Code	Title	Credits
CGN 6905	Special Problems in Civil Engineering	1-6
CWR 5125	Groundwater Flow I	3
CWR 5127	Evaluation of Groundwater Quality	3
CWR 5235	Open Channel Hydraulics	3
CWR 6537	Contaminant Subsurface Hydrology	3
EGM 5816	Intermediate Fluid Dynamics	3
ENV 5518	Field Methods in Environmental Hydrology	3
ENV 6441	Water Resources Planning and Management	3
ENV 6508	Wetland Hydrology	3
ENV 6932	Special Problems in Environmental Engineering	1-4

Civil and Coastal Engineering Departmental Courses

Code	Title	Credits
CCE 5035	Construction Planning and Scheduling	3
CCE 6016	Advanced Engineering Cost Estimating	3
CCE 6037	Civil Engineering Operations I	3
CCE 6515C	Engineering and Construction Analytics using BIM	3
CEG 5105	Geotechnical Engineer	3
CEG 5114	Advanced Geotechnical Aspects of Landfill Design	3
CEG 5115	Foundation Design	3
CEG 5205C	Insitu Measurement of Soil Properties	3
CEG 5805	Ground Modification Design	2

CEG 6015	Advanced Soil Mechanics	3	EOC 6086C	Python Programming for Coastal Oceanography	3
CEG 6116	Advanced Shallow Foundation Design	3	EOC 6116	Nearshore Coastal Processes	3
CEG 6117	Advanced Deep Foundation Design	3	EOC 6196	Littoral Processes	3
CEG 6206	Nondestructive Testing and Geophysical Methods	3	EOC 6430	Coastal Structures	3
CEG 6210	Computational Inelasticity	3	EOC 6850	Numerical Simulation Techniques in Coastal and Ocean Engineering	3
CEG 6405	Seepage in Soils	3	EOC 6855	Coastal Storms: Processes and Impacts	3
CEG 6515	Earth Retaining Systems and Slope Stability	3	EOC 6905	Individual Study in Coastal and Oceanographic Engineering	1-4
CES 5010	Probabilistic and Stochastic Methods in Civil Engineering	3	EOC 6934	Advanced Topics in Coastal and Oceanographic Engineering	1-6
CES 5116	Finite Elements in Civil Engineering	3	EOC 6939	Graduate Seminar	1
CES 5325	Design of Highway Bridges	3	EOC 6971	Research for Master's Thesis	1-15
CES 5607	Behavior of Steel Structures	3	EOC 7979	Advanced Research	1-12
CES 5715	Prestressed Concrete	3	EOC 7980	Research for Doctoral Dissertation	1-15
CES 5801	Design and Construction in Timber	3	OCP 6050	Physical Oceanography	3
CES 6106	Advanced Structural Analysis	3	OCP 6165	Ocean Waves I: Linear Theory	3
CES 6108	Structural Dynamics	3	OCP 6167	Ocean Waves II: Nonlinear Theory	3
CES 6117	Advanced Finite Element Analysis in Civil Engineering	3	OCP 6168	Data Analysis Techniques for Coastal and Ocean Engineers	3
CES 6164C	Structural Health Monitoring	3	OCP 6298	Coastal Sediment Transport Processes	3
CES 6165	Concrete Structural Rehabilitation	3	OCP 6605	Estuarine Circulation	3
CES 6585	Wind Engineering	3	TTE 5006	Advanced Urban Transportation Planning	3
CES 6588	Protective Structures	3	TTE 5256	Traffic Engineering	3
CES 6590	Impact Engineering	3	TTE 5305	Advanced Transportation Systems Analysis	3
CES 6591	Applied Protective Structures	3	TTE 5805	Geometric Design of Transportation Facilities	3
CES 6592	Retrofit Protective Structures	3	TTE 5835	Pavement Design	2
CES 6593	Advanced Protective Structures	3	TTE 5837	Pavement Management Systems	3
CES 6706	Advanced Reinforced Concrete	3	TTE 6008	Fundamentals of the Transportation Profession	3
CGN 5605	Public Works Planning	3	TTE 6205	Freeway Operations and Simulation	3
CGN 5606	Public Works Management	3	TTE 6207	Advanced Highway Capacity Analysis	3
CGN 6425	Applied Data Science in Civil and Environmental Engineering	3	TTE 6259	Urban Streets Simulation and Control	3
CGN 6504	Concrete Durability	3	TTE 6267	Traffic Flow Theory	3
CGN 6505	Properties, Design and Control of Concrete	3	TTE 6275	Connected & Automated Vehicles	3
CGN 6506	Bituminous Materials	3	TTE 6306	Computational Methods in Transportation Engineering	3
CGN 6525	Sustainable Materials	3	TTE 6315	Highway Safety Analysis	3
CGN 6877C	Nondestructive Evaluation of Civil Infrastructure	3	TTE 6505	Discrete Choice Analysis	3
CGN 6905	Special Problems in Civil Engineering	1-6	TTE 6605	Smart Multimodal Transportation Systems	3
CGN 6910	Supervised Research	1-5	TTE 6606	Urban Transportation Models	3
CGN 6936	Civil Engineering Graduate Seminar	1	TTE 6615	Electric, Shared, and Micro Mobility	3
CGN 6940	Supervised Teaching	1-5			
CGN 6971	Research for Master's Thesis	1-15			
CGN 6974	Master of Engineering or Engineer Degree Report	1-6			
CGN 7979	Advanced Research	1-12			
CGN 7980	Research for Doctoral Dissertation	1-15			
CWR 5125	Groundwater Flow I	3			
CWR 5127	Evaluation of Groundwater Quality	3			
CWR 5235	Open Channel Hydraulics	3			
CWR 6116	Advanced Surface Hydrology	3			
CWR 6240	Mixing and Transport in Turbulent Flow	3			
CWR 6308	Advanced Urban Stormwater Systems Design	3			
CWR 6537	Contaminant Subsurface Hydrology	3			
EGM 5816	Intermediate Fluid Dynamics	3			
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6			
EGN 6640	Entrepreneurship for Engineers	3			
EGN 6913	Engineering Graduate Research	0-3			
EOC 5860	Port and Harbor Engineering	3			
EOC 6085	Field Methods for Coastal Engineers	3			

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3

EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Civil Engineering (phd)

SLO 1 Knowledge

An ability to critically read engineering literature in the student's graduate program area (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation); and an ability to identify, formulate new solutions to engineering problems in the student's program area.

SLO 2 Skills

An ability to develop new techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in the students program area (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation).

SLO 3 Professional Behavior

Effectively communicate technical knowledge and information.

Civil Engineering (ME & MS)

SLO 1 Knowledge

An ability to identify, formulate and solve engineering problems in the student's program area. (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation)

SLO 2 Skills An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in the student's program area (Civil Engineering Materials, Water Resources, Geotechnical Engineering, Construction, Structures, and Transportation)

SLO 3 Professional Behavior Effectively communicate technical knowledge and information

Coastal and Oceanographic Engineering

Program Information

The coastal and oceanographic engineering program is offered through the Department of Civil and Coastal Engineering with the following degrees: Master of Engineering, Master of Science, and Doctor of Philosophy degree. Subject to approval by the supervisory committee,

graduate-level courses taken through the College of Engineering (EGN), the Departments of Environmental Engineering Sciences, Geological Sciences, and Mechanical and Aerospace Engineering are considered as major credit.

For courses taken through the Department of Civil and Coastal Engineering, credit hours graded S/U will not count toward graduation except for

- 6 hours of CGN 6971 Research for Master's Thesis (1-15 cr.) or EOC 6971 Research for Master's Thesis (1-15 cr.) for thesis students
- 3 hours of CGN 6974 Master of Engineering or Engineer Degree Report (1-6 cr.) for students working on the M.E. report
- CGN 7979 Advanced Research (1-12 cr.) or EOC 7979 Advanced Research (1-12 cr.)
- CGN 7980 Research for Doctoral Dissertation (1-15 cr.) or EOC 7980 Research for Doctoral Dissertation (1-15 cr.)

The department offers a combination bachelor's/master's degree program for current UF undergraduate students who intend to complete a graduate degree at UF. Please contact the undergraduate coordinator for information.

Degrees Offered

Degrees Offered with a Major in Coastal and Oceanographic Engineering

- Doctor of Philosophy
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Coastal and Oceanographic Engineering Courses

Code	Title	Credits
EGM 5816	Intermediate Fluid Dynamics	3
EOC 5860	Port and Harbor Engineering	3
EOC 6196	Littoral Processes	3
EOC 6430	Coastal Structures	3
EOC 6850	Numerical Simulation Techniques in Coastal and Ocean Engineering	3
EOC 6905	Individual Study in Coastal and Oceanographic Engineering	1-4
EOC 6934	Advanced Topics in Coastal and Oceanographic Engineering	1-6
EOC 6939	Graduate Seminar	1
EOC 6971	Research for Master's Thesis	1-15
EOC 7979	Advanced Research	1-12
EOC 7980	Research for Doctoral Dissertation	1-15
OCP 6050	Physical Oceanography	3
OCP 6165	Ocean Waves I: Linear Theory	3
OCP 6167	Ocean Waves II: Nonlinear Theory	3
OCP 6168	Data Analysis Techniques for Coastal and Ocean Engineers	3
OCP 6298	Coastal Sediment Transport Processes	3
OCP 6605	Estuarine Circulation	3

Civil and Coastal Engineering Departmental Courses

Code	Title	Credits			
CCE 5035	Construction Planning and Scheduling	3			
CCE 6016	Advanced Engineering Cost Estimating	3			
CCE 6037	Civil Engineering Operations I	3			
CCE 6515C	Engineering and Construction Analytics using BIM	3			
CEG 5105	Geotechnical Engineer	3			
CEG 5114	Advanced Geotechnical Aspects of Landfill Design	3			
CEG 5115	Foundation Design	3			
CEG 5205C	Insitu Measurement of Soil Properties	3			
CEG 5805	Ground Modification Design	2			
CEG 6015	Advanced Soil Mechanics	3			
CEG 6116	Advanced Shallow Foundation Design	3			
CEG 6117	Advanced Deep Foundation Design	3			
CEG 6206	Nondestructive Testing and Geophysical Methods	3			
CEG 6210	Computational Inelasticity	3			
CEG 6405	Seepage in Soils	3			
CEG 6515	Earth Retaining Systems and Slope Stability	3			
CES 5010	Probabilistic and Stochastic Methods in Civil Engineering	3			
CES 5116	Finite Elements in Civil Engineering	3			
CES 5325	Design of Highway Bridges	3			
CES 5607	Behavior of Steel Structures	3			
CES 5715	Prestressed Concrete	3			
CES 5801	Design and Construction in Timber	3			
CES 6106	Advanced Structural Analysis	3			
CES 6108	Structural Dynamics	3			
CES 6117	Advanced Finite Element Analysis in Civil Engineering	3			
CES 6164C	Structural Health Monitoring	3			
CES 6165	Concrete Structural Rehabilitation	3			
CES 6585	Wind Engineering	3			
CES 6588	Protective Structures	3			
CES 6590	Impact Engineering	3			
CES 6591	Applied Protective Structures	3			
CES 6592	Retrofit Protective Structures	3			
CES 6593	Advanced Protective Structures	3			
CES 6706	Advanced Reinforced Concrete	3			
CGN 5605	Public Works Planning	3			
CGN 5606	Public Works Management	3			
CGN 6425	Applied Data Science in Civil and Environmental Engineering	3			
CGN 6504	Concrete Durability	3			
CGN 6505	Properties, Design and Control of Concrete	3			
CGN 6506	Bituminous Materials	3			
CGN 6525	Sustainable Materials	3			
CGN 6877C	Nondestructive Evaluation of Civil Infrastructure	3			
CGN 6905	Special Problems in Civil Engineering	1-6			
CGN 6910	Supervised Research	1-5			
CGN 6936	Civil Engineering Graduate Seminar	1			
CGN 6940	Supervised Teaching	1-5			
CGN 6971	Research for Master's Thesis	1-15			
CGN 6974	Master of Engineering or Engineer Degree Report	1-6			
CGN 7979	Advanced Research	1-12			
CGN 7980	Research for Doctoral Dissertation	1-15			
CWR 5125	Groundwater Flow I	3			
CWR 5127	Evaluation of Groundwater Quality	3			
CWR 5235	Open Channel Hydraulics	3			
CWR 6116	Advanced Surface Hydrology	3			
CWR 6240	Mixing and Transport in Turbulent Flow	3			
CWR 6308	Advanced Urban Stormwater Systems Design	3			
CWR 6537	Contaminant Subsurface Hydrology	3			
EGM 5816	Intermediate Fluid Dynamics	3			
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6			
EGN 6640	Entrepreneurship for Engineers	3			
EGN 6913	Engineering Graduate Research	0-3			
EOC 5860	Port and Harbor Engineering	3			
EOC 6085	Field Methods for Coastal Engineers	3			
EOC 6086C	Python Programming for Coastal Oceanography	3			
EOC 6116	Nearshore Coastal Processes	3			
EOC 6196	Littoral Processes	3			
EOC 6430	Coastal Structures	3			
EOC 6850	Numerical Simulation Techniques in Coastal and Ocean Engineering	3			
EOC 6855	Coastal Storms: Processes and Impacts	3			
EOC 6905	Individual Study in Coastal and Oceanographic Engineering	1-4			
EOC 6934	Advanced Topics in Coastal and Oceanographic Engineering	1-6			
EOC 6939	Graduate Seminar	1			
EOC 6971	Research for Master's Thesis	1-15			
EOC 7979	Advanced Research	1-12			
EOC 7980	Research for Doctoral Dissertation	1-15			
OCP 6050	Physical Oceanography	3			
OCP 6165	Ocean Waves I: Linear Theory	3			
OCP 6167	Ocean Waves II: Nonlinear Theory	3			
OCP 6168	Data Analysis Techniques for Coastal and Ocean Engineers	3			
OCP 6298	Coastal Sediment Transport Processes	3			
OCP 6605	Estuarine Circulation	3			
TTE 5006	Advanced Urban Transportation Planning	3			
TTE 5256	Traffic Engineering	3			
TTE 5305	Advanced Transportation Systems Analysis	3			
TTE 5805	Geometric Design of Transportation Facilities	3			
TTE 5835	Pavement Design	2			
TTE 5837	Pavement Management Systems	3			
TTE 6008	Fundamentals of the Transportation Profession	3			
TTE 6205	Freeway Operations and Simulation	3			
TTE 6207	Advanced Highway Capacity Analysis	3			
TTE 6259	Urban Streets Simulation and Control	3			
TTE 6267	Traffic Flow Theory	3			
TTE 6275	Connected & Automated Vehicles	3			
TTE 6306	Computational Methods in Transportation Engineering	3			
TTE 6315	Highway Safety Analysis	3			
TTE 6505	Discrete Choice Analysis	3			
TTE 6605	Smart Multimodal Transportation Systems	3			
TTE 6606	Urban Transportation Models	3			
TTE 6615	Electric, Shared, and Micro Mobility	3			

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Coastal & Oceanographic Engineering (phd)

SLO 1 Knowledge

An ability to critically read engineering literature in Coastal and Oceanographic Engineering and an ability to identify, formulate new solutions to engineering problems in Coastal and Oceanographic Engineering.

SLO 2 Skills

An ability to develop new techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in Coastal and Oceanographic Engineering.

SLO 3 Professional Behavior

Effectively communicate technical knowledge and information.

Coastal & Oceanographic Engineering (ME & MS)

SLO 1 Knowledge

An ability to identify, formulate and solve engineering problems in Coastal and Oceanographic Engineering

SLO 2 Skills

An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice at an advanced level in Coastal and Oceanographic Engineering

SLO 3 Professional Behavior

Effectively communicate technical knowledge and information

Computer and Information Science and Engineering Department

Chair: J. Gilbert

Graduate Coordinator: J. Wilson

The Department of Computer and Information Science and Engineering is concerned with the theory, design, development, and application of computer systems and information processing techniques. The mission of the CISE Department is to educate undergraduate and graduate majors as well as the broader campus community in the fundamental concepts of the computing discipline, to create and disseminate computing knowledge and technology, and to use our expertise in computing to help society solve problems.

The Department of Computer and Information Science and Engineering (CISE) offers

- Ph.D. degree in computer engineering through the College of Engineering
- Master of Engineering degree in computer engineering through the College of Engineering
- Master of Science degree in computer engineering through the College of Engineering
- Ph.D. degree in computer science through the College of Engineering
- Ph.D. degree in human-centered computing through the College of Engineering
- Master of Science degree in computer science through the College of Engineering
- Master of Science degree in digital arts and sciences through the College of Engineering
- Master of Science degree in computer science through the College of Liberal Arts and Sciences

The department also offers a combination bachelor's/master's degree program. Contact the Department's Student Services Center for information.

The CISE Department has six broad areas of specialization:

- **Computer systems:** computer architecture, distributed systems, networks and communication, operating systems, performance evaluation, security, mobile computing, software engineering, programming languages, multimedia systems, and web technologies
- **Database and information systems:** database management systems, database design, database theory and implementation, data mining, database machines, parallel and distributed databases, digital libraries, E-services and commerce, medical, and bio-informatics
- **High-performance computing/applied algorithms:** design and analysis of algorithms, data structures, parallel and distributed computing, medical algorithms, numerical methods, computational complexity, and applied computational geometry
- **Computer graphics, modeling, and art:** modeling methodology, simulation, virtual reality, aesthetic computing, computer arts,

animation, real-time rendering, medical modeling, digital media, and musical acoustics

- **Intelligent systems and computer vision:** artificial intelligence, machine learning, visualization, image analysis and processing, pattern recognition, signal processing, biomedical imaging, and image databases
- **Computer networks and security:** wired and wireless networks, network routing and protocols, and QoS.

Applications for admission must be approved by both the Department and the college in which the student wishes to enroll. Applicants should have a strong computer science background.

All master's students must satisfy a core requirement by completing the appropriate number of core courses as specified by their degree program. According to Graduate School rule, students must maintain a 3.0 overall GPA, as well as a cumulative 3.0 GPA for all courses taken from CISE, to graduate. Students can select a thesis or non-thesis option for the master's degree. Digital Arts and Sciences students must choose either thesis or project in lieu of thesis. All options require a minimum of 30 credit hours. The thesis degree requires:

- A minimum of 6 credit hours must be taken in CIS 6971 Research for Master's Thesis (1-15 cr.).
- Specific degree requirements can be found at: <https://www.cise.ufl.edu/academics/grad> (<https://www.cise.ufl.edu/academics/grad/>)

The non-thesis option requires:

- Each non-thesis master's student is required to pass a comprehensive examination.
- Specific degree requirements can be found at: <https://www.cise.ufl.edu/academics/grad> (<https://www.cise.ufl.edu/academics/grad/>)

The Digital Arts and Sciences project in lieu of thesis option requires 6 credit hours of project/performance credits.

To demonstrate breadth and proficiency, Ph.D. students who major in Computer Engineering or Computer Science must take 4 required core courses obtaining a 3.4 GPA in 3 of the 4 required core courses, with no more than one of the core courses receiving a letter grade below B, to be eligible to take the Ph.D. qualifying examinations.

To demonstrate breadth and proficiency, Ph.D. students who major in Human-Centered Computing must take 3 required core courses obtaining a 3.4 GPA in 2 of the 3 required core courses, with no more than one of the core courses receiving a letter grade below B, to be eligible to take the Ph.D. qualifying examinations.

Ph.D. students are required to take a minimum of 90 credit hours. Of these, at least 36 hours must be graduate-level CISE course work excluding individual study and research credits. A minimum of 3 hours must be taken in CIS 7980 Research for Doctoral Dissertation (1-15 cr.). A maximum of 30 credits may be awarded toward the Ph.D. degree from an appropriate master's degree.

The Database Systems Research and Development Center, the Software Engineering Research Center, the Center for Computer Vision and Visualization Center, and a number of other campus research centers provide opportunities for students enrolled in the program.

Human Centered Computing (HCC) Ph.D.

The degree is focused on the design, construction, and evaluation of computational technologies as they relate to the human condition and impacts on society in general. The purpose of the HCC PhD degree is to train a new generation of computing researchers/developers that design, implement, and evaluate computing systems and technologies in real world, or applied, contexts.

HCC PhD degrees exist because the expertise required for this degree does not fit in traditional Computer Science (CS) or Computer Engineering (CE) PhD programs. CS & CE PhD programs have requirements for computer systems and theory.

For more information, please see the program pages below, or visit our website: <http://www.cise.ufl.edu>

Majors

- Computer Engineering (p. 402)
- Computer Science (Engineering) (p. 403)
- Digital Arts and Sciences (Engineering) (p. 405)
- Human-Centered Computing (p. 406)

Faculty

Professor

- Boyer, Kristy
- Butler, Kevin
- Chen, Shigang
- Dorr, Bonnie J.
- Kahveci, Tamer
- Lok, Benjamin
- Mishra, Prabhat Kumar
- Peters, Jorg
- Rangarajan, Anand
- Sitharam, Meera
- Thai, My Tra
- Traynor, Patrick
- Wang, Zhe

Associate Professor

- Anthony, Lisa
- Banerjee, Arunava
- Boucher, Christina A.
- Chuyew Yee, Sharon Lynn
- Dobra, Alin Viorel
- Entezari, Alireza
- Gardner-McCune, Christina
- Grant, Christan Earl
- Jain, Eakta
- Jiang, Zhe
- Kavalan, Jonathan C L
- McMullen, Kyla
- Ragan, Eric D.
- Ruiz, Jaime
- Ungor, Alper

- Wilson, Joseph N.
- Xia, Ye

Assistant Professor

- Bindschaedler, Vincent Christophe
- Dorley, Emmanuel Johnson
- Fairbanks, James Paul
- Graim, Kiley S.
- Huang, Kejun
- Rampazzi, Sara

Distinguished Professor

- Gilbert, Juan Eugene
- Ranka, Sanjay
- Sahni, Sartaj Kumar
- Vemuri, Baba C.

Senior Lecturer

- Zhang, Rong

Affiliated Faculty

- Blanchard, Jeremiah J.
Associate Engineer
- Fang, Ruogu
Associate Professor
- Fortes, Jose A.
Eminent Scholar
- Glenn, Alina Zare
Professor
- Li, Yanjun
Assistant Professor
- Rashidi, Parisa
Professor
- Woodard, Damon
Professor
- Yavuz, Tuba
Associate Professor

Computer Engineering Program Information

The Department of Computer and Information Science and Engineering offers the Master of Science and the Doctor of Philosophy degrees in Computer Engineering through the College of Engineering. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

The department offers graduate study and research in Algorithms, Computer Vision, Databases, Graphics and Modeling, Machine Learning, Networks, and Systems, with active labs in Bioinformatics; Computational Science and Intelligence; Vision, Graphics and Medical Imaging; Database Systems Research and Development; Data Science Research; Mobile and Pervasive Computing; Human-Centered Computing; and Cybersecurity.

Specific degree requirements and options may be found here: <http://cise.ufl.edu/academics/grad> (<http://cise.ufl.edu/academics/grad/>).

Instructions for application for admission may be found here: <http://cise.ufl.edu/admissions/graduate> (<http://cise.ufl.edu/admissions/graduate/>).

Degrees Offered

Degrees Offered with a Major in Computer Engineering

- Doctor of Philosophy
- Master of Engineering
- Master of Science
 - without a concentration
 - concentration in Digital Arts and Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Computer and Information Science and Engineering Departmental Courses

Code	Title	Credits
CAI 5731	Biostatistics for AI	2
CAI 5732	AI for Clinical Decision Support	3
CAI 6108	Machine Learning Engineering	3
CAI 6307	Natural Language Processing	3
CAI 6726	Clinical AI Design Studio I	3
CAI 6727	Clinical AI Design Studio II	3
CAI 6826	Project in Artificial Intelligence Systems	3
CAI 6910	Supervised Research in AI for Health	1-5
CAP 5100	Human-Computer Interaction	3
CAP 5108	Research Methods for Human-Centered Computing	3
CAP 5404	Deep Learning for Computer Graphics	3
CAP 5416	Computer Vision	3
CAP 5510	Bioinformatics	3
CAP 5705	Computer Graphics	3
CAP 5771	Introduction to Data Science	3
CAP 5841	Modeling and Computing with Geometry	3
CAP 6137	Malware Reverse Engineering	3
CAP 6516	Medical Image Analysis	3
CAP 6610	Machine Learning	3
CAP 6615	Neural Networks for Computing	3
CAP 6617	Advanced Machine Learning	3
CAP 6701	Advanced Computer Graphics	3
CAP 6769	Advanced Topics in Data Science	3
CAP 6779	Projects in Data Science	3
CDA 5155	Computer Architecture Principles	3
CDA 5636	Embedded Systems	3
CDA 6325C	Cyber-physical System Security	3
CEN 5035	Software Engineering	3
CEN 5726	Natural User Interaction	3
CEN 5728	User Experience Design	3
CEN 5735	Human-Centered Input Recognition Algorithms	3
CEN 6070	Software Testing and Verification	3
CEN 6075	Software Specification	3

CIS 5209	Penetration Testing – Ethical Hacking	3
CIS 5370	Computer and Information Security	3
CIS 5371	Introduction to Cryptology	3
CIS 6261	Trustworthy Machine Learning	3
CIS 6307	Internet Data Streaming	3
CIS 6905	Individual Study	1-3
CIS 6910	Supervised Research	1-5
CIS 6930	Special Topics in CIS	3
CIS 6935	Graduate Seminar	1-12
CIS 6940	Supervised Teaching	3
CIS 6971	Research for Master's Thesis	1-15
CIS 7979	Advanced Research	1-12
CIS 7980	Research for Doctoral Dissertation	1-15
CNT 5106C	Computer Networks	3
CNT 5410	Computer and Network Security	3
CNT 5517	Mobile Computing	3
CNT 6107	Advanced Computer Networks	3
CNT 6530	Mobile Networking	3
CNT 6885	Distributed Multimedia Systems	3
COP 5536	Advanced Data Structures	3
COP 5556	Programming Language Principles	3
COP 5615	Distributed Operating System Principles	3
COP 5618	Concurrent Programming	3
COP 5725	Database Management Systems	3
COP 6726	Database System Implementation	3
COT 5405	Analysis of Algorithms	3
COT 5442	Approximation Algorithms	3
COT 5520	Computational Geometry	3
COT 5615	Mathematics for Intelligent Systems	3
COT 6315	Formal Languages and Computation Theory	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3
IDC 5715	Virtual Reality for the Social Good	3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3

EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Computer engineering (phd)

SLO 1 Knowledge

Students identify, formulate, and solve computer science and engineering problems

SLO 2 Knowledge

Students can critically read computer science and engineering literature

SLO 3 Skills

Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level

SLO 4 Professional Behavior

An understanding of professional and ethical responsibility

SLO 5 Professional Behavior

Students can communicate effectively

Computer Engineering (ME & MS)

SLO 1 Knowledge

Students identify, formulate, and solve computer science and engineering problems

SLO 2 Knowledge

Students can critically read computer science and engineering literature

SLO 3 Skills

Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level

SLO 4 Professional Behavior

Professional experience: an understanding of professional and ethical responsibility

SLO 5 Professional Behavior

Professional experience: Students can communicate effectively

Computer Science (Engineering)

Program Information

The Department of Computer and Information Science and Engineering offers the Master of Science degree in Computer Science through the College of Engineering. Minimum requirements for this degree are given in the Graduate Degrees (p. 778) section of this catalog.

Degrees Offered**Degrees Offered with a Major in Computer Science**

- Doctor of Philosophy
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses**Computer and Information Science and Engineering Departmental Courses**

Code	Title	Credits
CAI 5731	Biostatistics for AI	2
CAI 5732	AI for Clinical Decision Support	3
CAI 6108	Machine Learning Engineering	3
CAI 6307	Natural Language Processing	3
CAI 6726	Clinical AI Design Studio I	3
CAI 6727	Clinical AI Design Studio II	3
CAI 6826	Project in Artificial Intelligence Systems	3
CAI 6910	Supervised Research in AI for Health	1-5
CAP 5100	Human-Computer Interaction	3
CAP 5108	Research Methods for Human-Centered Computing	3
CAP 5404	Deep Learning for Computer Graphics	3
CAP 5416	Computer Vision	3
CAP 5510	Bioinformatics	3
CAP 5705	Computer Graphics	3
CAP 5771	Introduction to Data Science	3
CAP 5841	Modeling and Computing with Geometry	3
CAP 6137	Malware Reverse Engineering	3
CAP 6516	Medical Image Analysis	3
CAP 6610	Machine Learning	3
CAP 6615	Neural Networks for Computing	3
CAP 6617	Advanced Machine Learning	3
CAP 6701	Advanced Computer Graphics	3
CAP 6769	Advanced Topics in Data Science	3
CAP 6779	Projects in Data Science	3
CDA 5155	Computer Architecture Principles	3
CDA 5636	Embedded Systems	3
CDA 6325C	Cyber-physical System Security	3
CEN 5035	Software Engineering	3
CEN 5726	Natural User Interaction	3
CEN 5728	User Experience Design	3
CEN 5735	Human-Centered Input Recognition Algorithms	3
CEN 6070	Software Testing and Verification	3
CEN 6075	Software Specification	3
CIS 5209	Penetration Testing – Ethical Hacking	3
CIS 5370	Computer and Information Security	3
CIS 5371	Introduction to Cryptology	3
CIS 6261	Trustworthy Machine Learning	3
CIS 6307	Internet Data Streaming	3
CIS 6905	Individual Study	1-3
CIS 6910	Supervised Research	1-5
CIS 6930	Special Topics in CIS	3
CIS 6935	Graduate Seminar	1-12
CIS 6940	Supervised Teaching	3

CIS 6971	Research for Master's Thesis	1-15
CIS 7979	Advanced Research	1-12
CIS 7980	Research for Doctoral Dissertation	1-15
CNT 5106C	Computer Networks	3
CNT 5410	Computer and Network Security	3
CNT 5517	Mobile Computing	3
CNT 6107	Advanced Computer Networks	3
CNT 6530	Mobile Networking	3
CNT 6885	Distributed Multimedia Systems	3
COP 5536	Advanced Data Structures	3
COP 5556	Programming Language Principles	3
COP 5615	Distributed Operating System Principles	3
COP 5618	Concurrent Programming	3
COP 5725	Database Management Systems	3
COP 6726	Database System Implementation	3
COT 5405	Analysis of Algorithms	3
COT 5442	Approximation Algorithms	3
COT 5520	Computational Geometry	3
COT 5615	Mathematics for Intelligent Systems	3
COT 6315	Formal Languages and Computation Theory	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3
IDC 5715	Virtual Reality for the Social Good	3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Computer Science (phd)

SLO1 Knowledge

Students identify, formulate, and solve computer science and engineering problems

SLO2 Knowledge

Students can critically read computer science and engineering literature

SLO3 Skills

Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level

SLO4 Professional Behavior

An understanding of professional and ethical responsibility

SLO5 Professional Behavior

Students can communicate effectively

Computer Science - Engineering (MS)

SLO 1 Knowledge

Students identify, formulate, and solve computer science and engineering problems.

SLO 2 Knowledge

Students can critically read computer science and engineering literature.

SLO 3 Skill

Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level.

SLO 4 Professional Behavior

Professional experience: an understanding of professional and ethical responsibility.

SLO 5 Professional Behavior

Professional experience: Students can communicate effectively.

Digital Arts and Sciences (Engineering)

Program Information

The Department of Computer and Information Science and Engineering offers the Master of Science degree in Digital Arts and Sciences through the College of Engineering. Minimum requirements for this degree are given in the Graduate Degrees (p. 778) section of this catalog.

This specialized program integrates engineering and design and was created for students with an interest in video games, human-computer interaction, 3D modeling and animation, virtual reality, and computer graphics. The curriculum includes core computer science with a special emphasis on human-centered computing and provides students the flexibility to focus on both computer science and design, and to create software that is computationally complex, user friendly and aesthetically pleasing.

Specific degree requirements and options may be found here: <http://cise.ufl.edu/academics/grad> (<http://cise.ufl.edu/academics/grad/>)

Instructions for application for admission may be found here:

<http://cise.ufl.edu/admissions/grad> (<http://cise.ufl.edu/admissions/grad/>)

Degrees Offered

Degrees

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Computer and Information Science and Engineering Departmental Courses

Code	Title	Credits
CAI 5731	Biostatistics for AI	2
CAI 5732	AI for Clinical Decision Support	3
CAI 6108	Machine Learning Engineering	3
CAI 6307	Natural Language Processing	3
CAI 6726	Clinical AI Design Studio I	3
CAI 6727	Clinical AI Design Studio II	3
CAI 6826	Project in Artificial Intelligence Systems	3
CAI 6910	Supervised Research in AI for Health	1-5
CAP 5100	Human-Computer Interaction	3
CAP 5108	Research Methods for Human-Centered Computing	3
CAP 5404	Deep Learning for Computer Graphics	3
CAP 5416	Computer Vision	3
CAP 5510	Bioinformatics	3
CAP 5705	Computer Graphics	3
CAP 5771	Introduction to Data Science	3
CAP 5841	Modeling and Computing with Geometry	3
CAP 6137	Malware Reverse Engineering	3
CAP 6516	Medical Image Analysis	3
CAP 6610	Machine Learning	3
CAP 6615	Neural Networks for Computing	3
CAP 6617	Advanced Machine Learning	3
CAP 6701	Advanced Computer Graphics	3
CAP 6769	Advanced Topics in Data Science	3
CAP 6779	Projects in Data Science	3
CDA 5155	Computer Architecture Principles	3
CDA 5636	Embedded Systems	3
CDA 6325C	Cyber-physical System Security	3
CEN 5035	Software Engineering	3
CEN 5726	Natural User Interaction	3
CEN 5728	User Experience Design	3
CEN 5735	Human-Centered Input Recognition Algorithms	3
CEN 6070	Software Testing and Verification	3
CEN 6075	Software Specification	3
CIS 5209	Penetration Testing -- Ethical Hacking	3
CIS 5370	Computer and Information Security	3
CIS 5371	Introduction to Cryptology	3
CIS 6261	Trustworthy Machine Learning	3
CIS 6307	Internet Data Streaming	3
CIS 6905	Individual Study	1-3
CIS 6910	Supervised Research	1-5
CIS 6930	Special Topics in CIS	3
CIS 6935	Graduate Seminar	1-12
CIS 6940	Supervised Teaching	3

CIS 6971	Research for Master's Thesis	1-15
CIS 7979	Advanced Research	1-12
CIS 7980	Research for Doctoral Dissertation	1-15
CNT 5106C	Computer Networks	3
CNT 5410	Computer and Network Security	3
CNT 5517	Mobile Computing	3
CNT 6107	Advanced Computer Networks	3
CNT 6530	Mobile Networking	3
CNT 6885	Distributed Multimedia Systems	3
COP 5536	Advanced Data Structures	3
COP 5556	Programming Language Principles	3
COP 5615	Distributed Operating System Principles	3
COP 5618	Concurrent Programming	3
COP 5725	Database Management Systems	3
COP 6726	Database System Implementation	3
COT 5405	Analysis of Algorithms	3
COT 5442	Approximation Algorithms	3
COT 5520	Computational Geometry	3
COT 5615	Mathematics for Intelligent Systems	3
COT 6315	Formal Languages and Computation Theory	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3
IDC 5715	Virtual Reality for the Social Good	3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Digital Arts & Sciences (MS)

SLO 1 Knowledge

Students identify, formulate, and solve computer science and engineering problems

SLO 2 Knowledge

Students can critically read computer science and engineering literature

SLO 3 Skills

Students use the techniques, skills, and tools necessary for computer science and engineering practice at an advanced level

SLO 4 Professional Behavior

Professional experience: an understanding of professional and ethical responsibility

SLO 5 Professional Behavior

Professional experience: Students can communicate effectively

Human-Centered Computing

Program Information

The Department of Computer and Information Science and Engineering offers doctorate in Human-Centered Computing through the College of Engineering. Minimum requirements for this degree are given in the Graduate Degrees (p. 778) section of this catalog.

Human-Centered Computing (HCC) draws on the disciplines of digital media, engineering psychology, assistive technologies, architecture, industrial and systems engineering, industrial design, music, and public policy to name a few. HCC research meets industrial and societal needs for education and research in humanizing computer technology through understanding how computers affect human quality of life, relationships, and culture, while also designing cutting edge technologies, and exploring the underlying issues of science, engineering, art, and design.

Degrees Offered

Degrees Offered with a Major in Human-Centered Computing

- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Computer and Information Science and Engineering Departmental Courses

Code	Title	Credits
CAI 5731	Biostatistics for AI	2
CAI 5732	AI for Clinical Decision Support	3
CAI 6108	Machine Learning Engineering	3
CAI 6307	Natural Language Processing	3
CAI 6726	Clinical AI Design Studio I	3
CAI 6727	Clinical AI Design Studio II	3
CAI 6826	Project in Artificial Intelligence Systems	3
CAI 6910	Supervised Research in AI for Health	1-5
CAP 5100	Human-Computer Interaction	3

CAP 5108	Research Methods for Human-Centered Computing	3
CAP 5404	Deep Learning for Computer Graphics	3
CAP 5416	Computer Vision	3
CAP 5510	Bioinformatics	3
CAP 5705	Computer Graphics	3
CAP 5771	Introduction to Data Science	3
CAP 5841	Modeling and Computing with Geometry	3
CAP 6137	Malware Reverse Engineering	3
CAP 6516	Medical Image Analysis	3
CAP 6610	Machine Learning	3
CAP 6615	Neural Networks for Computing	3
CAP 6617	Advanced Machine Learning	3
CAP 6701	Advanced Computer Graphics	3
CAP 6769	Advanced Topics in Data Science	3
CAP 6779	Projects in Data Science	3
CDA 5155	Computer Architecture Principles	3
CDA 5636	Embedded Systems	3
CDA 6325C	Cyber-physical System Security	3
CEN 5035	Software Engineering	3
CEN 5726	Natural User Interaction	3
CEN 5728	User Experience Design	3
CEN 5735	Human-Centered Input Recognition Algorithms	3
CEN 6070	Software Testing and Verification	3
CEN 6075	Software Specification	3
CIS 5209	Penetration Testing – Ethical Hacking	3
CIS 5370	Computer and Information Security	3
CIS 5371	Introduction to Cryptology	3
CIS 6261	Trustworthy Machine Learning	3
CIS 6307	Internet Data Streaming	3
CIS 6905	Individual Study	1-3
CIS 6910	Supervised Research	1-5
CIS 6930	Special Topics in CIS	3
CIS 6935	Graduate Seminar	1-12
CIS 6940	Supervised Teaching	3
CIS 6971	Research for Master's Thesis	1-15
CIS 7979	Advanced Research	1-12
CIS 7980	Research for Doctoral Dissertation	1-15
CNT 5106C	Computer Networks	3
CNT 5410	Computer and Network Security	3
CNT 5517	Mobile Computing	3
CNT 6107	Advanced Computer Networks	3
CNT 6530	Mobile Networking	3
CNT 6885	Distributed Multimedia Systems	3
COP 5536	Advanced Data Structures	3
COP 5556	Programming Language Principles	3
COP 5615	Distributed Operating System Principles	3
COP 5618	Concurrent Programming	3
COP 5725	Database Management Systems	3
COP 6726	Database System Implementation	3
COT 5405	Analysis of Algorithms	3
COT 5442	Approximation Algorithms	3
COT 5520	Computational Geometry	3
COT 5615	Mathematics for Intelligent Systems	3
COT 6315	Formal Languages and Computation Theory	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3
IDC 5715	Virtual Reality for the Social Good	3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Electrical and Computer Engineering Department

Chair: J. Harris

Graduate Coordinator: Y. K. Yoon

The Department of Electrical and Computer Engineering (ECE) offers the Master of Science and Doctor of Philosophy degrees. Minimum requirements for these degrees are given in the Graduate Degrees Section (p. 778) of this catalog. For more information about the ECE program, please visit: <https://www.eng.ufl.edu/academics/degree-programs/> and the accompanying ECE major pages in this catalog.

In addition to the thesis and non-thesis master's degree options and the research-based Doctor of Philosophy degree, the Department of Electrical and Computer Engineering also offers a combination bachelor's/master's degree program. This program allows qualified students to earn both a bachelor's degree and master's degree with a saving of one semester. Qualified students may begin their master's programs while seniors, counting up to 12 hours of specified electrical and computer engineering graduate courses for both bachelor's and master's degree requirements. Bachelor's/master's program admission requirements are

- satisfaction of Graduate School admission requirements for the master's degree,
- an upper-division (undergraduate) GPA of at least 3.3, and

- completion of at least 7 EEL core courses and 2 EEL laboratories.

Students with a GPA between 3.3 and 3.59 can double count up to 6 hours, while students with a GPA of 3.6 or higher can double count up to 12 hours.

Majors

- Electrical and Computer Engineering (p. 409)

Faculty

Professor

- Arnold, David P.
- Bhunia, Swarup
- Bobda, Christophe
- Eisenstadt, William R.
- Feng, Philip
- Figueiredo, Renato Jansen
- Forte, Domenic J.
- Fuchs, Wesley Kent
- Glenn, Alina Zare
- Guo, Jing
- Judy, Jack
- Lampotang, Samsun
- Li, Jian
- Mcnair, Janise Y.
- Moore, Robert C.
- Nishida, Toshikazu
- Oweiss, Karim
- Ray, Sandip
- Shea, John Mark
- Sorger, Volker
- Stitt, Gregory M.
- Tehranipoor, Mark M.
- Wang, Shuo
- Wong, Tan Foon
- Woodard, Damon
- Yoon, Yong Kyu

Associate Professor

- Asadi Zanjani, Navid
- Dalir, Hamed
- Ewetz, Rickard
- Harley, Joel
- Ji, Mingyue
- Koppal, Sanjeev Jagannatha
- Lam, Herman
- Maghari, Nima
- Ramirez, Ann M.
- Tabrizian, Roozbeh
- Ural, Ant

- Xu, Jie
- Yavuz, Tuba

Assistant Professor

- Abdollahi Biron, Zoleikha
- Bu, Yuheng
- Chatterjee, Baibhab
- Farahmandi, Farimah
- Fu, Jie
- Ge, Baoyun
- Heidari, Elham
- Islam, Md Jahidul
- Khalifa, Adam
- Kim, Dennis Sungtae
- Kim, Laura
- Napoli, Nicholas
- Ruchkin, Ivan
- Wu, Yingying

Eminent Scholar

- Fortes, Jose A.
- Meyn, Sean Peter

Lecturer

- Pinho Da Silva, Catia Sofia

Distinguished Professor

- Law, Mark E.
- Principe, Jose C.
- Rakov, Vladimir Aleksandrovich
- Uman, Martin A.

Research Assistant Professor

- Wilson, Ronald

Senior Lecturer

- Patrick, Erin E.

Master Lecturer

- Thompson, Scott E.

Affiliated Faculty

- Babajani-Feremi, Abbas
Associate Professor
- Blanchard, Jeremiah J.
Associate Engineer
- Bliznyuk, Nikolay A.
Associate Professor
- Fang, Ruogu
Associate Professor
- Gong, Kuang
Assistant Professor
- Huang, Yong
Professor

- Kim, Gloria Jung A
Assistant Professor
- McMullen, Kyla
Associate Professor
- Mohseni, Kamran
Professor
- Otto, Kevin
Professor
- Rashidi, Parisa
Professor
- Sarder, Pinaki
Associate Professor
- Shao, Wei
Assistant Professor
- Sheplak, Mark
Professor
- Wang, Zhe
Professor

Electrical and Computer Engineering Program Information

The Department of Electrical and Computer Engineering (ECE) offers the Master of Science and Doctor of Philosophy degrees. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog. ECE offers graduate study and research in computer engineering, devices, electromagnetics and energy systems, electronics, and signals and systems.

The Department of Electrical and Computer Engineering offers both thesis and non-thesis options for the master's degrees offered.

In the *thesis option* a student shall complete a minimum of 30 semester credit hours with a maximum of 6 semester credit hours of EEL 6971 Research for Master's Thesis (1-15 cr.). While the Graduate School sets the minimum requirements, the supervisory committee determines the appropriate number of thesis hours a student shall be required to take for the thesis. Other course requirements include a minimum of 18 hours at the 5000 or 6000 level in electrical and computer engineering. Excluded from satisfying these course requirements are EEL 5905 Individual Work (1-4 cr.) and EEL 6905 Individual Work (1-4 cr.), EEL 6910 Supervised Research (1-5 cr.), EEL 6940 Supervised Teaching (1-5 cr.), and EEL 6971 Research for Master's Thesis (1-15 cr.). No more than 6 hours of Individual Work (EEL 5905 Individual Work (1-4 cr.) or EEL 6905 Individual Work (1-4 cr.)) may be counted toward the degree.

In the non-thesis option a student shall complete a minimum of 30 semester credit hours with a maximum of 6 semester credit hours of Individual Work (EEL 5905 Individual Work (1-4 cr.) or EEL 6905 Individual Work (1-4 cr.)). The course requirements include a minimum of 21 semester credit hours at the 5000 or 6000 level in electrical and computer engineering. Excluded from satisfying these course requirements are EEL 5905 Individual Work (1-4 cr.) and EEL 6905 Individual Work (1-4 cr.), EEL 6910 Supervised Research (1-5 cr.), EEL 6940 Supervised Teaching (1-5 cr.), and EEL 6971 Research for Master's Thesis (1-15 cr.).

In addition to other requirements, all prospective doctoral students must take the written part of the Ph.D. qualifying examination within the first year of enrollment. Other requirements for the doctoral degree, as well as requirements for master's and engineering degrees, are given in the Electrical and Computer Engineering Department's Graduate Guidelines (see <http://www.ece.ufl.edu/content/graduate-academics> (<http://www.ece.ufl.edu/content/graduate-academics/>)) and in the front section of this catalog.

The following course listing indicates the major areas of faculty interest. Special topics courses EEL 5934 Special Topics in Electrical Engineering (1-3 cr.) and EEL 6935 Special Topics in Electrical Engineering (1-4 cr.) cover a wide variety of subjects for which there are no present courses.

Degrees Offered

Degrees Offered with a Major in Electrical and Computer Engineering

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Electrical and Computer Engineering Departmental Courses

Code	Title	Credits
EEE 5216	Introduction to Biophotonics	3
EEE 5225	Resonant MEMS	3
EEE 5283	Neural Signals, Systems and Technology	3
EEE 5317C	Introduction to Power Electronics	3
EEE 5320	Analog IC Design I	3
EEE 5322	VLSI Circuits and Technology 1	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5364	Fundamentals of Data Converters	3
EEE 5374	Radio Frequency Integrated Circuits 1	3
EEE 5379	Introduction to RF Circuits	3
EEE 5400	Future of Microelectronics Technology	3
EEE 5405	Microelectronic Fabrication Technologies	3
EEE 5408	Mixed Signal IC Testing I	3
EEE 5415	Modern Memory Device Technologies	3
EEE 5426	Introduction to Nanodevices	3
EEE 5467	Micro/Nano Machined Metamaterials	3
EEE 5480	Physical Attacks and Inspection of Electronics	3
EEE 5502	Foundations of Digital Signal Processing	3
EEE 5544	Stochastic Methods for Engineering 1	3
EEE 5590	Introduction to Quantum Computing	3
EEE 5702	Automated Hardware/Software Verification	3
EEE 5716	Introduction to Hardware Security and Trust	3
EEE 5725	Acoustics	3
EEE 6321	Analog IC Design II	3
EEE 6323	VLSI Circuits and Technology 2	3
EEE 6328C	Microwave IC Design	3

EEE 6374	RF Circuits and Systems	3
EEE 6382	Semiconductor Physical Electronics	3
EEE 6390	VLSI Device Design	3
EEE 6397	Semiconductor Device Theory I	3
EEE 6428	Nanoscale Devices for VLSI Technology	3
EEE 6431	Carbon Nanotubes	3
EEE 6460	Advanced Microsystem Technology	3
EEE 6465	Design of MEMS Transducers	3
EEE 6504	Machine Learning for Time Series	3
EEE 6512	Image Processing and Computer Vision	3
EEE 6545	Stochastic Methods for Engineering 2	3
EEE 6561	Fundamentals of Biometric Identification	3
EEE 6586	Automatic Speech Processing	3
EEE 6742	Advanced Hardware Security and Trust	3
EEE 6744	Hands-On Hardware Security	3
EEL 5182	State Variable Methods in Linear Systems	3
EEL 5225	Principles of Micro-Electro-Mechanical Transducers	3
EEL 5249	Fundamentals of RF and Power Electronic Devices	3
EEL 5250	Power System Analysis	3
EEL 5285	Smart Grid for Sustainable Energy	3
EEL 5406	Computational Photography	3
EEL 5417	Applied Magnetism & Magnetic Materials	3
EEL 5426	RF/Microwave Passive Circuits	3
EEL 5441	Fundamentals of Photonics	3
EEL 5447	Laser Theory and Design	3
EEL 5462	Advanced Antenna Systems	3
EEL 5486	Electromagnetic Fields and Applications	3
EEL 5490	Lightning	3
EEL 5547	Introduction to Radar	3
EEL 5632	Safety and Security of Vehicular Electronic Systems	3
EEL 5655	Control of Biological Systems	3
EEL 5666C	Intelligent Machines Design Laboratory	4
EEL 5718	Computer Communications	3
EEL 5721	Reconfigurable Computing	3
EEL 5733	Advanced Systems Programming	3
EEL 5737	Principles of Computer System Design	3
EEL 5739	IoT Security and Privacy	3
EEL 5749	IoT Design	3
EEL 5764	Computer Architecture	3
EEL 5840	Fundamentals of Machine Learning	3
EEL 5855	Cross Layered Systems Security	3
EEL 5905	Individual Work	1-4
EEL 5934	Special Topics in Electrical Engineering	1-3
EEL 6246	Power Electronics II	3
EEL 6275	Power System Protection	3
EEL 6487	Electromagnetic Field Theory and Applications II	3
EEL 6507	Queueing Theory and Data Communications	3
EEL 6509	Wireless Communication	3
EEL 6528	Digital Communications with Software-defined Radios	3
EEL 6532	Information Theory	3
EEL 6533	Data Analytics and Decision Sciences	3
EEL 6535	Digital Communications	3
EEL 6537	Spectral Sensing and Sparse Signal Recovery	3
EEL 6550	Error Correction Coding	3
EEL 6555	Signal Processing for Active Sensing	3
EEL 6588	Wireless Ad Hoc Networks	3
EEL 6591	Wireless Networks	3

EEL 6614	Modern Control Theory	3
EEL 6617	Linear Multivariable Control	3
EEL 6686	Embedded Systems Seminar	3
EEL 6706	Fault-Tolerant Computer Architecture	3
EEL 6761	Cloud Computer Systems and Applications	3
EEL 6763	Parallel Computer Architecture	3
EEL 6814	Neural Networks and Deep Learning	3
EEL 6825	Pattern Recognition and Intelligent Systems	3
EEL 6841	Machine Intelligence and Synthesis	3
EEL 6871	Cloud Computing Systems Management	3
EEL 6892	Virtual Computers	3
EEL 6905	Individual Work	1-4
EEL 6910	Supervised Research	1-5
EEL 6933	Electrical and Computer Engineering Graduate Seminar	1
EEL 6935	Special Topics in Electrical Engineering	1-4
EEL 6940	Supervised Teaching	1-5
EEL 6971	Research for Master's Thesis	1-15
EEL 7979	Advanced Research	1-12
EEL 7980	Research for Doctoral Dissertation	1-15
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3
EGN 6913	Engineering Graduate Research	0-3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Electrical & Computer engineering (PHD)

SLO 1 Knowledge

Ability to identify, formulate and solve engineering problems. Ability to critically read and integrate engineering research literature

SLO 2 Skills

Ability to use applied mathematical and/or modern experimental techniques. Ability to use modern engineering tools for practice at an advanced level

SLO 3 Professional Behavior

Ability to communicate effectively

Electrical & Computer Engineering (Me & Ms)

SLO 1 Knowledge

Ability to identify, formulate and solve electrical and computer engineering problems

SLO 2 Skills

Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level

Engineering Education Department

Chair: H. van Oostrom

The Department of Engineering Education was formed in June 2019.

The department specializes in engineering education research and the delivery of innovative and effective instructional methods in engineering courses, as well as assessment. Faculty design and teach engineering courses that span multiple majors using methods that promote conceptual understanding and student retention, performing research into the effectiveness of learning methods, while continually striving to improve and adapt course content and delivery methods to serve students and faculty throughout the Herbert Wertheim College of Engineering.

The department offers the Master of Science degree with a major in Applied Data Science and the Master of Science and Doctor of Philosophy degrees with majors in Engineering Education. Minimum requirements for these degrees are given in the Graduate Degrees Section (p. 778) of this catalog.

For more information about this interdisciplinary program offering, please contact the department through one of the means listed below.

Via telephone: 352-392-9672

Via email for M.S. degrees: phs@ufl.edu (Administration) and Catia Silva catiaspsilva@ece.ufl.edu

Via email for Ph.D. degrees: phs@ufl.edu (Administration) and Idalis Villanueva i.villanueva@ufl.edu (<http://gradcatalog.ufl.edu/graduate/colleges-departments/engineering/engineering-education/i.villanueva@ufl.edu>)

Majors

- Applied Data Science (p. 411)
- Artificial Intelligence Systems (p. 413)
- Engineering Education (p. 413)

Faculty

Associate Professor

- Van Oostrom, Johannes H.
- Villanueva Alarcon, Idalis

Assistant Professor

- Kim, Gloria Jung A
- Rivera-Jimenez, Sindia
- Waisome, Jeremy Alexis Magruder

Other

- Marte Zorrilla, Edwin Ambiorix
- Ramirez Salgado, Andrea
- Virguez Barroso, Lilianny Josefina

Lecturer

- Baisley, Amie N.
- Goncher, Andrea

Assistant Engineer

- Cruz Castro, Laura Melissa

Associate Engineer

- Blanchard, Jeremiah J.
- Latorre, Edward M.

Senior Lecturer

- Mendoza Garcia, John Alexander

Engineer

- Dickrell, Pamela Laurie

Affiliated Faculty

- Douglas, Elliot Paul
Professor
- Ruzyski, Nancy Jean
Other
- Taylor, Curtis
Associate Professor

Applied Data Science

Overview

PROGRAM INFORMATION

The Master of Science with a major in Applied Data Science degree will provide students with a working knowledge of techniques and software commonly used in Data Science. The degree is designed for engineering students and working professional engineers with a B.S. degree in a non-computing engineering field, that is, for engineering students and professional engineers who have engineering degrees other than Computer Science or Computer Engineering and possibly Industrial and Systems Engineering. The degree will prepare engineering students to work as data scientists in industry and can also be used by engineering

students working towards a Ph.D. degree in non-computing focused engineering degree programs.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN applied data science

- Master of Science

Courses

applied data SCIENCE PROGRAM COURSES

Core/Required Courses:

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
COT 5615	Mathematics for Intelligent Systems	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 5442	Programming for Applied Data Science	3
EGN 6933	Special Topics	1-3
LAW 6930	Selected Legal Probs	1-4

Example Specialization Courses

Code	Title	Credits
ABE 5038	Recent Developments and Applications in Biosensors	3
ABE 5643C	Biological Systems Modeling	3
ABE 6035	Advanced Remote Sensing: Science and Sensors	3
ABE 6649C	Advanced Biological Systems Modeling	3
ABE 6840	Data Diagnostics	3
BME 6522	Biomedical Multivariate Signal Processing	3
BME 6938	Special Topics in Biomedical Engineering	1-4
BME 6938	Special Topics in Biomedical Engineering	1-4
EIN 6905	Special Problems	1-6
OCP 6168	Data Analysis Techniques for Coastal and Ocean Engineers	3
TTE 6505	Discrete Choice Analysis	3

ENGINEERING EDUCATION departmental COURSES

Code	Title	Credits
EGN 6913	Engineering Graduate Research	0-3
EGN 6933	Special Topics	1-3
EGS 6012	Research Methods in Engineering Education	3
EGS 6020	Research Design in Engineering Education	3
EGS 6050	Foundations in Engineering Education	3
EGS 6051	Instructional Design in Engineering Education	3
EGS 6054	Cognition, Learning, and Pedagogy in Engineering Education	3
EGS 6056	Learning and Teaching in Engineering	1
EGS 6085	Advanced Engineering Educational Technology	3
EGS 6930	Engineering Education Seminar	1

EGS 6940	Foundations of Research to Practice in Engineering Education	1
EGS 6949	Research to Practice Experience in Engineering Education	1-3
EGS 6971	Research for Master's Thesis	1-12
EGS 7979	Advanced Research	1-12
EGS 7980	Research for Doctoral Dissertation	1-12

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Applied data SCIENCE

- SLO 1 Knowledge

To analyze, design, implement, and evaluate Data Science systems solution to meet a given set of system requirements.
- SLO 2 Skills

To recognize professional responsibilities and make informed decisions when developing Data Science systems based on legal, ethical, and policy principles.
- SLO 3 Professional Behavior

To function effectively as a member of a team engaged to develop a Data Science systems solution.

Artificial Intelligence Systems

PROGRAM INFORMATION

The Master of Science with a major in Artificial Intelligence Systems degree will provide students with a working knowledge of techniques and software commonly used in Artificial Intelligence Systems. The degree is designed for students with strong analytical and computing backgrounds. For example, students with strong computing backgrounds and B.S. degrees in areas such as computer engineering or science, industrial and systems engineering, or physics would qualify to pursue this degree. Students working toward a Ph.D. in other engineering fields, such as agricultural and biological, biomedical, civil and coastal, chemical, electrical, environmental, mechanical, and aerospace and materials science engineering, may also be interested in and qualified to pursue this degree.

The Master of Science with a major in Artificial Intelligence Systems is a 30- credit hour, non-thesis degree that consists of a set of 6 core courses (18 credit hours), one project course (3 credit hours), and 3 electives options selected from Table 1 (9 credit hours). The students will also have the option to have a committee chair/program faculty advisor reflected in UF GIMS.

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN Artificial intelligence systems

- Master of Science

Student Learning Outcomes

Artificial intelligence Systems

SLO 1 Knowledge

To analyze, design, implement, and evaluate an AI systems solution to meet a given set of system requirements.

SLO 2 Skills

To recognize professional responsibilities and make informed decisions when developing AI systems based on legal, ethical, and policy principles.

SLO 3 Professional Behavior

To function effectively as a member of a team engaged to develop an AI systems solution.

Engineering Education

Program Information

This program aims to prepare graduate students to become researchers, practitioners, future leaders, and agents of positive change in engineering education. Graduates are prepared to conduct educational research, informing evidence-based practice in an engineering context through a core curriculum in engineering education, experiential learning, and further graduate work within their disciplinary concentration.

Ph.D. with a major in Engineering Education

Admission Requirements

- B.S. in a STEM-related field or B.S. and related experience or a master's degree in an engineering or Computer Science discipline

- GPA requirements as defined by the Graduate School
- No GRE is required for admission into this program.

M.S. with a major in Engineering Education

Admission Requirements

- B.S. in a STEM-related field or B.S. and related experience or a bachelor's degree and experience as a teacher of a STEM-related topic
- GPA requirements as defined by the Graduate School
- No GRE is required for admission into this program.

Degrees Offered

Degrees Offered with a Major in Engineering Education

- Master of Science
- Doctor of Philosophy

Courses

Ph.D. Requirements

Minimum of 90 credits beyond the bachelor's degree

- EED Core Courses: 15 credit hours
- Experiential Learning: 5 credit hours
- Elective Requirement: 6 credit hours
- Disciplinary Concentration: 15 credits of graduate work in computer science or a single engineering discipline outside EED. This requirement is waived if a student is admitted with a master's degree in an engineering or computer science discipline.
- Up to 30 credits may be transferred from another graduate degree program with the approval of the student's advisor and the Graduate School. Transfer credits must be appropriate for the student's graduate program, and the student must have earned a B or better.
- Research for doctoral dissertation (remaining credits)

Successful presentation and defense of the

- Qualifying exam (limited to 2 attempts) in core areas of engineering education
- Dissertation proposal in an individual area of engineering education, designed by the student with support from their advisor and supervisory committee
- The doctoral dissertation, based on the proposal, will be the culminating experience of the degree.
- Submission of one peer-reviewed journal article AND acceptance of one conference presentation or one seminar presentation or one workshop presentation, both as first author
- One semester of research to practice experience, such as a teaching experience, a practical internship, or curriculum development/creation/transformation
- Creation of a reflective engineering education portfolio, which highlights EED teaching, research, service, and practical application of the student's research toward the discipline. The portfolio will be reviewed and evaluated by the entire supervisory committee.

M.S. with a major in Engineering Education

Core Courses (15 credits)

- EGS 6050 Foundations in Engineering Education (3 cr.)
- EGS 6054 Cognition, Learning, and Pedagogy in Engineering Education (3 cr.)
- EGS 6051 Instructional Design in Engineering Education (3 cr.)
- EGS 6020 Research Design in Engineering Education (3 cr.)
- EGS 6012 Research Methods in Engineering Education (3 cr.)

Experience (5 credits)

- EGS 6940 Foundations of Research to Practice in Engineering Education (1 cr.)
- EGS 6949 Research to Practice Experience in Engineering Education (3 cr.)
- EGS 6930 Engineering Education Seminar (1 cr.)

Electives Required (6 credits)

Students must take 6 credits of graduate courses related to their dissertation research topic and/or career goals. The courses must be approved by the student's advisor.

Disciplinary Concentration (15 credits)

Students must take 15 credits of graduate courses in a single engineering or computer science discipline. At least 9 credits must be at the 6000 level. This requirement is waived if a student is admitted with a master's in an engineering discipline or computer science.

Admission to Candidacy

Successful completion of both the Qualifying Exam and Dissertation Proposal will result in admission to Ph.D. candidacy.

Qualifying Exam

The student's supervisory committee will prepare a set of questions for the student. The student will have two weeks from the date the questions are delivered to the student to submit written answers to the committee. The student will then meet with the committee as a panel to discuss those answers.

Dissertation Proposal

The student must write an original proposal that will serve as the basis for the dissertation research. The student will then meet with their dissertation committee to defend the proposal.

Final Dissertation and Defense

The student will write a dissertation based on their research activities. The student will then meet with their dissertation committee to present and defend the dissertation. The dissertation and defense serve as the culminating activity for the Ph.D. program.

M.S. Requirements (without a thesis)

The MS without thesis option requires a total of 30 credits of coursework and a final comprehensive examination. Up to 9 credits may be transferred from another graduate degree program with the approval of the student's advisor and the Graduate School. Transfer credits must be

appropriate for the student's graduate program and the student must have earned a B or better. The specific requirements are

Core Courses (9 credits)

- EGS 6050 Foundations in Engineering Education (3 cr.)
- EGS 6054 Cognition, Learning, and Pedagogy in Engineering Education (3 cr.)
- EGS 6051 Instructional Design in Engineering Education (3 cr.)

Elective Requirement (21 credits)

Students must take 21 credits of engineering education-related graduate courses. The courses must be approved by the student's advisor and the graduate coordinator. A minimum of 6 credits must be graduate-level courses within the major. A maximum of 6 credits of the 21 may be S/U courses.

Comprehensive Examination

A final comprehensive exam, as required by the Graduate School, must be completed at the end of the student's graduate program. This exam is separate from any coursework. In conjunction with the student's advisor, the student will design a culminating experience related to the student's career goals. Students are encouraged to be creative in designing the experience, but it must be approved by the student's advisor, who will evaluate the student's performance.

M.S. Requirements (with a thesis)

The MS with thesis option requires a total of 30 credits and successful completion of an MS thesis. The specific requirements are

Core Courses (15 credits)

- EGS 6050 Foundations in Engineering Education (3 cr.)
- EGS 6054 Cognition, Learning, and Pedagogy in Engineering Education (3 cr.)
- EGS 6051 Instructional Design in Engineering Education (3 cr.)
- EGS 6020 Research Design in Engineering Education (3 cr.)
- EGS 6012 Research Methods in Engineering Education (3 cr.)

Up to 9 credits may be transferred from another graduate degree program with the approval of the student's advisor and the Graduate School. Transfer credits must be appropriate for the student's graduate program and the student must have earned a B or better.

Research Requirement (6 credits)

Students must take 6 credits of EGS 6971 Research for Master's Thesis.

Additional Course Requirements

Students must take 9 credits of graduate courses and/or EGS 6971. The courses must be approved by the student's advisor. Note that only 6 credits of EGS 6971 may count toward the degree.

Master's Thesis

The student will write a thesis based on their research activities. The student will then meet with their thesis committee to present and defend

the thesis. The thesis and defense serve as the culminating activity of the M.S. with thesis option.

ENGINEERING Education departmental COURSES

Code	Title	Credits
EGN 6913	Engineering Graduate Research	0-3
EGN 6933	Special Topics	1-3
EGS 6012	Research Methods in Engineering Education	3
EGS 6020	Research Design in Engineering Education	3
EGS 6050	Foundations in Engineering Education	3
EGS 6051	Instructional Design in Engineering Education	3
EGS 6054	Cognition, Learning, and Pedagogy in Engineering Education	3
EGS 6056	Learning and Teaching in Engineering	1
EGS 6085	Advanced Engineering Educational Technology	3
EGS 6930	Engineering Education Seminar	1
EGS 6940	Foundations of Research to Practice in Engineering Education	1
EGS 6949	Research to Practice Experience in Engineering Education	1-3
EGS 6971	Research for Master's Thesis	1-12
EGS 7979	Advanced Research	1-12
EGS 7980	Research for Doctoral Dissertation	1-12

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3

EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Faculty

Associate Professor

- Van Oostrom, Johannes H.
- Villanueva Alarcon, Idalis

Assistant Professor

- Kim, Gloria Jung A
- Rivera-Jimenez, Sindia
- Waisome, Jeremy Alexis Magruder

Other

- Marte Zorrilla, Edwin Ambiorix
- Ramirez Salgado, Andrea
- Virguez Barroso, Lilianny Josefina

Lecturer

- Baisley, Amie N.
- Goncher, Andrea

Assistant Engineer

- Cruz Castro, Laura Melissa

Associate Engineer

- Blanchard, Jeremiah J.
- Latorre, Edward M.

Senior Lecturer

- Mendoza Garcia, John Alexander

Engineer

- Dickrell, Pamela Laurie

Affiliated Faculty

- Douglas, Elliot Paul
Professor
- Ruzycski, Nancy Jean
Other
- Taylor, Curtis
Associate Professor

Student Learning Outcomes

Ph.D. Student Learning Outcomes

After completion of the Ph.D., the candidate will be able to

- Synthesize the literature to identify research topics;
- Create relevant research question(s);
- Conduct independent research in engineering education to address the research question(s);
- Conduct an analysis of needs and context to identify gaps between research and practice;

- Collaborate with others in academia, industry, and other organizations to conduct research and develop evidence-based best practices
- Apply engineering education research findings, methodologies, concepts, and frameworks to real-world contexts such as industry or academic training experiences, professional development, classroom innovation, or assessment

Environmental Engineering Sciences Department

Director: K. Hatfield

Graduate Coordinator: M. Annable

The Department of Environmental Engineering Sciences offers graduate study in the following areas: Air Resources; Biogeochemical Systems; Environmental Nanotechnology; Solid and Hazardous Waste Management; Storm Water, Water Supply and Waste Water; Sustainability Science & Engineering; Systems Ecology and Ecological Engineering; and Water Resources. Students graduated from the program will demonstrate depth in individual focus areas as well as breadth of core knowledge concepts in all areas.

Please visit the program page below and our website: <http://www.essie.ufl.edu> for more information about our program in Environmental Engineering Sciences.

Majors

- Environmental Engineering Sciences (p. 416)

Faculty

Professor

- Annable, Michael D.
- Bonzongo, Jean-Claude J.
- Douglas, Elliot Paul
- Kaplan, David A.
- Lindner, Angela S.
- Sansalone, John Joseph
- Townsend, Timothy G.

Associate Professor

- Behdad, Sara
- Jang, Myoseon
- Jutla, Antarpreet Singh
- Li, Shuai

Assistant Professor

- Altieri, Andrew H.
- Deliz Quinones, Katherine Y.
- Fonseca De Faria, Andreia
- Jung, Sungyoon
- Morrison, Elise S.
- Oh, Chamteut
- Todd-Brown, Katherine Elizabeth

Other

- Cornwell, David Alan

Lecturer

- Cahill, James

Affiliated Faculty

- Bowden, John A.
Associate Professor
- Hiltunen, Dennis R.
Professor
- Newman, Mark A.
Senior Lecturer
- Sheremet, Alexandru Aurica
Professor
- Villanueva Alarcon, Idalis
Associate Professor
- Waisome, Jeremy Alexis Magruder
Assistant Professor

Environmental Engineering Sciences Program Information

Graduate study is offered leading to the degrees Master of Engineering, Master of Science, and Doctor of Philosophy in the field of environmental engineering sciences. Our graduate research and education areas are

Air Resources

- Monitoring of air pollutants: indoor, ambient, industrial, and occupational
- Monitoring methodology and instrumentation development
- Formation and fate of air pollutants
- Air quality modeling
- Air pollution control: system, process and materials
- Sustainability of air quality
- Health effects and environmental impact of air pollutant

Environmental Nanotechnology

- Manufacturing and tailoring of nanomaterials and nanodevices for application in environmental and human health research
- Environmental fate and transport of nanomaterials
- Environmental implications of nanomaterials

Engineering Education Collaborative

- Student-centered learning and design based apprenticeship
- Problem solving and critical thinking
- Diversity and cultures of inclusion
- Role of informal learning environments
- Universal design for STEM students with (learning) disabilities

GeoSystem Engineering/Waste Management

- Bioreactor Landfills
- Combustion and Thermal Treatment Residuals
- Contaminated Soil Characterization and Treatment
- Construction and Demolition Debris

- Electronic Waste
- Hazardous Waste
- Landfill Design and Operations
- Landfill Gas and Leachate
- Recycling and Beneficial Use of Wastes
- Treated Wood
- Waste Characterization and Leaching
- Solid Waste Management in Developing Countries

Stormwater, Water Supply and Wastewater

- Fundamental characterization of aqueous and particulate-phase contaminants including emerging contaminants: representative ambient monitoring, methodology and load quantification.
- Sourcing and generation of aqueous and particulate phase contaminants, physics and chemistry of contaminant transport and fate.
- Water contaminant control: systems, unit operation and processes, and materials development, in particular innovative mass transfer materials and low impact development materials.
- Water reuse as part of the urban water cycle: volumetric and contaminant load impacts
- Unit operation and process modeling: scalable physical models and computational fluid dynamics (CFD).
- Integrated physical, chemical, biological and thermal treatment phenomena for water cycle components.
- Coupling fundamental monitoring and material balance testing with urban water modeling.
- Fundamental and applied studies of physical-chemical water treatment processes, such as adsorption, coagulation, ion exchange, and oxidation, for a wide range of water qualities including surface water, groundwater, membrane concentrate, landfill leachate, and human urine.
- Innovative applications of ion exchange for water treatment.
- Fundamental studies in aquatic chemistry with a focus on the role of natural organic matter.
- Fundamental and applied studies of adsorption and photocatalysis, including surface optimization
- Bottom up integrated urban water system simulation and optimization

Sustainability Science & Engineering

- Rational design of nanomaterial through acute and full-life-cycle toxicity assessment
- Life cycle assessment calculations and comparisons of alternative energy and materials options
- Industrial ecology
- Corporate water resources sustainability
- Campus green building codes
- Green laboratory techniques
- Operation of buildings to meet green energy requirements

Systems Ecology and Ecological Engineering

- Ecological Engineering
- Energy Analysis and Environmental Economics
- Wetlands and Watershed Ecology
- Ecological Modeling

- Community and Conservation Ecology
- Environmental Policy
- Microbiology of Natural and Engineered Systems
- Biological and Chemical Remediation of Contaminated Systems
- Effects of Climate and Land Use Changes on Biogeochemical Cycles

Water Systems

- Contaminant transport and fate
- Decision support systems
- Ecohydrology and hydrologic restoration
- Hydrology
- Stormwater control
- Water resources planning and management
- Water conservation
- Fundamental characterization of aqueous and particulate-phase contaminants including emerging contaminants: representative ambient monitoring, methodology and load quantification.
- Sourcing and generation of aqueous and particulate phase contaminants, physics and chemistry of contaminant transport and fate.
- Water contaminant control: systems, unit operation and processes, and materials development, in particular innovative mass transfer materials and low impact development materials.
- Water reuse as part of the urban water cycle: volumetric and contaminant load impacts
- Unit operation and process modeling: scalable physical models and computational fluid dynamics (CFD).
- Integrated physical, chemical, biological and thermal treatment phenomena for water cycle components.
- Coupling fundamental monitoring and material balance testing with urban water modeling.
- Fundamental and applied studies of physical-chemical water treatment processes, such as adsorption, coagulation, ion exchange, and oxidation, for a wide range of water qualities including surface water, groundwater, membrane concentrate, landfill leachate, and human urine.
- Innovative applications of ion exchange for water treatment.
- Fundamental studies in aquatic chemistry with a focus on the role of natural organic matter.
- Fundamental and applied studies of adsorption and photo catalysis, including surface optimization
- Bottom up integrated urban water system simulation and optimization
- Aqueous Geochemistry and Water Treatment

Graduate students can also combine one or more of the above areas with specialties in other departments at the University of Florida.

The department participates in the hydrologic sciences interdisciplinary concentration that is offered through 9 departments in 3 colleges. This concentration is described under Interdisciplinary Graduate Studies.

Direct admission into the Master of Science and Doctor of Philosophy programs requires a bachelor's degree in engineering or in a basic science such as chemistry, geology, physics, biology, or mathematics. Persons with a degree in a nontechnical field may also be admitted into this program after completing appropriate technical courses. Direct

admission into the Master of Engineering program requires a bachelor's degree in engineering from an ABET-accredited institution.

Requirements for a master's degree normally take 12 to 24 months to complete. The length of time required for the Doctor of Philosophy degree depends partly on the research topic, and may be completed in 3 years, but often takes longer, depending on prior academic experience.

Combination degree program: The department offers a combination bachelor's/master's degree program. This program allows qualified students to earn both a bachelor's degree and a master's degree, with a savings of 12 credits.

Joint program: The Environmental Engineering Sciences Department, in partnership with the Levin College of Law, offers a joint program leading to the M.S. or M.E. degree in environmental engineering sciences and the Juris Doctor degree. Twelve credits of appropriate course work are counted toward both degrees.

For more information, please see our website: <http://www.essie.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Environmental Engineering Sciences

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences
- Master of Engineering
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences
- Master of Science
 - without a concentration
 - concentration in Geographic Information Systems
 - concentration in Hydrologic Sciences
 - concentration in Wetland Sciences

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Environmental Engineering Sciences Departmental Courses

Code	Title	Credits
CWR 5125	Groundwater Flow I	3
CWR 6116	Advanced Surface Hydrology	3
CWR 6252	Environmental Biochemistry of Trace Metals	3
CWR 6537	Contaminant Subsurface Hydrology	3
EES 6007	Advanced Energy and Environment	3
EES 6051	Advanced Environmental Planning and Design	3
EES 6208	Principles of Water Chemistry I	3
EES 6225	Atmospheric Chemistry	3
EES 6307	Advanced Ecological Engineering	3

EES 6309	Wetland Design and Restoration	3
EES 6344	Coastal Policy Lab	3
EES 6345	Florida Marine and Coastal Law and Policy	3
EES 6346	Engineering Nature-Based Coastal Solutions	3
EES 6932	Modeling the Fate of Air Pollutants	3
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3
EGN 6913	Engineering Graduate Research	0-3
ENV 5105	Foundations of Air Pollution	3
ENV 5306	Municipal Refuse Disposal	3
ENV 5518	Field Methods in Environmental Hydrology	3
ENV 5619	Principles of Sustainable Engineering Design	3
ENV 6043	Life Cycle Assessment	3
ENV 6126	Air Pollution Control Design	3
ENV 6130	Aerosol Mechanics	3
ENV 6301	Advanced Solid Waste Containment Design	3
ENV 6416	Advanced Stormwater Control Systems	3
ENV 6435	Advanced Water Treatment Process Design	3
ENV 6437	Advanced Wastewater System Design	3
ENV 6438	Advanced Potable Water Systems Design	3
ENV 6439	Activated Carbon: Environmental Design and Application	3
ENV 6441	Water Resources Planning and Management	3
ENV 6455	Microbiology of Environmental Engineering Systems	3
ENV 6508	Wetland Hydrology	3
ENV 6511	Biological Wastewater Treatment	3
ENV 6905	Individual Work	1-4
ENV 6910	Supervised Research	1-5
ENV 6916	Nonthesis Project	1-3
ENV 6932	Special Problems in Environmental Engineering	1-4
ENV 6935	Graduate Environmental Engineering Seminar	1
ENV 6940	Supervised Teaching	1-5
ENV 6971	Research for Master's Thesis	1-15
ENV 7979	Advanced Research	1-12
ENV 7980	Research for Doctoral Dissertation	1-15
LAW 6472	Natural Resources Law	3-4

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1

EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Environmental Engineering Sciences (PHD)

SLO 1 Knowledge

Knowledge an ability to identify, formulate, and solve environmental problems using scientific and engineering methods and tools

SLO 2 Skills

An ability to critically read and evaluate engineering or science literature.
An ability to use the techniques, methods, and appropriate professional tools necessary for professional practice at an advanced level
An ability to communicate effectively

SLO 3 Professional Behavior

An understanding of professional and ethical responsibility

Environmental Engineering Sciences (ME & MS)

SLO 1 Knowledge

An ability to identify, formulate, and solve environmental problems using scientific and engineering methods and tools

SLO 2 Skills

An ability to critically read and evaluate engineering or science literature

An ability to use the techniques, methods, and appropriate professional tools necessary for professional practice at an advanced level
An ability to communicate effectively

SLO 3 Professional Behavior

An understanding of professional and ethical responsibility

Industrial and Systems Engineering Department

Chair: I. Rivero

Graduate Coordinator: J. Sefair

The Department of Industrial and Systems Engineering offers the Master of Engineering and the Master of Science degrees, each with a thesis or non-thesis option, with specialization in engineering management, manufacturing and logistics systems engineering, operations research, quality engineering, and special interest options such as health systems. In addition, the Department offers the Doctor of Philosophy degree with specialization in linear, combinatorial, nonlinear, and global optimization; supply chain management and e-commerce; financial engineering;

manufacturing management; facilities location and layout; quality engineering; and stochastic processes.

Complete descriptions of the requirements for the M.E., M.S., and Ph.D. degrees are provided in the *General Information* section of this catalog.

A degree in one of the engineering disciplines or in mathematics, statistics, physics, computer sciences, quantitative management, or similar fields is prerequisite. Where the student's background is deficient, an articulation program of foundation courses will be required.

The Department offers a combination bachelor's/master's degree program of B.S.I.S.E./Master of Science (Management), B.S.I.S.E./Master of Engineering or Master of Science, and a B.S. from disciplines within the College of Engineering/Master of Science or Master of Engineering. Contact the graduate coordinator for information.

Majors

- Industrial and Systems Engineering (p. 419)

Faculty

Professor

- Guan, Yongpei
- Rivero, Iris Violeta

Associate Professor

- Akcali, Elif
- Amini, Leo Hamed
- Chowdhury, Suman Kanti
- Hu, Boyi
- Liu, Hongcheng
- Sefair, Jorge A.
- Zhong, Xiang

Assistant Professor

- Giang, Wayne Chi Wei
- Hicklin, Karen Theodora
- Kazachkov, Aleksandr
- Kim, Minhee
- Reisi Gahrooei, Mostafa
- Sun, Xu
- Yang, Yu

Research Assistant Professor

- Semenov, Alexander

Courtesy Professor

- Uryasev, Stanislav

Industrial and Systems Engineering Program Information

The Department of Industrial and Systems Engineering offers the Master of Engineering degree, the Master of Science degree, the Engineer degree, and the Doctor of Philosophy degree. Complete descriptions of the

minimum requirements for the M.E., M.S., Engineer, and Ph.D. degrees are provided in the Graduate Degrees (p. 778) section of this catalog.

Master of Science (M.S.) Program

Admission to the Master of Science program is open to students with an undergraduate degree in engineering, mathematics, statistics, computer science, physics, quantitative management, or similar field. The M.S. degree does not require a thesis, although a student interested in pursuing research or possibly continuing their education beyond a master's degree is encouraged to write one.

Master of Engineering (M.E.) Program

Students seeking admission to the Master of Engineering program must have a bachelor's degree from an ABET-accredited curriculum or have taken sufficient articulation coursework to meet the minimum requirements specified by ABET. The M.E. degree does not require a thesis and is generally considered a terminal degree.

Ph.D. Program

The doctoral program in Industrial and Systems Engineering covers the areas of data analytics, health systems engineering, human-systems engineering, operations research (including deterministic and stochastic processes), risk management and financial engineering, and supply chain and logistics systems. Application areas include energy systems, financial engineering, healthcare, manufacturing systems, security systems, supply chain management, and transportation systems.

For more information, please see our website: <http://www.ise.ufl.edu>.

Degrees Offered

Degrees Offered with a Major in Industrial and Systems Engineering

- Doctor of Philosophy
 - without a concentration
 - concentration in Quantitative Finance
- Master of Engineering
 - without a concentration
 - concentration in Data Analytics
 - concentration in Engineering Management
 - concentration in Human Systems Engineering
 - concentration in Operations Research
 - concentration in Productions and Service Operations
- Master of Science
 - without a concentration
 - concentration in Data Analytics
 - concentration in Engineering Management
 - concentration in Human Systems Engineering
 - concentration in Operations Research
 - concentration in Productions and Service Operations

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Industrial and Systems Engineering Departmental Courses

Code	Title	Credits
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3
EGN 6913	Engineering Graduate Research	0-3
EIN 5249	Human Factors in System Design	3
EIN 5501	Health Systems Engineering Models and Methods	3
EIN 6176	Advanced Quality Management and Engineering for Business Processes	3
EIN 6212	Loss Assessment and Control	3
EIN 6215	System Safety Engineering	3
EIN 6216	Occupational Safety Engineering	3
EIN 6357	Advanced Engineering Economy	3
EIN 6422	Manufacturing Management	3
EIN 6510	Principles of Manufacturing Systems Engineering	3
EIN 6905	Special Problems	1-6
EIN 6910	Supervised Research	1-5
EIN 6918	Graduate Seminar	1
EIN 6940	Supervised Teaching	1-5
EIN 6971	Research for Master's Thesis	1-15
EIN 7933	Special Problems	1-6
EIN 7979	Advanced Research	1-12
EIN 7980	Research for Doctoral Dissertation	1-15
ESI 5471	Optimization for Financial Engineering	3
ESI 5613	Data Analytics for ISE	3
ESI 5687	Machine Learning for Financial Risk Management	4
ESI 6314	Deterministic Methods in Operations Research	4
ESI 6323	Models for Supply Chain Management	3
ESI 6325	Applied Probability Methods in Engineering	3
ESI 6341	Intro to Stochastic Optimization	3
ESI 6346	Decision Making under Uncertainty	3
ESI 6352	Financial Optimization Case Studies	3
ESI 6417	Linear Programming and Network Optimization	3
ESI 6420	Fundamentals of Mathematical Programming	3
ESI 6448	Discrete Optimization Theory	3
ESI 6492	Global Optimization	3
ESI 6529	Digital Simulation Techniques	3
ESI 6546	Stochastic Modeling and Analysis	3
ESI 6552	Systems Architecture	3
ESI 6553	Systems Design	3
ESI 6555	Systems Management	3
ESI 6616	Data Analytics for System Monitoring	3
ESI 6617	High-Dimensional Data Analytics	3
FIN 5490	Stochastic Calculus in Financial Engineering	4
FIN 5776	Numerical Methods in Financial Engineering	4
FIN 5778	Introduction to Financial Technology	3
FIN 6951	Master's Project in Financial Engineering	3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Industrial and Systems Engineering (PHD)

SLO 1 Knowledge

Basic proficiency in the core methodological areas of operations research and industrial engineering, including mathematical modeling and optimization theory and algorithms

SLO 2 Professional Behavior

Ability to effectively and professionally communicate industrial engineering concepts and information in lecture format

SLO 3 Skills

Ability to assimilate foundational material, describe important research contributions, and independently plan future research activities that advance the state-of-the-art in the student's field of expertise

SLO 4 Knowledge

Contribution of significant new research to the student's field of expertise, either in theoretical foundations or practical applications

Industrial & Systems Engineering (ME & MS)

SLO 1 Knowledge

Proficiency in the core methodological areas of operations research and industrial engineering, including mathematical modeling and analysis of business problems

SLO 2 Skills

Ability to apply methodology in the customized development of solutions for business problems, and the use of information technologies for solution delivery

SLO 3 Professional Behavior

Ability to effectively and professionally communicate industrial engineering concepts and information in written and oral forms

J. Crayton Pruitt Family Department of Biomedical Engineering

Chair: G. Hudalla

Graduate Coordinator: C. Stabler

The mission of the J. Crayton Pruitt Family Department of Biomedical Engineering (BME) is to educate students with strong engineering and science backgrounds for Master's and/or Ph.D. degrees in biomedical engineering. Graduates in BME typically apply their skills and training directly to engineering solutions to clinical problems in medicine. The BME mission is accomplished through a core program of study that has strong collaborations with faculty in the Colleges of Engineering and Medicine.

Degrees offered include: Doctor of Philosophy, Master of Science (thesis and non-thesis options), and Master of Engineering (thesis and non-thesis options). More details regarding these degrees and the minimum entry requirements are provided at <http://www.bme.ufl.edu/academics/graduate> (<http://www.bme.ufl.edu/academics/graduate/>).

The Biomedical Engineering Department faculty members work collaboratively with joint, affiliate, and adjunct faculty from many other departments in the College of Engineering, the College of Medicine, and local industry. This diversity ensures students the highest-quality education and varied opportunities for cutting-edge research.

Areas of Research within these graduate programs include:

- Biomaterials and Regenerative Medicine
- Biomechanics and Bionics
- Biomedical Imaging and Applications
- Molecular and Cellular Engineering
- Modeling and Biomedical Data Science
- Neural Engineering

More information about our dynamic and collaborative department is available at: <http://www.bme.ufl.edu>.

Majors

- Biomedical Engineering (p. 422)

Faculty

Professor

- Allen, Kyle
- Ferris, Daniel Perry
- Gunduz, Aysegul

- Keselowsky, Benjamin G.
- Liu, Chihray
- Murfee, Walter L.
- Rashidi, Parisa
- Rinaldi, Carlos
- Stabler Anderson, Cheryl
- Williams, Lakiesha Nicole

Associate Professor

- Fang, Ruogu
- Hudalla, Gregory
- Lewis, Jamal Sana
- Nichols, Jennifer A.
- Phelps, Edward Allen
- Sharma, Blanka

Assistant Professor

- Fan, Xiao
- Ferrall-Fairbanks, Meghan C.
- Gong, Kuang
- Parker, Ivana Kennedy
- Porras, Ana Maria
- Taylor, Brittany Louise

Lecturer

- Furtney, Sarah C.
- Mansy, May M.

Distinguished Professor

- Bolch, Wesley Emmett
- Ding, Mingzhou
- Schmidt, Christine E.

Affiliated Faculty

- Allen, Jessica Lynn
Assistant Professor
- Allen, Josephine
Professor
- Angelini, Thomas Ettor
Professor
- Arreola, Manuel Munoz
Clinical Assistant Professor
- Babajani-Feremi, Abbas
Associate Professor
- Berceli, Scott A.
Professor
- Bova, Frank J.
Distinguished Professor
- Butson, Christopher R.
Professor
- Coombes, Stephen A.
Associate Professor
- Costello, Kerry E.
Assistant Professor

- Dickinson, Richard Bernhart
Professor
- Fan, Zhonghui Hugh
Distinguished Professor
- Huang, Yong
Professor
- Judy, Jack
Professor
- Khalifa, Adam
Assistant Professor
- Lamb, Damon Geoffrey
Assistant Professor
- Leon, Stephanie Marie
Clinical Associate Professor
- Mareci, Thomas H.
Professor
- Mecholsky, John J.
Professor
- Menezes, Amor
Associate Professor
- Mickle, Aaron
Assistant Professor
- O'Dell, Walter G.
Research Associate Professor
- Oweiss, Karim
Professor
- Sarntinoranont, Malisa
Professor
- Shickel, Benjamin P.
Assistant Professor
- Stoppel, Whitney Leigh
Assistant Professor
- Vahdat, Shahabeddin
Assistant Professor
- Vaillancourt, David E.
Professor
- Van Oostrom, Johannes H.
Associate Professor
- Vemuri, Baba C.
Distinguished Professor
- Yan, Guanghua
Clinical Associate Professor
- Zarrinpar, Ali
Professor

Biomedical Engineering

Program Information

The Master's degree (thesis or nonthesis) requires at least 30 semester hours. The Doctoral degree requires at least 90 semester credit hours beyond the bachelor's degree. No more than 30 hours of a master's degree from another institution will be transferred to the Ph.D. degree. If a student holds a master's degree in a discipline different from the doctoral program, the master's work will not be counted toward the doctoral degree unless the BME Department successfully petitions the Dean of

the Graduate School. Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Complete BME program details and courses available are listed in the Biomedical Engineering Graduate Guidelines, on the BME website (<https://www.bme.ufl.edu/>) (which also offers information on available research areas).

Combination program: Biomedical Engineering also offers a combination bachelor's/master's degree program in collaboration with the other departments in the College of Engineering. This program allows qualified students to earn both a bachelor's degree and a master's degree within 5 years for a net savings of 1 year. Contact the BME academic services office for more information or see <https://www.bme.ufl.edu/academics/bme-graduate-program/>

Degrees Offered

Degrees Offered with a Major in Biomedical Engineering

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Biomedical Engineering Departmental Courses

Code	Title	Credits
BME 5401	Biomedical Engineering and Physiology I	3
BME 5500	Biomedical Instrumentation	3
BME 5703	Statistical Methods for Biomedical Engineering	3
BME 5937	Special Topics	1-4
BME 6010	Clinical Immersion	1
BME 6018	Clinical Correlations in BME	3
BME 6164	Magnetic Biomaterials	3
BME 6330	Cell and Tissue Engineering	3
BME 6353	Patient Dosimetry in Medical Imaging and Radiotherapy	3
BME 6360	Neural Engineering	3
BME 6522	Biomedical Multivariate Signal Processing	3
BME 6535	Radiological Physics, Measurements and Dosimetry	3
BME 6705	Mathematical Modeling of Biological and Physiological Systems	3
BME 6905	Individual Work in Biomedical Engineering	1-4
BME 6907	BME Project	1-9
BME 6910	Supervised Research	1-5
BME 6936	Biomedical Engineering Seminar	1
BME 6938	Special Topics in Biomedical Engineering	1-4
BME 6940	Supervised Teaching	1-5
BME 6971	Research for Master's Thesis	1-15
BME 7979	Advanced Research	1-12
BME 7980	Research for Doctoral Dissertation	1-15

EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6913	Engineering Graduate Research	0-3

College of Engineering and College of Medicine Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Biomedical Engineering (PHD)

SLO 1 Knowledge
An ability to develop a broad-based knowledge of Biomedical Engineering problems

SLO 2 Knowledge
An ability to critically read Biomedical Engineering literature

SLO 3 Skills
An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems

SLO 4 Skills
An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data

SLO 5 Professional Behavior
An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions

SLO 6 Professional Behavior

An ability to communicate effectively and work collaboratively

Biomedical Engineering (ME & MS)

SLO 1 Knowledge

An ability to develop a broad-based knowledge of Biomedical Engineering problems

SLO 2 Knowledge

An ability to critically read Biomedical Engineering literature

SLO 3 Skills

An ability to use apply fundamental engineering principles to identify, analyze and solve biomedical engineering problems

SLO 4 Skills

An ability to design and conduct scientific and engineering experiments, and to analyze and interpret the resulting data

SLO 5 Professional Behavior

An understanding of professional and ethical responsibility and the impact of clinically significant engineering solutions

SLO 6 Professional Behavior

An ability to communicate effectively and work collaboratively

Materials Science and Engineering Department

Chair: M. V. Manuel

The Department of Materials Science and Engineering offers the Master of Science, Master of Engineering, and Doctor of Philosophy degrees in Materials Science & Engineering (MSE) and Nuclear Engineering (NE). Requirements for these degrees are described in the General Information section of this catalog.

Degrees in MSE include specific areas of research and study in biomaterials, ceramics, composites, computational materials science, electronic materials, metals, polymers, nanomaterials, and nuclear materials. Degrees in NE include specific areas of research and study in advanced nuclear power concepts and systems, digital control of nuclear reactor power plant technology and operations, reactor dynamics and control, advanced radiation detectors and analysis in support of nuclear forensics and homeland security.

Nontraditional Degree Programs: The Department offers combination bachelor/master's degree programs: MSE BS/MS, NE BS/MS, and students may also combine the MSE BS with the MS awarded through the Dept. of Biomedical Engineering (BME). The combination bachelor/master's program allows qualified students to earn both degrees in materials science and engineering with savings of a tangible number of credit hours. Qualified students are allowed to begin master's course work in their junior years and double count specific graduate courses for both degrees. The master's degree may be completed within 2 to 3 semesters after completing the bachelor's degree. Program admission requirements are:

1. satisfaction of Graduate School admission requirements prior to the beginning of the senior year,
2. an upper division GPA of at least 3.5 in MSE and 3.4 in NE,
3. for MSE, completion of a minimum of 18 credit hours of courses,

4. admission by the Department's Graduate Admission Committee and approval by the College of Engineering and the Graduate School.

For more information, contact the Department.

The J.D./M.S. in MSE (thesis/non-thesis) is a joint degree program culminating in both the Juris Doctor degree, awarded by the College of Law, and the Master of Science (thesis/non-thesis), awarded by the College of Engineering. Under this program, a student can earn both degrees in approximately 1 year less than it would take to attain both degrees if pursued consecutively.

The concurrent M.D./Ph.D. degree in MSE is a joint degree program offered through a collaborative program between the College of Medicine and Materials Science and Engineering. For more information, please contact the Department.

To be eligible for regular admission to the graduate program within the Department, the student must hold a B.S. in an appropriate major. Because of the breadth of MSE graduate programs, students with degrees in materials, ceramics, metallurgy, other engineering, mathematics, or science areas (such as biology, chemistry, or physics) have found ample opportunities to pursue their research and training areas of interest.

Majors

- Materials Science and Engineering (p. 425)
- Nuclear Engineering Sciences (p. 427)

Faculty

Professor

- Allen, Josephine
- Andrew, Jennifer
- Hennig, Richard
- Hite, Jennifer K.
- Mecholsky, John J.
- Nino, Juan C.
- Norton, David P.
- Sigmund, Wolfgang Michael
- Tonks, Michael
- Wall, Nathalie A.
- Xue, Jiangeng

Associate Professor

- Aitkaliyeva, Assel
- Hartig, Kyle Cameron
- McDevitt, Christopher
- Watson, Justin C.

Assistant Professor

- Butala, Megan Marie
- De Hoe, Guilhem X.
- Kim, Honggyu
- Krause, Amanda Rochelle
- Miller, Victoria Mayne

- Need, Ryan F.
- Neitzel, Angelika Elisabeth

Other

- Ruzycki, Nancy Jean

Distinguished Professor

- Jones, Kevin S.
- Myers, Michele V.
- Pearton, Stephen J.
- Phillpot, Simon R.

Research Professor

- Glicksman, Martin E.

Associate Engineer

- Gila, Brent P.
- Rudawski, Nicholas G.

Engineer

- Dempere, Luisa Amelia
- Schubring, DuWayne

Affiliated Faculty

- Angelini, Thomas Ettor
Professor
- Baciak, James Edward
Professor
- Enqvist, Andreas Per Jon
Associate Professor
- Greenslet, Hitomi
Professor
- Huang, Yong
Professor
- Schmidt, Christine E.
Distinguished Professor
- Spearot, Douglas
Professor
- Subhash, Ghatu
Professor
- Vermerris, Willem
Professor
- Yang, Yong
Associate Professor

Materials Science and Engineering

Graduate Coordinator: W. M. Sigmund

The University of Florida's Materials Science and Engineering (MSE) graduate program offers students a world-class education in a world-class research environment, offering two graduate degrees: a Master of Science and a Doctor of Philosophy.

UF's MSE graduate program includes more than 40 graduate faculty members across multiple colleges and departments and numerous research institutes. Faculty routinely conduct multidisciplinary research

with researchers in other departments. This provides graduate students exposure to a broad spectrum of concepts and skills, access to state-of-the-art research instrumentation, and the experience of a vibrant collaborative culture.

MSE graduate students master a set of core concepts and principles critical to a fundamental understanding of materials science and engineering, but also have tremendous flexibility in designing a sequence of coursework and research.

Degrees Offered

Degrees Offered with a Major in Materials Science and Engineering

- Doctor of Philosophy
 - without a concentration
 - concentration in Clinical and Translational Science
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Materials Science and Engineering Program Courses

Code	Title	Credits
EMA 5095	Critical Analysis of Research in Materials Science & Engineering	3
EMA 6001	Properties of Materials - A Survey	3
EMA 6005	Thin and Thick Films	3
EMA 6105	Fundamentals and Applications of Surface Science	3
EMA 6106	Advanced Phase Diagrams	3
EMA 6107	High Temperature Materials	3
EMA 6110	Electron Theory of Solids for Materials Scientists I	3
EMA 6111	Electron Theory of Solids for Materials Scientists II	3
EMA 6114	Properties of Functional Materials	3
EMA 6128	Materials Microstructures	3
EMA 6136	Diffusion, Kinetics, and Transport Phenomena	3
EMA 6165	Polymer Physical Science	3
EMA 6166	Polymer Composites	3
EMA 6227	Advanced Mechanical Metallurgy II	3
EMA 6265	Mechanical Properties of Polymers	3
EMA 6313	Structure and Mechanical Properties of Materials	3
EMA 6316	Materials Thermodynamics	3
EMA 6412	Synthesis and Characterization of Electronic Materials	3
EMA 6416	Organic Electronics	3
EMA 6445	Electroceramics	3
EMA 6446	Solid State Ionics	3
EMA 6448	Ceramic Processing	3
EMA 6461	Polymer Characterization	3
EMA 6507	Scanning Electron Microscopy and Microanalysis	3

EMA 6507L	Scanning Electron Microscopy and Microanalysis Lab	1	EMA 6110	Electron Theory of Solids for Materials Scientists I	3
EMA 6510	Survey of Materials Analysis Techniques	3	EMA 6111	Electron Theory of Solids for Materials Scientists II	3
EMA 6516	X-Ray Methods for Materials Characterization	3	EMA 6114	Properties of Functional Materials	3
EMA 6516L	X-Ray Methods Laboratory for Materials Characterization	1	EMA 6128	Materials Microstructures	3
EMA 6518	Transmission Electron Microscopy	3	EMA 6136	Diffusion, Kinetics, and Transport Phenomena	3
EMA 6518L	Transmission Electron Microscopy Laboratory	1	EMA 6165	Polymer Physical Science	3
EMA 6519L	Specialized Research Techniques in Materials Science	1-2	EMA 6166	Polymer Composites	3
EMA 6540	Fundamentals of Crystallography	3	EMA 6227	Advanced Mechanical Metallurgy II	3
EMA 6541	Applied Crystallography and Powder Diffraction	3	EMA 6265	Mechanical Properties of Polymers	3
EMA 6580	Science of Biomaterials I	3	EMA 6313	Structure and Mechanical Properties of Materials	3
EMA 6581	Polymeric Biomaterials	3	EMA 6316	Materials Thermodynamics	3
EMA 6583	The Science of Cell Material Interactions	3	EMA 6412	Synthesis and Characterization of Electronic Materials	3
EMA 6589	Mechanical Behavior of Biomaterials	3	EMA 6416	Organic Electronics	3
EMA 6590	Advances in Biomaterials and Tissue Engineering for Healthcare	3	EMA 6445	Electroceramics	3
EMA 6616	Advanced Electronic Materials Processing	3	EMA 6446	Solid State Ionics	3
EMA 6625	Advanced Metals Processing	3	EMA 6448	Ceramic Processing	3
EMA 6667	Polymer Processing	2-3	EMA 6461	Polymer Characterization	3
EMA 6715	Fracture of Brittle Materials	3	EMA 6507	Scanning Electron Microscopy and Microanalysis	3
EMA 6803	Classical Methods in Computational Materials Science	3	EMA 6507L	Scanning Electron Microscopy and Microanalysis Lab	1
EMA 6804	Quantum Methods in Computational Materials Science	3	EMA 6510	Survey of Materials Analysis Techniques	3
EMA 6808	Error Analysis and Optimization Methodologies in Materials Research	3	EMA 6516L	X-Ray Methods Laboratory for Materials Characterization	1
EMA 6905	Individual Work in Materials Science and Engineering	1-4	EMA 6516	X-Ray Methods for Materials Characterization	3
EMA 6910	Supervised Research	1-5	EMA 6518L	Transmission Electron Microscopy Laboratory	1
EMA 6920	Professional Development for Materials Science and Engineering	1	EMA 6518	Transmission Electron Microscopy	3
EMA 6936	Seminar in Materials Science and Engineering	1	EMA 6519L	Specialized Research Techniques in Materials Science	1-2
EMA 6938	Special Topics in Materials Science and Engineering	1-4	EMA 6540	Fundamentals of Crystallography	3
EMA 6971	Research for Master's Thesis	1-15	EMA 6541	Applied Crystallography and Powder Diffraction	3
EMA 7979	Advanced Research	1-12	EMA 6580	Science of Biomaterials I	3
EMA 7980	Research for Doctoral Dissertation	1-15	EMA 6581	Polymeric Biomaterials	3
ENU 6805	Introduction to Nuclear Reactor Materials	3	EMA 6583	The Science of Cell Material Interactions	3
			EMA 6589	Mechanical Behavior of Biomaterials	3
			EMA 6590	Advances in Biomaterials and Tissue Engineering for Healthcare	3
			EMA 6616	Advanced Electronic Materials Processing	3
			EMA 6625	Advanced Metals Processing	3
			EMA 6667	Polymer Processing	2-3
			EMA 6715	Fracture of Brittle Materials	3
			EMA 6803	Classical Methods in Computational Materials Science	3
			EMA 6804	Quantum Methods in Computational Materials Science	3
			EMA 6808	Error Analysis and Optimization Methodologies in Materials Research	3
			EMA 6905	Individual Work in Materials Science and Engineering	1-4
			EMA 6910	Supervised Research	1-5
			EMA 6920	Professional Development for Materials Science and Engineering	1
			EMA 6936	Seminar in Materials Science and Engineering	1

Materials Science and Engineering Departmental Courses

Code	Title	Credits	
ECH 6726	Interfacial Phenomena I	3	
ECH 6727	Interfacial Phenomena II	3	
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6	
EGN 6640	Entrepreneurship for Engineers	3	
EGN 6913	Engineering Graduate Research	0-3	
EMA 5095	Critical Analysis of Research in Materials Science & Engineering	3	
EMA 6001	Properties of Materials - A Survey	3	
EMA 6005	Thin and Thick Films	3	
EMA 6105	Fundamentals and Applications of Surface Science	3	
EMA 6106	Advanced Phase Diagrams	3	
EMA 6107	High Temperature Materials	3	

EMA 6938	Special Topics in Materials Science and Engineering	1-4
EMA 6941	Supervised Teaching	1-5
EMA 6971	Research for Master's Thesis	1-15
EMA 7979	Advanced Research	1-12
EMA 7980	Research for Doctoral Dissertation	1-15
ENU 6805	Introduction to Nuclear Reactor Materials	3

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Materials science & Engineering (PHD)

SLO 1 Knowledge

Identify unknown aspects of structure-property-processing relationships for a materials system and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a doctoral research.

SLO 2 Knowledge

Demonstrate proficiency on appropriate experimental or computational techniques used for materials characterization, and uses these techniques to investigate structure-property-relationships in material systems at a level appropriate to doctoral research.

SLO 3 Skills

Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state of the art and areas in which further research is needed.

SLO 4 Skills

Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state of the art, areas in which additional research is needed, research objectives, procedures, results, and conclusions.

SLO 5 Professional Behavior

Write reports and research papers following ethical standards regarding appropriate citation and plagiarism.

SLO 6 Professional Behavior

Work cooperatively with others, interact with supervisors, follow guidelines for appropriate management of data, and follow safety requirements for working in a research laboratory. develop leadership skills

Materials Science & Engineering (ME & MS)

SLO 1 Knowledge

Identify unknown aspects of structure-property-processing relationships for a materials system and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a master student.

SLO 2 Skills

Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state of the art and areas in which further research is needed

SLO 3 Skills

Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state of the art, areas in which additional research is needed, research objectives, procedures, results, and conclusions

SLO 4 Professional Behavior

Write reports and research papers following ethical standards regarding appropriate citation and plagiarism

Nuclear Engineering Sciences

Graduate Coordinator: D. Schubring

Housed within the Herbert Wertheim College of Engineering's Department of Materials Science & Engineering, this program offers students an opportunity to work on research teams related to backscatter radiation, extreme environment testing and nuclear fuel cycles. Students also conduct research alongside academics and in partnership with national labs and government agencies, including Idaho National Laboratory and the U.S. Department of Energy. At UF, we're developing the next generation of nuclear engineering leaders by performing high-impact research and providing exceptional educational programs. Please contact the Department of Materials Science & Engineering for more information about this program.

Degrees Offered**Degrees Offered with a Major in Nuclear Engineering Sciences**

- Doctor of Philosophy
 - without a concentration
 - concentration in Imaging Science and Technology
- Master of Engineering
- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses**Nuclear Engineering Sciences Program Courses**

Code	Title	Credits
ENU 5142	Risk Assessment and Economic Analysis of Nuclear Systems.	3
ENU 5176L	Principles of Nuclear Reactor Operations Laboratory	1
ENU 5186	Nuclear Fuel Cycles	3
ENU 5516L	Nuclear Engineering Laboratory II	2
ENU 5615C	Nuclear Radiation Detection and Instrumentation	4
ENU 6051	Radiation Interaction Basics and Applications I	3
ENU 6106	Nuclear Reactor Analysis I	3
ENU 6126	Fundamentals of Reactor Kinetics	3
ENU 6135	Nuclear Thermal Hydraulics	4
ENU 6136	Advanced Nuclear Thermal Hydraulics	3
ENU 6623	Radiation Dosimetry	3
ENU 6835	Nuclear Fuels	3
ENU 6905	Individual Work	1-6
ENU 6910	Supervised Research	1-5
ENU 6935	Nuclear and Radiological Engineering Seminar	1
ENU 6936	Special Projects in Nuclear and Radiological Engineering Sciences	1-9
ENU 6937	Special Topics in Nuclear and Radiological Engineering Sciences	1-9
ENU 6971	Research for Master's Thesis	1-15
ENU 6972	Research for Engineer's Thesis	1-15
ENU 7979	Advanced Research	1-12
ENU 7980	Research for Doctoral Dissertation	1-15

Nuclear Engineering Sciences Departmental Courses

Code	Title	Credits
EGN 6913	Engineering Graduate Research	0-3
ENU 5005	Introduction to Nuclear Engineering	4
ENU 5142	Risk Assessment and Economic Analysis of Nuclear Systems.	3
ENU 5176L	Principles of Nuclear Reactor Operations Laboratory	1
ENU 5186	Nuclear Fuel Cycles	3
ENU 5516L	Nuclear Engineering Laboratory II	2

ENU 5615C	Nuclear Radiation Detection and Instrumentation	4
ENU 6051	Radiation Interaction Basics and Applications I	3
ENU 6106	Nuclear Reactor Analysis I	3
ENU 6115	Power Plant Simulation	3
ENU 6126	Fundamentals of Reactor Kinetics	3
ENU 6135	Nuclear Thermal Hydraulics	4
ENU 6136	Advanced Nuclear Thermal Hydraulics	3
ENU 6143	Advanced Nuclear Reactor Concepts	3
ENU 6305	Radiochemistry	3
ENU 6375	Nuclear Security Science	3
ENU 6616C	Advanced Radiation Measurement Laboratory	3
ENU 6715	Plasma and Fusion	3
ENU 6835	Nuclear Fuels	3
ENU 6845L	Nuclear Fuels and Materials Laboratory	3
ENU 6905	Individual Work	1-6
ENU 6910	Supervised Research	1-5
ENU 6935	Nuclear and Radiological Engineering Seminar	1
ENU 6936	Special Projects in Nuclear and Radiological Engineering Sciences	1-9
ENU 6937	Special Topics in Nuclear and Radiological Engineering Sciences	1-9
ENU 6940	Supervised Teaching	2
ENU 6941	Professional Development for Nuclear Engineering Sciences	1
ENU 6971	Research for Master's Thesis	1-15
ENU 6972	Research for Engineer's Thesis	1-15
ENU 7979	Advanced Research	1-12
ENU 7980	Research for Doctoral Dissertation	1-15

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3

EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Nuclear engineering sciences (PHD)

SLO 1 Knowledge

Identify unknown aspects of nuclear and/or radiological systems and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a doctoral research.

SLO 2 Knowledge

Demonstrate proficiency on appropriate experimental or computational techniques used for nuclear engineering research, and use these techniques to investigate various relationships (atomic, nuclear, mechanical, materials performance, etc.) in nuclear systems at a level appropriate to doctoral research.

SLO 3 Skills

Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state-of-the-art and areas in which further research is needed.

SLO 4 Skills

Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state-of-the-art, areas in which additional research is needed, research objectives, procedures, results, and conclusions.

SLO 5 Professional Behavior

Follow requirements for writing reports and research papers, and do so based on ethical standards regarding appropriate citation and plagiarism.

SLO 6 Professional Behavior

Work cooperatively with others, interact with supervisors, follow guidelines for appropriate management of data, and follow safety requirements for working in a research laboratory

Nuclear Engineering Sciences (Me & Ms)

SLO 1 Knowledge

Identify unknown aspects of nuclear and/or radiological systems and formulate an approach to elucidating those aspects using engineering and/or scientific principles at a level appropriate to a Master of Science degree in nuclear engineering

SLO 2 Skills

Obtain information from primary literature and technical reports, and integrate that information to reach conclusions regarding the current state of the art and areas in which further research is needed

SLO 3 Skills

Write and/or orally present the results of a research project or literature review in a manner that clearly communicates one or more of the following: current state-of-the-art, areas in which additional research is needed, research objectives, procedures, results, and conclusions

SLO 4 Professional Behavior

Follow requirements for writing reports and research papers, and does so based on ethical standards regarding appropriate citation and plagiarism

Mechanical and Aerospace Engineering Department

Chair: W. Dixon

Graduate Coordinators: H. Greenslet and D. Spearot

The Department of Mechanical and Aerospace Engineering offers the degrees of Master of Science (thesis or non-thesis), Master of Engineering (thesis or non-thesis), and Doctor of Philosophy in Aerospace Engineering and Mechanical Engineering. Minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Prospective students are expected to have strong backgrounds in engineering. For the first year of study, each student is generally required to take a minimum of three regular courses each semester.

The Department offers a combination bachelor's/master's degree program. Contact the undergraduate coordinator for information.

For more information, please see the program pages below and our website: <http://www.mae.ufl.edu/current/graduate> (<http://www.mae.ufl.edu/current/graduate/>).

- Aerospace Engineering (<https://gradcatalog.ufl.edu/graduate/colleges-departments/engineering/mechanical-aerospace/aerospace/>)
- Mechanical Engineering (<https://gradcatalog.ufl.edu/graduate/colleges-departments/engineering/mechanical-aerospace/mechanical/>)

Majors

- Aerospace Engineering (p. 430)
- Mechanical Engineering (p. 433)

Faculty

Professor

- Angelini, Thomas Ettor
- Arakere, Nagaraj Keshavamurthy
- Chen, Youping
- Crane, Carl D.
- Greenslet, Hitomi
- Huang, Yong
- Ifju, Peter G.
- Kim, Nam Ho
- Moghaddam, Saeed
- Mohseni, Kamran
- Rao, Anil
- Roy, Subrata
- Sankar, Bhavani V.
- Sarntinoranont, Malisa
- Schueller, John Kenneth
- Segal, Corin
- Sheplak, Mark
- Sherif, Sherif Ahmed
- Spearot, Douglas

- Subhash, Ghatu
- Ukeiley, Lawrence S.

Associate Professor

- Aifantis, Katerina Elias
- Carroll, Bruce F.
- Conklin, John
- Dunn, Alison Campbell
- Fitz-Coy, Norman G.
- Houim, Ryan W.
- Kamalapurkar, Rushikesh L.
- Lind, Richard C.
- Menezes, Amor
- Scheffe, Jonathan
- Taylor, Curtis

Assistant Professor

- Allen, Jessica Lynn
- Hale, Matthew
- Musgrave, Patrick Francis
- Pan, Jing
- Petersen, Alicia Kathryn
- Petersen, Christopher Daniel
- Shi, Jingjing
- Shin, Jaejeong
- Song, Youngsup
- Tang, Xin
- Wang, Yu

Other

- Stewart, Donald Scott

Eminent Scholar

- Chung, Jacob Nan-Chu

Distinguished Professor

- Balachandar, Sivaramakrishnan
- Dixon, Warren E.
- Fan, Zhonghui Hugh

Research Assistant Scientist

- Guralnik, Dan

Senior Lecturer

- Dickrell, Daniel John
- Griffis, Michael W.
- Niemi, Sean Russell
- Traum, Matthew J.

Research Scientist

- Jackson, Thomas L.
- Wass, Peter James

Master Lecturer

- Kumar, Ashok V.

Affiliated Faculty

- Chu, Henry Chi-Wah
Assistant Professor
- Costello, Kerry E.
Assistant Professor
- Du, Jing
Professor
- Fairbanks, James Paul
Assistant Professor
- Ferris, Daniel Perry
Professor
- Fu, Jie
Assistant Professor
- Harley, Joel
Associate Professor
- Nichols, Jennifer A.
Associate Professor
- Ray, Sandip
Professor
- Tonks, Michael
Professor
- Williams, Lakiesha Nicole
Professor

Aerospace Engineering

Program Information

The Department of Mechanical and Aerospace Engineering offers the degrees of Master of Science (thesis or non-thesis), Master of Engineering (thesis or non thesis), and Doctor of Philosophy in Aerospace Engineering. Official minimum requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Master of Science & Master of Engineering

Any Master's degree candidate will pursue the Master of Science degree (M.S.), however only those holding ABET-accredited baccalaureate degrees in engineering may choose the Master of Engineering degree (M.E.). All other degree requirements remain the same. A Master's degree candidate should establish a Plan of Study by the end of the second term of enrollment. As the candidate progresses toward their degree, any deviations in their program from an approved Plan of Study should be recorded by the submission of a revised Plan of Study. A Master's degree candidate seeking a thesis option must form a supervisory committee by the end of the second term of enrollment and the supervisory committee must approve the Plan of Study. A Master's degree candidate seeking a non-thesis option submits a self-guided Plan of Study.

A total of 30 credit hours is required for the Master's degree. Of this total, at least 18 credits of coursework (excluding S/U courses) must be in the student's major field of study. Technical courses from other fields may be used to satisfy remaining credits, so long as they are graduate level courses (5000 and above, excluding S/U courses).

The Master's degree, with thesis option, includes a minimum of 24 graded credit hours of coursework (excluding S/U courses), up to 6 credit hours

EGM 6812	Fluid Mechanics I	3
EGM 6813	Fluid Mechanics II	3
EGM 6855	Bio-Fluid Mechanics and Bio-Heat Transfer	3
EGM 6905	Individual Study	1-6
EGM 6934	Special Topics in Engineering Mechanics	1-6
EGM 6936	Graduate Seminar	1
EGM 7819	Computational Fluid Dynamics	3
EGM 7845	Turbulent Fluid Flow	3
EGM 7979	Advanced Research	1-12
EGM 7980	Research for Doctoral Dissertation	1-15
EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3
EGN 6913	Engineering Graduate Research	0-3
EGN 6950	Engineering Capstone	3
EML 5045	Computational Methods for Design and Manufacturing	3
EML 5104	Classical and Statistical Thermodynamics	3
EML 5131	Combustion	3
EML 5215	Analytical Dynamics I	3
EML 5223	Structural Dynamics	3
EML 5224	Acoustics	3
EML 5233	Failure of Materials in Mechanical Design	3
EML 5311	Control System Theory	3
EML 5318	Computer Control of Machines and Processes	3
EML 5465	Energy Management for Mechanical Engineers	3
EML 5515	Gas Turbines and Jet Engines	3
EML 5516	Design of Thermal Systems	3
EML 5526	Finite Element Analysis and Application	3
EML 5598	Orthopedic Biomechanics	3
EML 5605	Advanced Refrigeration	3
EML 5714	Introduction to Compressible Flow	3
EML 6048	Machine Learning and System Control	3
EML 6154	Conduction Heat Transfer	3
EML 6155	Convective Heat Transfer I	3
EML 6156	Multiphase Convection Heat Transfer	3
EML 6157	Radiation Heat Transfer	3
EML 6267	Advanced Manufacturing Processes and Analysis	3
EML 6281	Geometry of Mechanisms and Robots I	3
EML 6282	Geometry of Mechanisms and Robots II	3
EML 6323	Nontraditional Manufacturing	3
EML 6324	Fundamentals of Production Engineering	3
EML 6350	Introduction to Nonlinear Control	3
EML 6351	Nonlinear Control II: Adaptive Control	3
EML 6352	Optimal Estimation and Kalman Filtering	3
EML 6364	Optimal Control	3
EML 6386	Computational Nanomechanics and Nanomaterials	3
EML 6417	Solar Energy Utilization	3
EML 6451	Energy Conversion	3
EML 6466	Industrial Energy Management	3
EML 6573	Nonlinear Programming	3
EML 6577	Verification, Validation, and Uncertainty Quantification	3
EML 6606	Advanced Air Conditioning	3
EML 6905	Individual Projects in Mechanical Engineering	1-3
EML 6934	Special Topics in Mechanical Engineering	1-4
EML 6940	Supervised Teaching	1-3
EML 6971	Research for Master's Thesis	1-15

EML 7979	Advanced Research	1-12
EML 7980	Research for Doctoral Dissertation	1-15

College of Engineering Courses

Code	Title	Credits
CAP 5771	Introduction to Data Science	3
EEE 5354L	Semiconductor Device Fabrication Laboratory	3
EEE 5776	Applied Machine Learning	3
EEE 6778	Applied Machine Learning II	3
EGN 5215	Machine Learning Applications in Civil Engineering	3
EGN 5216	Machine Learning for Artificial Intelligence Systems	3
EGN 5442	Programming for Applied Data Science	3
EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3
EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

Aerospace Engineering (PHD)

SLO 1 Knowledge

Ability to identify, formulate, and solve engineering problems. Ability to critically read and integrate engineering research literature.

SLO 2 Skills

Ability to use applied mathematical and/or modern experimental techniques. Ability to use modern engineering tools for practice at an advanced level.

SLO 3 Professional Behavior

Ability to communicate effectively.

Aerospace Engineering (MS)

SLO 1 Knowledge

Ability to identify, formulate, and solve engineering problems.

SLO 2 Skills

Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level.

EAS 6403	Spacecraft Attitude Dynamics	3
EAS 6413C	Spacecraft Attitude Estimation and Control	3
EAS 6415	Guidance and Control of Aerospace Vehicles	3
EAS 6416	Robust and Adaptive Control for Aerospace Systems	3
EAS 6511	Intermediate Astrodynamics	3
EAS 6905	Individual Projects in Aerospace Engineering	1-3
EAS 6910	Supervised Research	1-5
EAS 6939	Special Topics in Aerospace Engineering	1-6
EAS 6940	Supervised Teaching	1-3
EAS 6971	Research for Master's Thesis	1-15
EAS 7979	Advanced Research	1-12
EAS 7980	Research for Doctoral Dissertation	1-15
EGM 5111L	Experimental Stress Analysis	3
EGM 5121C	Data Measurement and Analysis	3
EGM 5423	High Strain Rate Behavior of Materials	3
EGM 5533	Applied Elasticity and Advanced Mechanics of Solids	3
EGM 5584	Biomechanics of Soft Tissue	3
EGM 5586	Modeling and Control of Biomolecular Machines	3
EGM 5816	Intermediate Fluid Dynamics	3
EGM 6321	Principles of Engineering Analysis I	3
EGM 6322	Principles of Engineering Analysis II	3
EGM 6341	Numerical Methods of Engineering Analysis I	3
EGM 6342	Fundamentals of Computational Fluid Dynamics	3
EGM 6352	Advanced Finite Element Methods	3
EGM 6365	Structural Optimization	3
EGM 6570	Principles of Fracture Mechanics	3
EGM 6611	Continuum Mechanics	3
EGM 6671	Inelastic Materials	3
EGM 6812	Fluid Mechanics I	3
EGM 6813	Fluid Mechanics II	3
EGM 6855	Bio-Fluid Mechanics and Bio-Heat Transfer	3
EGM 6905	Individual Study	1-6
EGM 6934	Special Topics in Engineering Mechanics	1-6
EGM 6936	Graduate Seminar	1
EGM 7819	Computational Fluid Dynamics	3
EGM 7845	Turbulent Fluid Flow	3
EGM 7979	Advanced Research	1-12
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EGN 5949	Practicum/Internship/Cooperative Work Experience	1-6
EGN 6640	Entrepreneurship for Engineers	3
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EML 5233	Failure of Materials in Mechanical Design	3
EML 5311	Control System Theory	3
EML 5318	Computer Control of Machines and Processes	3
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EML 5515	Gas Turbines and Jet Engines	3
EML 5516	Design of Thermal Systems	3

EML 5526	Finite Element Analysis and Application	3
EML 5598	Orthopedic Biomechanics	3
EML 5605	Advanced Refrigeration	3
EML 5714	Introduction to Compressible Flow	3
EML 6048	Machine Learning and System Control	3
EML 6154	Conduction Heat Transfer	3
EML 6155	Convective Heat Transfer I	3
EML 6156	Multiphase Convection Heat Transfer	3
EML 6157	Radiation Heat Transfer	3
EML 6267	Advanced Manufacturing Processes and Analysis	3
EML 6281	Geometry of Mechanisms and Robots I	3
EML 6282	Geometry of Mechanisms and Robots II	3
EML 6323	Nontraditional Manufacturing	3
EML 6324	Fundamentals of Production Engineering	3
EML 6350	Introduction to Nonlinear Control	3
EML 6351	Nonlinear Control II: Adaptive Control	3
EML 6352	Optimal Estimation and Kalman Filtering	3
EML 6364	Optimal Control	3
EML 6386	Computational Nanomechanics and Nanomaterials	3
EML 6417	Solar Energy Utilization	3
EML 6451	Energy Conversion	3
EML 6466	Industrial Energy Management	3
EML 6573	Nonlinear Programming	3
EML 6577	Verification, Validation, and Uncertainty Quantification	3
EML 6606	Advanced Air Conditioning	3
EML 6905	Individual Projects in Mechanical Engineering	1-3
EML 6934	Special Topics in Mechanical Engineering	1-4
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EML 6971	Research for Master's Thesis	1-15
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College of Engineering Courses

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EGN 5447	Mathematical Foundations for Data Science for Engineers I	3
EGN 6216	Artificial Intelligence Systems	3
EGN 6217	Applied Deep Learning	3
EGN 6446	Mathematical Foundations for Applied Data Science	3
EGN 6640	Entrepreneurship for Engineers	3
EGN 6642	Engineering Innovation	3
EGN 6937	Engineering Fellowship Preparation	0-1
EGN 6951	Integrated Product and Process Design G1	3
EGS 6039	Engineering Leadership	3
EGS 6101	Divergent Thinking	3
EGS 6216	AI Ethics for Technology Leaders	3
EGS 6512	Managing Engineering with Integrity	3

EGS 6626	Fundamentals of Engineering Project Management	3
EGS 6628	Advanced Practices in Engineering Project Management	3
EGS 6629	Agile Project Management for Engineers and Scientists	3
EGS 6681	Advanced Engineering Leadership	3
ESI 6900	Principles of Engineering Practice	1-4

Student Learning Outcomes

mechanical engineering (Ph.D.)

SLO 1 Knowledge

Ability to identify, formulate, and solve engineering problems. Ability to critically read and integrate engineering research literature

SLO 2 Skills

Ability to use applied mathematical and/or modern experimental techniques. Ability to use modern engineering tools for practice at an advanced level

SLO 3 Professional Behavior

Ability to communicate effectively

Mechanical Engineering (M.e. & M.s.)

SLO 1 Knowledge

Ability to identify, formulate, and solve engineering problems

SLO 2 Skills

Ability to use applied mathematical techniques. Ability to use modern engineering tools for practice at an advanced level

SLO1 Comprehensive Knowledge

Describe knowledge of the normal structure and physiologic function of the human body and how the failure of normal function is associated with disease

Nuclear and Radiological Engineering Department

The graduate degrees offered with a major in Nuclear Engineering Sciences are now administered through the Materials Science and Engineering Department (p. 424).

Faculty

Professor

- Baciak, James Edward

Associate Professor

- Enqvist, Andreas Per Jon
- Yang, Yong

Affiliated Faculty

- Aitkaliyeva, Assel
Associate Professor
- Allen, Josephine
Professor
- Andrew, Jennifer

Professor

- Hartig, Kyle Cameron
Associate Professor
- Hennig, Richard
Professor
- Jones, Kevin S.
Distinguished Professor
- McDevitt, Christopher
Associate Professor
- Mecholsky, John J.
Professor
- Myers, Michele V.
Distinguished Professor
- Nino, Juan C.
Professor
- Pearton, Stephen J.
Distinguished Professor
- Phillpot, Simon R.
Distinguished Professor
- Rudawski, Nicholas G.
Associate Engineer
- Ruzycki, Nancy Jean
Other
- Schubring, DuWayne
Engineer
- Sigmund, Wolfgang Michael
Professor
- Tonks, Michael
Professor
- Wall, Nathalie A.
Professor
- Watson, Justin C.
Associate Professor
- Xue, Jiangeng
Professor

Warrington College of Business

Dean: S. Mitra

The mission of the Warrington College of Business is to build a better society by creating influential research and educating tomorrow's business leaders. The mission emphasizes service to society, a key feature of a Land Grant university. The activities through which the College achieves this global aim are research and teaching. These two activities are highly complementary, indeed intertwined, and both are vital to the continued excellence of the Warrington College. The Hough Graduate School of Business has specialized programs tailored to fit students' strengths and interests.

Graduate degrees offered (<http://warrington.ufl.edu/graduate/academics/>) by the Warrington College of Business are the Doctor of Philosophy with major programs in business administration; the Master of Science with major programs in Business Administration, in Finance, in Management, and in Real Estate; the Master of Business Administration; the Master of Entrepreneurship; the Master of Science in Information Systems and Operations Management; the Master of International Business; and the Master of Accounting. Fields of concentration and minimum requirements for the M.B.A. are given in the Graduate Degrees

(p. 778) section of this catalog, as well as admission and degree requirements for the Ph.D.

For more information, please see the associated department and program pages in this catalog, and our website: <http://warrington.ufl.edu>.

Departments

- College of Business Interdisciplinary Programs in Business Administration (p. 436)
 - Business Administration (M.A.) (p. 436)
 - Business Administration (M.B.A.) (p. 439)
 - Business Administration (M.S.) (p. 444)
 - Business Administration (Ph.D.) (p. 447)
- Finance, Insurance, and Real Estate (p. 451)
 - Business Administration (Finance, Insurance, and Real Estate) (p. 451)
 - Entrepreneurship (p. 455)
 - Finance (p. 456)
 - Finance and Technology (p. 457)
 - Real Estate (p. 458)
- Fisher School of Accounting (p. 460)
 - Accounting (p. 460)
 - Business Administration (Accounting) (p. 461)
- Information Systems and Operations Management (p. 465)
 - Business Administration (Information Systems and Operations Management) (p. 465)
 - Business Analytics (p. 469)
 - Information Systems and Operations Management (p. 470)
- Management (p. 472)
 - Business Administration (Management) (p. 473)
 - International Business (p. 476)
 - Management (p. 480)
- Marketing (p. 483)
 - Business Administration (Marketing - Master's) (p. 484)
 - Business Administration (Marketing - Ph.D.) (p. 485)

Faculty

Faculty Appointed to the Warrington College of Business
Clinical Assistant Professor

- Carrillo, Michael A.

Clinical Professor

- Gendreau, Brian
- Hoover, James H.

See individual department pages for the lists of affiliate faculty appointed to each of the individual divisions.

Interdisciplinary Departments

Majors

- Business Administration (M.A.) (p. 436)
- Business Administration (M.B.A.) (p. 439)

- Business Administration (M.S.) (p. 444)
- Business Administration (Ph.D.) (p. 447)

Faculty

Clinical Assistant Professor

- Carrillo, Michael A.

Clinical Professor

- Gendreau, Brian
- Hoover, James H.

Business Administration (M.A.)

Degrees Offered

Degrees Offered through the College with a Major in Business Administration

- Master of Arts

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2

TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1

FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2

ISM 6486	eCommerce Technologies	2	BUL 6441	Business Ethics and Corporate Social Responsibility	2
ISM 6487	Risks and Controls in eCommerce	2	BUL 6516	Law of Real Estate Transactions	2
ISM 6562	Business Data Presentation and Visualization	2	BUL 6841	Employment Law	2
ISM 6942	Electronic Commerce Practicum	2	BUL 6852	International Business Law	2
MAN 5501	Management	3	BUL 6905	Individual Work	1-5
MAN 5502	Production and Operations Management	2	BUL 6930	Special Topics	1-3
MAN 6508	Management of Service Operations	2	ENT 6006	Entrepreneurship	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2	ENT 6008	Entrepreneurial Opportunity	2
MAN 6528	Principles of Logistics/Transportation Systems	2	ENT 6116	Business Plan Formation	2
MAN 6573	Purchasing and Materials Management	2	ENT 6416	Venture Finance	2
MAN 6575	Purchasing and Supplier Relationship Management	3	ENT 6506	Social Entrepreneurship	2
MAN 6581	Project Management	2	ENT 6616	Creativity in Entrepreneurship	2
MAN 6598	Logistics and Distribution Management	3	ENT 6621	Strategy and Disruption in Technology Industries	2
MAN 6617	International Operations/Logistics	2	ENT 6905	Individual Work in Entrepreneurship	1-4
MAN 6619	International Logistics	3	ENT 6930	Special Topics	1-4
QMB 5303	Managerial Statistics	3	ENT 6933	Entrepreneurship Lecture Series	1-4
QMB 5304	Introduction to Managerial Statistics	2	ENT 6946	Entrepreneurial Consulting Project	2
QMB 5305	Advanced Managerial Statistics	2	ENT 6950	Integrated Technology Ventures	1-4
QMB 6317	Artificial Intelligence Methods in Business	2	ENT 7932	Entrepreneurship	3
QMB 6358	Statistical Analysis for Managerial Decisions I	2	GEB 5114	Entrepreneurship and Venture Finance	3
QMB 6359	Statistical Analysis for Managerial Decisions II	2	GEB 6366	Fundamentals of International Business	2
QMB 6616	Business Process Analysis	3	MAN 5245	Organizational Behavior	3
QMB 6693	Quality Management and Control Systems	2	MAN 5246	Organizational Behavior	2
QMB 6755	Managerial Quantitative Analysis I	2	MAN 6149	Developing Leadership Skills	2
QMB 6756	Managerial Quantitative Analysis II	2	MAN 6266	Managing Groups and Teams in Organizations	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2	MAN 6331	Compensation in Organizations	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5	MAN 6365	Organizational Staffing	3
QMB 6910	Supervised Research	1-5	MAN 6366	Organizational Staffing	2
QMB 6930	Special Topics in Information Systems and Operations Management	1-4	MAN 6375	Human Capital Analytics	2
QMB 6938	Analytics Processes for Business – Bootcamp	1	MAN 6446	Negotiations	3
QMB 6940	Supervised Teaching	1-5	MAN 6447	Art and Science of Negotiation	2
QMB 6941	Internship	1-4	MAN 6635	International Aspects of Human Resource Management	2
QMB 6942	Analytics Projects Practicum 1	1	MAN 6636	Global Strategic Management	2
QMB 6943	Analytics Practicum 2	1	MAN 6637	Global Strategic Management	3
QMB 6944	Analytics Practicum 3	1	MAN 6721	Business Policy	3
QMB 6945	ISOM Department Business Practicum	2	MAN 6724	Strategic Management	2
QMB 6957	International Studies in Quantitative Methods	1-4	MAN 6900	Capstone Project	2
QMB 6971	Research for Master's Thesis	1-15	MAN 6905	Individual Work in Management	1-5
QMB 7565	Stat Research Methods	3	MAN 6910	Supervised Research	1-5
QMB 7931	Special Topics in Information Systems and Operations Management	1-4	MAN 6930	Special Topics	1-3
QMB 7933	Seminar in Information Systems and Operations Management	1-4	MAN 6940	Supervised Teaching	1-5
QMB 7979	Advanced Research	1-12	MAN 6973	Project in Lieu of Thesis	1-4
QMB 7980	Research for Doctoral Dissertation	1-15	MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
Management Departmental Courses			MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
			MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
			MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
			MAN 7249	Org Behavior	3
			MAN 7267	Seminar on Groups and Teams Research	1-2
			MAN 7328	Seminar on Staffing and Selection	1-3
			MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
			MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
			MAN 7934	Org Res Methods Sem	4
Code	Title	Credits			
BUL 5810	Legal Environment of Business	3			
BUL 5811	Law, Ethics, and Organizations	2			
BUL 5832	Commercial Law for Accountants	2			

MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Business Administration (M.B.A.)

Program Information

The Master of Business Administration (M.B.A.) degree gives students

1. conceptual knowledge for understanding the functions and behaviors common to business organizations and
2. analytical, problem-solving, and decision-making skills essential for effective management.

Emphasis is on developing the student's capacities and skills for business decision making.

The traditional MBA curriculum is structured so that students may extend their knowledge in a specialized field. The program offers concentrations in business analytics, competitive strategy, finance, human capital, marketing, real estate and supply chain management.

Admission: All program options require at least two years of full-time professional work experience, along with two professional recommendation letters, a resume, written essays, and official transcripts for all previous academic work. Applicants for admission into a Full-Time MBA program must submit official scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) and are required to interview as part of the admissions process. If English is not your native language and you do not have a bachelor's degree or higher from a country where English is the official language, a TOEFL, IELTS, or MELAB score must be submitted.

A diverse student body is seen as an important asset of the program. Accordingly, the backgrounds of students include a wide range of disciplines and cultures. With the exception our 32 credit programs, the curriculum requires no prerequisites in business coursework.

For more specific information on other aspects of the program, contact the UF MBA Program:

310 Hough Hall, P.O. Box 117152
Gainesville FL 32611-7152

or visit the website, <http://www.floridamba.ufl.edu> (<http://www.floridamba.ufl.edu/>)

Course work: A minimum of 48 qualified credits of course work are required for the two-year option, and one-year All Major. The one-year Business Majors program requires a minimum of 32 credits. Credits cannot be transferred from another institution or program..

Options

Traditional MBA Two-Year Option: This 48 credit program requires 4 terms of full-time study over two academic years. Students are admitted for the fall term only; many students spend the summer between academic years working at internships. This option requires at least two years of full-time, post-undergraduate work experience as well as a bachelor's degree from an accredited four year institution.

Traditional One-Year, All Majors: This 48 credit program starts in late spring/ early summer and students are expected to complete all coursework within 12 months. Successful candidates are expected to have a bachelor's degree from an accredited four year institution and two years of post-undergraduate work experience.

Traditional One-Year, Business Majors: This 32 credit program starts in mid-summer and students expected to complete all course work within 10 months. Applicants to this program are required to have a bachelor's degree in business from a four-year accredited institution (conferred within the last seven years) and at least two years of post-undergraduate work experience. Students take primarily graduate business electives during summer B, fall, and spring terms and graduate in May.

Executive MBA Program: A 20-month program for working professionals, students attend classes four weekends per term (Saturday-Sunday). The program is divided into seven terms. The program starts in August, and includes a one-week two credit international experience. The international study tour is a program requirement; students travel abroad in May for a week of experiential learning through lectures or discussions with local business and government leaders. The tour will include a combination of lectures, group projects and/or site visits. This option requires eight years of post-undergraduate work experience, and students are expected to have people or project management responsibilities in their current positions.

Professional Two-Year MBA: This 24-month program starts in August and January and is designed for professionals who work full time while pursuing their degrees part time. Students attend classes one weekend per month (Saturday-Sunday) and must complete an immersive experiential learning course for one week during their enrollment. This option requires two years of post-undergraduate work experience.

Professional One-Year MBA: For students with acceptable undergraduate degrees in business (completed within seven years before starting the program), this 16-month option starts in January. Students attend classes one weekend per month (Saturday-Sunday) and must complete an immersive experiential learning course for one week during their enrollment. In order to begin the One Year MBA program, students must complete and pass a Foundations Review course. This option requires two years of post-undergraduate work experience.

Online Two-Year MBA: This 24-month program starts in August and January and allows students to earn their MBA primarily through asynchronous class lectures. Students interact with faculty and classmates via email, synchronous group discussion software, asynchronous class presentation software, and multimedia courseware. This option requires two years of post-undergraduate work experience.

Online One-Year MBA: For students with acceptable undergraduate degrees in business (completed within seven years before starting this program), this 16-month option starts in August and January and gives students and faculty the same interactive technology as the Online One-Year MBA. In order to begin the One Year MBA program, students must

complete and pass a Foundations Review course. This option requires two years of post-undergraduate work experience.

Professional MBA in South Florida: This 24 month program starts during the late summer, and is designed for professionals who wish to continue working full time while pursuing their degrees part time. This program includes a one-week two credit international experience. The international study tour is a program requirement; students travel abroad in June for a week of experiential learning through lectures or discussions with local business and government leaders. The tour will include a combination of lectures, group projects, and/or site visits. Students attend classes once every three weeks (Saturday-Sunday) at the UF MBA Center in Miramar, Florida. This option requires two years of post-undergraduate work experience.

M.B.A./Ph.D. in medical sciences program: Concurrent studies leading to the Master of Business Administration and Doctor of Philosophy degrees are offered in cooperation with the College of Medicine. This 120-credit program trains research scientists to assume responsibilities as managers of biotechnical industries. Estimated time to complete both degrees is 5 to 7 years. Students must meet the admission and curriculum requirements of both programs. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the MBA program.

MBA./J.D. program: A program of joint studies leading to the Master of Business Administration and Juris Doctor degrees is offered under the joint auspices of the Warrington College of Business Administration and the Levin College of Law. Current M.B.A. or J.D. students must declare their intent to apply for the second degree during their first year. Applications are then due according to admission schedules for that year. Both degrees are awarded after a 4-year course of study. Students must take both the LSAT and the GMAT/GRE before admission and meet the admission and curriculum requirements of both degrees. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the MBA program.

M.B.A./Pharm.D. program in management and pharmacy administration: A program of concurrent studies culminating in both the Master of Business Administration and Doctor of Pharmacy degrees allows students interested in both management and pharmacy administration to obtain the appropriate education in both areas. Candidates must meet the entrance requirements and follow the entrance procedures of both the Warrington College of Business Administration and the College of Pharmacy. The degrees may be granted after 5 years of study. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the MBA program.

Exchange programs: The Warrington College of Business has many partner institutions from which full-time MBA students may choose to study. Programs vary in length from one semester to a modular format similar to ours. Students who study abroad are able to select a variety of business courses and options depending on location. Students work closely with their academic advisors to develop a customized plan since careful consideration of the UF MBA curriculum and career planning is necessary to make a study abroad experience successful. For a complete list of exchange partners, see <https://warrington.ufl.edu/academics/go-global/>

Degrees Offered

Degrees Offered with a Major in Business Administration

- Master of Business Administration
 - without a concentration
 - concentration in Business Analytics
 - concentration in Competitive Strategy
 - concentration in Finance
 - concentration in Human Capital
 - concentration in Marketing
 - concentration in Real Estate
 - concentration in Supply Chain Management

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax I	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2

TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4

FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3

MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5

BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3

GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Business administration (MBA)

SLO 1 Knowledge

Interpret the essential elements of core business principles to examine and evaluate problems and to construct and implement solutions in the business environment.

SLO 2 Skills

Identify core leadership skills to examine and evaluate problems, choose from and generate alternative solutions, for the purpose of affecting organizational change or influencing others.

SLO 3 Skills

Interpret the appropriate analytical models and examine critical reasoning processes to evaluate evidence, select among alternatives, and generate creative options in furtherance of effective decision making.

SLO 4 Professional Behavior

Write business documents clearly, concisely, and analytically.

SLO 5 Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids..

Business Administration (M.S.)

Program Information

Specialized Masters of Sciences degrees offered are:

- Master of Science in Information Systems and Operations Management (p. 470)
- Master of Science in Entrepreneurship (p. 455)
- Master of Science in Finance (p. 456)
- Master of Science in Management (p. 480)
- Master of Science in Real Estate (p. 458)

For more information, please see the program pages above or our website: <http://warrington.ufl.edu/graduate/academics> (<http://warrington.ufl.edu/graduate/academics/>).

Degrees Offered

Degrees Offered with a Major in Business Administration

- Master of Science
 - without a concentration
 - concentration in Retailing

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2

FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2

REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2

QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2

MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2

MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

- Quantitative Finance (p. 451)
- Marketing (p. 485)
- Real Estate and Urban Analysis (p. 451)

Minimum requirements for the various departments and specialties are given in the Graduate Degrees (p. 778) section in this catalog.

All candidates for the Ph.D. in business administration must satisfy the following general requirements:

Breadth requirement: All applicants for Ph.D. in the business administration program are expected to have completed prior business-related course work at either the advanced undergraduate or graduate level. Students entering without prior work are required to take a minimum of three graduate courses in at least two fields other than their chosen area of concentration. Most often, the appropriate courses will be found in the M.B.A. first-year core; the particular courses to be taken by a student will be decided in consultation with the student's academic adviser. After a student enters the Ph.D. program, the courses taken to satisfy the breadth requirement must be taken in the College of Business Administration.

Research foundations requirement: All students must complete a six-course research skills sequence that prepares them for scholarly research in their chosen area of concentration. Research foundations are defined as essential methodological tools (e.g., statistics, quantitative analysis) and/or substantive content domains (e.g., psychology, economics) outside the student's major field that are considered essential to conducting high quality research in the chosen field. The specific research skills required by each area of concentration can be found in the field descriptions in this Catalog.

Other requirements include satisfactory completion of graduate course work in the major field of concentration, as well as one or two minor fields designed to add depth to the student's research training. Minors are selected by the student in consultation with their advisory committee, and may be within or outside the College of Business Administration.

For more information, please see the links above and our website: <http://warrington.ufl.edu/graduate/academics> (<http://warrington.ufl.edu/graduate/academics/>).

Degrees Offered

Degrees Offered with a Major in Business Administration

- Doctor of Philosophy

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Business Administration (Ph.D.) Program Information

For the Ph.D. in Business Administration, students must have a concentration in one of the following:

- Accounting (p. 461)
- Finance (p. 451)
- Information Systems and Operation Management (p. 465)
- Insurance (p. 451)
- Management (p. 473)

ACG 5647	Auditing II	2	FIN 6547	Interest Rate Risk Management	2
ACG 5815	Accounting Regulation	2	FIN 6549	Special Topics in Fixed Income Securities	2
ACG 6107	Accounting for Income Taxes	2	FIN 6575	Emerging Markets Finance I	2
ACG 6136	Accounting Theory	2	FIN 6576	Emerging Markets Finance II	2
ACG 6175	Financial Reporting and Analysis	2	FIN 6585	Securities Trading	2
ACG 6207	Accounting for Risk	2	FIN 6586	Behavioral Finance	2
ACG 6635	Issues in Audit Practice	2	FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
ACG 6685	Forensic Accounting	2	FIN 6597	Financial Modeling for Investments	2
ACG 6691	International Auditing	2	FIN 6608	Financial Management of the Multinational Corporation	2
ACG 6697	Information Systems Assurance	2	FIN 6626	International Finance	3
ACG 6841	Data Analytics for Accounting	2	FIN 6636	Open Economy Macrofinance	2
ACG 6905	Individual Work in Accounting	1-4	FIN 6638	International Finance	2
ACG 6935	Special Topics in Accounting	1-4	FIN 6728	Capitalism and Regulation	2
ACG 6940	Supervised Teaching	1-5	FIN 6729	Economics Organizations and Markets	3
ACG 7399	Accounting Research and Analysis	3	FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
ACG 7848	Data Analysis Skills	2	FIN 6785	Investment Banking and Corporate Financial Modeling I	2
ACG 7849	Web Crawling and Textual Analysis	2	FIN 6786	Investment Banking and Corporate Financial Modeling II	2
ACG 7850	Advanced Data and Regression Techniques	3	FIN 6905	Individual Work in Finance	1-4
ACG 7885	Overview of Accounting Research	4	FIN 6930	Special Topics in Finance	1-4
ACG 7886	Accounting Research II	4	FIN 6935	Finance Professional Speaker Series	1
ACG 7887	Research Analysis in Accounting	3	FIN 6936	Special Topics In Investment Finance	2
ACG 7939	Theoretical Constructs in Accounting	3	FIN 6957	International Studies in Finance	1-4
ACG 7979	Advanced Research	1-12	FIN 6958	International Finance Study Tour	2
ACG 7980	Research for Doctoral Dissertation	1-15	FIN 7446	Financial Theory I	4
TAX 5025	Federal Income Tax 1	2	FIN 7447	Financial Theory II	4
TAX 5027	Federal Income Tax 2	2	FIN 7808	Corporate Finance	4
TAX 5065	Tax Professional Research	2	FIN 7809	Investments	4
TAX 6105	Corporate Taxation	2	FIN 7938	Finance Research Workshop	1-4
TAX 6115	Advanced Corporate Taxation	2	FIN 7979	Advanced Research	1-12
TAX 6205	Partnership Taxation	2	FIN 7980	Research for Doctoral Dissertation	1-15
TAX 6526	International Taxation	2	FIT 6335	Blockchain and Cryptocurrencies	2
TAX 6877	State and Local Taxation	2	FIT 6356	Decentralized Finance Project	2
			FIT 6710	Natural Language Processing & Generative AI for Finance	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits			
FIN 5405	Business Financial Management	3	REE 6007	Fundamentals of Real Estate Development	2
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2	REE 6045	Introduction to Real Estate	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2	REE 6058	Real Estate Research and Technology	1
FIN 6108	Personal Financial Management	1	REE 6105	Real Estate Appraisal	2
FIN 6246	Money and Capital Markets	3	REE 6206	Primary Mortgage Markets and Institutions	2
FIN 6296	Capitalism	2	REE 6208	Secondary Mortgage Markets and Securitization	2
FIN 6306	Investment Banking	2	REE 6315	Real Estate Market and Transaction Analysis	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2	REE 6395	Real Estate Private Equity	2
FIN 6425	Corporation Finance	3	REE 6397	Real Estate Securities and Portfolios	2
FIN 6427	Measuring and Managing Value	2	REE 6455	Law of Real Estate Transactions	2
FIN 6429	Financial Decision Making	2	REE 6705	Geographic Information Systems and Location Analysis	2
FIN 6432	Asset Valuation and Corporate Finance	2	REE 6737	Real Estate Development	2
FIN 6438	Study in Valuation	2	REE 6905	Individual Work in Real Estate	1-6
FIN 6465	Financial Statement Analysis	2	REE 6930	Special Topics in Real Estate	1-4
FIN 6477	Entrepreneurial Finance	2	REE 6935	Real Estate Case Studies	1-2
FIN 6489	Financial Risk Management	2	REE 6948	Capstone Seminar and Applied Project	2
FIN 6496	Mergers & Acquisitions	2			
FIN 6518	Investment Concepts	2			
FIN 6525	Asset Management Project	1			
FIN 6526	Portfolio Theory	2			
FIN 6528	Asset Allocation and Investment Strategy	2			
FIN 6537	Derivative Securities	2			
FIN 6545	Fixed Income Security Valuation	2			

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2

QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3

MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3

MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Business Administration

2017-18 PhD SLO 1 Knowledge
Manage the technical tools (theory, methodology, statistical analyses, and reporting norms) essential to the departmental area of study.

2017-18 PhD SLO 2 Skills
Interpret with technical tools to create new knowledge through original research.

2017-18 PhD SLO 3 Professional Behavior
Communicate specialized information from a field of expertise verbally and in writing.

2017-18 PhD SLO 4 Professional Behavior
Communicate specialized information from a field of expertise verbally at an educated layman or university undergraduate student level.

Finance, Insurance, and Real Estate Department

Chair: A. Naranjo

Graduate Coordinator: M. Nimalendran

The Department of Finance, Insurance, and Real Estate offers graduate work leading to the Master of Science degree with major programs in finance and real estate; the Master of Science in Entrepreneurship (M.S.E.); and the Doctor of Philosophy degree in business administration with a concentration in finance, insurance, quantitative analysis, or real estate. Complete descriptions of the minimum requirements for the M.S., M.S.E., and Ph.D. degrees are provided in the Graduate Degrees (p. 778) section of this catalog.

Finance, Real Estate, and Entrepreneurship are also available as concentrations within the M.B.A. program. For information about the M.B.A. program, please consult that listing in the Graduate Degrees (p. 778) section.

For more information see the program pages below, and visit our website: <http://warrington.ufl.edu/departments/fire> (<http://warrington.ufl.edu/departments/fire/>).

Majors

- Business Administration (Finance, Insurance, and Real Estate) (p. 451)
- Entrepreneurship (p. 455)
- Finance (p. 456)
- Finance and Technology (p. 457)
- Real Estate (p. 458)

Faculty

Professor

- Houston, Joel F.
- Kraft, John
- Ling, David Curtis
- Livingston, Miles B.
- Naranjo, Andy
- Nimalendran, Mahendrarajah
- Ryngaert, Michael David

Associate Professor

- Brown, David T.
- Li, Tao
- Saleh, Fahad
- Song, Changcheng
- Tang, Yuehua
- Wang, Baolian

Assistant Professor

- Da Silva Cortes Goncalves, Gustavo
- Jiang, Bo
- Kim, Sehoon
- Kumar, Nitish

- Lopez Lira Y Ramirez, Jose Alejandro
- Wu, Yanbin
- Xu, Xun

Eminent Scholar

- James, Christopher

Clinical Assistant Professor

- Martin, Stephen Glenn

Clinical Associate Professor

- Aitsahlia, Farid

Business Administration (Finance, Insurance, and Real Estate)

Program Information

The Ph.D. in Business Administration - Finance and Real Estate program prepares students to engage in productive scholarly research and teaching in the broad area of financial and real estate economics. Graduates of this program typically are placed with major universities in the United States, although some students choose to work in research positions at non-academic institutions.

The Ph.D. program has a strong emphasis on scholarly research training. Admissions are based on several criteria including academic performance in the undergraduate and graduate programs, standardized test scores, proficiency in English, and potential for research and teaching. For more specific admission information on our Ph.D. program, please visit our website at <http://warrington.ufl.edu/graduate/academics/phd-fre/>. Generally, admitted students will also be considered for financial aid.

Finance

The student pursuing a concentration in finance typically specializes in corporate finance, financial markets and institutions, or investments. The Ph.D. curriculum consists of course work of four types: research foundations, the major field, a minor or supporting field, and a breadth requirement.

The research foundation requirements are comprised of courses in microeconomic theory, macroeconomic theory, mathematical methods and applications to economics, mathematical statistics, and econometrics. The actual courses will depend on the student's background and proposed thesis research.

The major field in finance consists of at least 16 credit hours in graduate course work in finance including financial theory, corporate finance, and seminars in empirical methods, market micro structure, and special topics. Students may elect to have one "strong" minor (16 credit hours), two "weak" minors (8 credit hours each), or a supporting field which is not declared as a minor. If a supporting field is chosen, at least 16 hours of course work acceptable to the student's supervisory committee must be taken. The supporting field option is selected when a student wishes to take courses across a number of departments. The department offers a combination B.S./M.S. program. Contact the graduate coordinator for information.

The breadth requirement applies only to students with no prior course work in business and consists of financial and managerial accounting or their equivalents, plus two courses out of the following areas: managerial economics, production operations management, or problems and methods in marketing management.

Real Estate

The research foundations are identical to those listed above for finance. The major field, minor, and supporting field requirements have the same credit stipulation as those outlined above for finance, except that the major work is in real estate.

The breadth requirement, as in all concentrations for the business administration program, applies only to students entering without prior course work in business. It consists of at least three courses from the following list (two or more fields must be represented): managers and legal environment of business, finance, money and capital markets, problems and methods of marketing management, consumer behavior, and financial and managerial accounting.

Other degree requirements are listed in the Graduate Degrees (p. 778) section of this catalog.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/phd-fre> (<http://warrington.ufl.edu/graduate/academics/phd-fre/>).

Degrees Offered

Degrees Offered with a Major in Business Administration

- Doctor of Philosophy
 - concentration in Finance
 - concentration in Insurance
 - concentration in Quantitative Finance
 - concentration in Real Estate and Urban Analysis

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2

FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2

REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2

ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2

QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4

MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15

MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Entrepreneurship

Program Information

The Masters of Science in Entrepreneurship (M.S.E.) program is a one-year, 36-credit, campus-based program designed for young and aspiring entrepreneurs and change-makers. Offered to both business and non-business majors alike, the program is a combination of classroom delivery and experiential learning activities with a focus on opportunity assessment, feasibility analysis, lean entrepreneurial concept testing, business plan development, entrepreneurial leadership, and the sourcing of capital. Students are exposed to cutting edge entrepreneurial theory, which they apply immediately by consulting for small business, commercializing UF technology, and creating their own businesses.

Combination Degree: The Master of Science in Entrepreneurship offers a combination bachelor's/master's degree option for students pursuing a bachelor's degree in any discipline.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/mse> (<http://warrington.ufl.edu/graduate/academics/mse/>).

Degrees Offered

Degrees Offered with a Major in Entrepreneurship

- Master of Science in Entrepreneurship

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4

FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Entrepreneurship (MS)

SLO 1 Knowledge

Assess and evaluate potential new value-driven creative venture opportunities in ways that convey a vision

SLO 2 Professional Behavior

Apply professional entrepreneurial skills to leverage resources, manage risk, plan when nothing exists, develop an action orientation and be tenacious in the face of setbacks.

SLO 3 Skills

Utilize professional experience effectively to adapt and build action-oriented networks in the pursuit of entrepreneurial opportunities

Finance

Program Information

The student pursuing a major in finance typically specializes in corporate finance, financial markets and institutions, or investments.

Master of Science degree in Finance, non-thesis option: This M.S. program option consists of at least 32 credits in letter-graded courses. It is designed to ensure that each student acquires a basic knowledge of the major financial economics subject areas: corporate finance, derivatives, fixed income securities, investments, international finance, and real estate. The program is designed to prepare students for positions in commercial banking, asset management, investment banking, securities markets and more. See the program's website or contact the Associate Director for further information and criteria. This program is predominantly a **combination bachelor's/master's program**, with applications due early in the sophomore year at UF.

Master of Science degree in Finance/Juris Doctorate joint degree program: This joint degree program culminates in the M.S. and J.D. degrees. Applicants must meet the entrance requirements for both the Warrington College of Business Administration and the Levin College of Law. Admission to the second degree program is required no later than the end of the second consecutive semester after beginning one degree in the joint program.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/msf> (<http://warrington.ufl.edu/graduate/academics/msf/>).

Degrees Offered

Degrees Offered with a Major in Finance

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Finance Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2

FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4

REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Finance (MS)

SLO 1 Knowledge

Produce a valuation of financial claims.

SLO 2 Skills

Synthesize financial and economic data, apply the appropriate framework, and recommend a financial strategy.

SLO 3 Skills

Independently assess financial strategies.

SLO 4 Professional Behavior

Write business documents and make clear, concise presentations that are supported by convincing analysis.

Finance and Technology

Overview

Program Information

Master of Science degree with a major in Finance and Technology, non-thesis option:

The M.S. with a major in Finance and Technology consists of a minimum of 30 credit hours. It is designed to ensure that students have exposure related to investments, derivatives, valuation, and current trends in financial intermediation and financial services, while also giving students an extensive grounding in the technologies being employed in finance today related to AI and blockchain. The program will primarily be a combination bachelor's/master's program beginning when students enter their senior year, with the possibility of entering the program on a stand-alone basis with the same set of master's level requirements.

Degrees Offered

Degrees Offered with a Major in Finance and Technology

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Finance Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4

FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Additional Finance and Technology Courses

FIT 6335 Blockchain and Cryptocurrencies
 FIN 6314 Financial Intermediation, Financial Services and Technology-
 FIT 6356 Decentralized Finance Project-
 FIT 6710 Natural Language Processing and Generative AI for Finance
 FIN 6597 Financial Modeling for Investments
 FIN 6586 Behavioral Finance

Student Learning Outcomes

Finance and Technology (MS)

SLO 1 Knowledge

Produce a valuation of a financial claim and understanding of blockchain technologies and machine learning in finance.

SLO 2: Skills

Synthesize financial and economic data, apply the appropriate framework, and recommend a financial strategy.

SLO 3: Skills

Ability to process financial and economic data for finance applications using machine learning and generative AI.

SLO4: Skills

Ability to strategize and analyze “fintech” products using blockchain technology.

Real Estate

Program Information

The ten-month, full-time in residence, Nathan S. Collier Master of Science in Real Estate (MSRE) Program, housed in the Warrington College of Business Administration (WCBA), thrives on innovation, a dynamic student body, significant interaction with high-level working

professionals, and nationally recognized professors. The program is a unique combination of theory and practice that will both enhance your real estate education and develop your professional skills.

Master of Science degree in real estate, non-thesis option: This M.S. option consists of at least 34 credits of letter-graded courses. It is designed to ensure that each student acquires a basic knowledge of the various functional areas in real estate, real estate finance and investment, real estate development, real estate law and institutions, real estate asset management, international real estate, and advanced training in specialized areas. The capstone course (REE 6948 Capstone Seminar and Applied Project (2 cr.)) involves actual projects in which students work in teams to undertake a real estate problem for real clients. This two-tiered program of study provides both a firm theoretical foundation for later professional effectiveness and an applied bridge to professional practice.

Master of Science degree in real estate/juris doctorate joint program:

This joint degree program culminates in the M.S. and J.D. degrees. Applicants must meet the entrance requirements for both the Warrington College of Business Administration and the Levin College of Law. Admission to the second degree program is required no later than the end of the second consecutive semester after beginning one degree of the joint program.

The Department also offers a combination bachelor's / master's program for all undergraduate disciplines.

For more information, please contact the admissions director and see our website: <http://warrington.ufl.edu/graduate/academics/msre> (<http://warrington.ufl.edu/graduate/academics/msre/>).

Degrees Offered

Degrees Offered with a Major in Real Estate

- Master of Science

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2

FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6

REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Code	Title	Credits
BCN 5905	Special Studies in Construction	1-5
BUL 6516	Law of Real Estate Transactions	2
QMB 5304	Introduction to Managerial Statistics	2

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Real estate (MS)

SLO 1 Knowledge

Identify elements in construction methods and materials, market analysis, real estate finance and investment, real estate law, real estate appraisal, business statistics, and ethical and social responsibility.

SLO 2 Skills

Specify and implement a framework for identifying a real estate problem/decision, apply appropriate decision making tools, techniques, and evaluation criteria to the problem/decision, and develop alternative solutions.

SLO 3 Skills

Predict the outcomes of a decision or course of action and make appropriate adjustments to changing conditions and information.

SLO 4 Skills

Critically assess the impact of various courses of action on multiple stakeholders, including investors, lenders, and the local community.

SLO 5 Professional Behavior

Write business documents clearly, concisely, and analytically.

SLO 6 Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids.

Fisher School of Accounting

Director: Gary A. McGill

Graduate Coordinators: J. Laibson and J. Tucker

As a professional school in a major public research university, the Fisher School of Accounting (FSOA) is committed to scholarly research, teaching, and service to advance knowledge and prepare future leaders for business, professional, and academic careers.

The Fisher School of Accounting offers graduate work leading to the Master of Accounting (M.Acc.) degree with a major in accounting and optional concentrations in auditing and taxation, and the Ph.D. degree with a major in business administration and an accounting concentration. Requirements for these degrees are available in the Graduate Degrees (p. 778) section of this catalog.

For more information, please see the program pages below, or visit our website: <http://warrington.ufl.edu/about/fisher> (<http://warrington.ufl.edu/about/fisher/>).

Majors

- Accounting (p. 460)
- Business Administration (Accounting) (p. 461)

Faculty

Professor

- Asare, Stephen K.
- McGill, Gary A.
- Tucker, Jennifer Wu

Associate Professor

- Kirk, Marcus
- Madsen, Paul
- Mayberry, Michael A.
- Wang, Kailong

Assistant Professor

- Hinson, Lisa
- Lee, Ruby Sophia
- Munoko, Ivy
- Pereira Pundrich, Gabriel
- Rane, Scott G.
- Ricci, Michael Anthony
- Rimkus, Daniel

Clinical Assistant Professor

- Impink, Johannes

Distinguished Professor

- Knechel, Warren Robert

Accounting

Program Information

Master of Accounting: Three variations of the Master of Accounting degree program are available. These allow students to select one of three options: a concentration in Auditing, a concentration in Taxation, or no concentration. Minimum admission requirements include an acceptable score on the Graduate Management Admission Test (GMAT), with a minimum score of 550 and completion of essays with a minimum score of 4. International students must submit a satisfactory score on the following: TOEFL (Test of English as a Foreign Language: internet based, minimum score 100), or IELTS (International English Language Testing System: minimum overall score 7.0). Minimum scores on individual test sections are also required. Additional information,

including minimum GPA standards for admission, may be viewed at <http://warrington.ufl.edu/master-of-accounting/requirements> (<http://warrington.ufl.edu/master-of-accounting/requirements/>).

Combination degree program: The recommended curriculum to prepare for a professional career in accounting is the 3/2 five-year program with a joint awarding of the Bachelor of Science in Accounting and Master of Accounting degrees upon completion of the 150-hour program. The entry point into the 3/2 program is the beginning of the senior year.

Traditional Master of Accounting program: Students who have already completed an undergraduate degree in accounting may enter the 1-year M.Acc. degree program which requires satisfactory completion of 34 hours of course work. A minimum of 28 credits must be in graduate-level courses; a minimum of 20 credits must be in graduate-level accounting courses. The remaining credits are selected from business core courses and elective courses. Students are cautioned to seek early advisement, since many graduate courses are offered only once a year.

J.D./M.Acc. program: A joint program leading to the Juris Doctor and Master of Accounting degrees is offered by the Fisher School of Accounting and Levin College of Law.

Specific details for the M.Acc., J.D./M.Acc., and Ph.D. programs are available at <http://warrington.ufl.edu/Jd-macc/requirements> (<http://warrington.ufl.edu/Jd-macc/requirements/>).

Degrees Offered

Degrees Offered with a Major in Accounting

- Master of Accounting
 - no concentration
 - concentration in Auditing
 - *optional second concentration in Taxation*
 - concentration in Taxation

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2

ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Student Learning Outcomes

Accounting (MACC)

SLO 1 Knowledge
Conduct effective professional tax research.

SLO 2 Knowledge
Conduct effective professional accounting research.

SLO 3 Professional Behavior
Write clearly and concisely.

SLO 4 Professional Behavior
Write effective business reports.

SLO 5 Skills
Solve complex business problems.

SLO 6 Professional Behavior
Identify and interpret professional standards of conduct.

SLO 7 Professional Behavior
Identify legal, ethical, and social responsibilities to stakeholders.

Business Administration (Accounting)

Program Information

The Ph.D. program offers a broad-based interdisciplinary training that prepares students to conduct empirical research. The curriculum consists of course work of three types: the major field, a breadth requirement, and a research foundation requirement. In addition, students must demonstrate competence in conducting research and teaching, and must complete a dissertation on an accounting topic.

The major field in accounting consists of course work including research analysis, archival research, experimental research, readings, a research project, and dissertation. The breadth requirement consists of course work including microeconomic theory, game theory,

information economics, corporate finance theory, and asset pricing. The research foundation requirement consists of graduate course work in mathematical economics, statistics, or econometrics. Students demonstrate competency in conducting research by completing a research project in the summer of the first year. Teaching competence is demonstrated by completing a teaching training class and by teaching for at least one 1 semester.

Admission requirements include a history of academic excellence, adequate score on the GMAT (the average score of recently admitted applicants is 720 for GMAT) with a writing score of at least 5, competence in written and spoken English (TOEFL Internet-Based test (iBT) required for applicants whose native language is not English), appreciation of accounting issues, and institutional and math competency. The school requires a total score of 100 on the TOEFL, including a minimum of 26 on the speaking section.

Degrees Offered

Degrees Offered with a Major in Business Administration

- Doctor of Philosophy
 - concentration in Accounting

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12

ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4

FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2

ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2

BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2

MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Information Systems and Operations Management Department

Chair: H.K. Cheng

Graduate Coordinator: A. Kumar

The primary mission of the Department of Information Systems & Operations Management is a commitment to scholarly research, teaching and service to advance the state of knowledge in information systems and supply chain management and to train future leaders for professional and academic careers.

The Department offers graduate courses leading to the Master of Science in Information Systems and Operations Management (M.S.ISOM); the Ph.D. degree in Business Administration; and a concentration in the Master of Business Administration (M.B.A.) program. Minimum requirements for these degrees are available in the Graduate Degrees (p. 778) section of this catalog.

Combination Bachelor/Master of Science: The Department also offers a combination bachelor's/master's degree program. This program allows qualified students to earn both the bachelor's and master's degrees, using 12 to 16 credit hours of graduate-level courses for both degrees.

For more information, please see the program pages below and our website: <http://warrington.ufl.edu/departments/isom> (<http://warrington.ufl.edu/departments/isom/>).

Majors

- Business Administration (Information Systems and Operations Management) (p. 465)
- Business Analytics (p. 469)
- Information Systems and Operations Management (p. 470)

Faculty

Professor

- Aytug, Haldun
- Bandyopadhyay, Subhajyoti
- Carrillo, Janice Ellen
- Cheng, Hsing
- Erenguc, Sahin S.
- Mitra, Sabyasachi
- Paul, Anand Abraham
- Piramuthu, Selwyn

- Qiu, Liangfei
- Vakharia, Asoo J.

Associate Professor

- Kumar, Anuj
- Pan, Xiajun
- Pathak, Praveen Ashok
- Pu, Jingchuan
- Rajapakshe, Tharanga

Assistant Professor

- Demirezen, Emre
- He, Shu
- Liu, Yuchen
- Rhee, Kyung Sun

Clinical Assistant Professor

- Akyapi, Berkay

Clinical Associate Professor

- Dogan, Kutsal

Clinical Professor

- Davis, Joel

Affiliated Faculty

- Fu, Rachel Juichi
Professor
- Ranka, Sanjay
Distinguished Professor
- Tighe, Patrick J.
Professor

Business Administration (Information Systems and Operations Management)

Program Information

The Department of Information Systems & Operations Management offers graduate courses leading to the Master of Science in Information Systems and Operations Management (M.S.ISOM); the Ph.D. degree in Business Administration; and a concentration in the Master of Business Administration (M.B.A.) program. Minimum requirements for these degrees are available in the Graduate Degrees (p. 778) section of this catalog.

Doctor of Philosophy: The mission of the Ph.D. Program is to educate scholars who will make substantial contributions in their field of research. Our primary goal is to train graduate students to make such contributions. To achieve this goal, we attempt to place students in productive academic research environments. The major areas of study within the department are Information Systems/Information Technology (IS/IT) and Operations Management (OM).

Students come from a variety of backgrounds, with the most common being engineering computer sciences, mathematics, business, and statistics. Students admitted for the Ph.D. choose to specialize either in information systems/information technology or in operations management. The course schedule taken by each student is always personalized to fit the background of the student and is developed in consultation with the Ph.D. program coordinator and/or chair of the dissertation committee. Additionally, doctoral students will be required to attend all ISOM Workshops and the Department Seminar Series (regardless of area of specialization) held at the University of Florida.

Admission requirements for the Ph.D. include

- A minimum grade point average of 3.2
- A minimum GMAT score of 650, or GRE scores acceptable to the program
- For nonnative speakers of English, submit an acceptable score on one of the following: TOEFL (Test of English as a Foreign Language: computer=213, paper=550, web=80), IELTS (International English Language Testing System: 6), MELAB (Michigan English Language Assessment Battery: 77), or successful completion of the UF English Language Institute program.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/phd-isom> (<http://warrington.ufl.edu/graduate/academics/phd-isom/>).

Degrees Offered

Degrees Offered with a Major in Business Administration

- Doctor of Philosophy
 - concentration in Information Systems and Operations Management

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2

ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax I	2
TAX 5027	Federal Income Tax II	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2

FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2

REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4

MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3

MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Business Analytics

Overview

PROGRAM INFORMATION

The Master of Science in Business Analytics (M.S.B.A.) program provides analytic, computing, business, and communications skills to prepare students to work in various industries. In the M.S.B.A. program, students will learn how to become a crucial translator of functional business needs into analytics processes and analyses. This program combines business knowledge and related data with analytics skills to meet the growing needs of analytics teams supporting businesses. The curriculum consists of 36 credit hours. Courses taken include a business core including accounting, finance, marketing, management, and communications. Also, sample technical courses include artificial intelligence, database, data visualization, and marketing analytics.

Admission standards: The admission standards will be similar to those already established for the current M.S.I.S.O.M. program. In particular, students will need to submit (a) to transcript certifying a bachelor's degree from an accredited college or university with a minimum GPA of 3.0, (b) GMAT or GRE scores, (c) a current resume, and (d) three letters of recommendation. International students will also need to complete a personal interview and submit TOEFL or IELTS scores. Details for admissions are included in the following : <https://warrington.ufl.edu/master-of-science-in-information-systems-and-operations-management/admissions/>.

Graduation requirements: Students will need to complete 36 credits consisting of 22 credits for required courses, an additional 14 credits of electives and satisfaction of all UF Graduate Council policies governing master level graduate degree programs (including but not limited to the requirements for graduate student oversight, a final comprehensive examination, time limitation, and a minimum 3.0 (truncated) GPA (in overall, major, and, where applicable, minor credits) in order to graduate.

All courses are offered in a modular (i.e., half-semester) format, most of which consists of 2 units of credit. The required courses consist of (a) required business core functional courses (such as accounting and marketing) (b) required analytics tools courses (such as systems analysis and design, database, statistics, Python, Business Intelligence), (c) required communications courses (such as writing and communications), and (d) required practicum courses. The elective courses consist of choices for (i) functional analytics courses (such as organizational staffing, human capital management, marketing analytics, corporate finance, and AI & ML for FINTECH, (ii) technical analytics courses (such as Data Mining, Data Visualization, Managerial Quantitative Analysis, and Artificial Intelligence Methods).

For more information, please see our website: <https://warrington.ufl.edu/graduate-current-students/>

Degrees Offered

DEGREES OFFERED WITH A MAJOR IN BUSINESS Analytics

- Master of Science in Business Analytics

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

INFORMATION SYSTEMS AND OPERATIONS MANAGEMENT DEPARTMENTAL COURSES

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2

MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

WARRINGTON COLLEGE OF BUSINESS COURSES

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3

GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Business Analytics (MS)

SLO 1 Knowledge

Interpret and explain elements of economics, finance, accounting, marketing, operations management, organizational behavior, business law, information technology, business statistics, and social responsibility.

SLO 2 Skills

Specify and implement a framework for identifying a business problem and develop alternative solutions and a set of evaluation criteria.

SLO 3 Skills

Assess the outcomes of a course of action and make appropriate adjustments.

SLO 4 Skills

Solve intricate problems by applying expanded knowledge of ever evolving technologies, processes, and technical skills.

SLO 5 Skills

Critically assess the impact of business decisions on stakeholders.

SLO 6 Professional Behavior

Write business documents clearly, concisely, and analytically.

SLO 7 Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids

Information Systems and Operations Management

Program Information

The Department of Information Systems & Operations Management offers graduate courses leading to the Master of Science in Information Systems and Operations Management (M.S.ISOM); the Ph.D. degree in Business Administration; and a concentration in the Master of Business Administration (M.B.A.) program. Minimum requirements for these degrees are available in the Graduate Degrees (p. 778) section of this catalog.

Master of Science: The M.S.ISOM program provides computing, analytical, and application skills to be used in a business setting. The primary areas of emphasis in the M.S.ISOM program are business intelligence and analytics, information systems/information technology, and supply chain management. Requirements span traditional academic disciplines to produce a multiple-discipline focus. Typical positions for graduates include decision support specialist, information systems specialist, systems analyst, and logistic support specialist.

For a student with a bachelor's degree in business, the M.S.ISOM non-thesis on-campus program consists of a minimum of 36 credit hours, normally requiring a minimum of three semesters of study, not including summer. For students without a bachelor's degree in business, the M.S.ISOM non-thesis on-campus program consists of a minimum of 40

credit hours, normally requiring a minimum of four semesters of study, not including summer.

All M.S.ISOM candidates must complete 26 credits of core coursework:

Code	Title	Credits
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6485	Electronic Commerce and Logistics	2
MAN 6581	Project Management	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2

All M.S.ISOM candidates must also complete 6 credits of track coursework for the information technology, supply chain management, or business intelligence and analytics track:

Code	Title	Credits
Information Technology Track		
ISM 6216	Business Database Systems II	2
ISM 6236	Business Objects I	2
ISM 6259	Business Programming	2
Supply Chain Management Track		
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
Business Intelligence and Analytics Track		
ISM 6216	Business Database Systems II	2
ISM 6405	Business Intelligence	2
ISM 6423	Data Analysis for Decision Support	2

These required courses total 32 credit hours. In addition, each M.S.ISOM student with an undergraduate major or minor in business must take a minimum of 4 additional hours of approved graduate business electives for a total of 36 credit hours required for the M.S.ISOM degree. For students without an undergraduate business degree or minor, instead of graduate business electives, they must complete four of the following core business courses:

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5075	Managerial Accounting	2
ECP 5702	Managerial Economics	2
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
MAN 5246	Organizational Behavior	2

MAR 5806	Problems and Methods in Marketing Management	2

Bachelor/Master of Science: The Department also offers a combination bachelor's/master's degree program. This program allows qualified students to earn both the bachelor's and master's degrees, using 12 to 16 credit hours of graduate-level courses for both degrees.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/ms-isom/combined/>.

Degrees Offered

Degrees Offered With a Major in Information Systems and Operations Management

- Master of Science in Information Systems and Operations Management
 - without a concentration
 - concentration in Business Analytics
 - concentration in Data Science
 - concentration in Information Technology
 - concentration in Supply Chain Management

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2

ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Information systems & Operations management (MS)

SLO 1 Knowledge

Interpret and explain elements of economics, finance, accounting, marketing, operations management, organizational behavior, business law, information technology, business statistics, and social responsibility.

SLO 2 Skills

Specify and implement a framework for identifying a business problem and develop alternative solutions and a set of evaluation criteria.

SLO 3 Skills

Assess the outcomes of a course of action and make appropriate adjustments.

SLO 4 Skills

Solve intricate problems by applying expanded knowledge of ever evolving technologies, processes, and technical skills.

SLO 5 Skills

Critically assess the impact of business decisions on stakeholders.

SLO 6 Professional Behavior

Write business documents clearly, concisely, and analytically.

SLO 7 Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids

Management Department

Chair: M. Wang

Graduate Coordinator: J. Bono

The Management Department offers graduate work leading to a Ph.D. degree with a major in Business Administration and a concentration in Management; a Master of Business Administration degree with a concentration in Management; a Master of Science degree with a major in Management; and a Master of International Business (M.I.B.). Complete descriptions of the minimum requirements for these degrees are provided in the Graduate Degrees Section (p. 778) of this catalog.

The Department participates in combination bachelor's/master's degree programs for the Master of International Business (M.I.B.) and Master of Science (M.S.) with a major in management. The Master of International Business is open to students pursuing a bachelor's degree in a business discipline or minor in business administration. The M.S. with a major in management program is only open to non-business majors. Contact the graduate coordinator for information.

For more information, please see the program pages below and our website: <http://warrington.ufl.edu/departments/mgt> (<http://warrington.ufl.edu/departments/mgt/>).

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3

Majors

- Business Administration (Management) (p. 473)
- International Business (p. 476)
- Management (p. 480)

Faculty

Professor

- Di Matteo, Larry Alan
- Emerson, Robert W.
- Erez, Amir
- Lee, Gwendolyn K.
- Louie, Arnold
- Olmanson, Klodiana Lanaj
- Xu, Heng
- Zhang, Nan

Associate Professor

- Foulk, Trevor A.
- Hill, Aaron Donald
- Ross, David Gaddis
- Swider, Brian W.

Assistant Professor

- Li, Yixuan

Distinguished Professor

- Wang, Mo

Senior Lecturer

- Callahan, Judith Scully

Business Administration (Management)

Program Information

The Ph.D. program in business administration in the Department of Management prepares students for careers as faculty members of universities that emphasize research and teaching. The program is designed so that the student will:

1. develop strong competence in the base discipline crucial to the study of organizations and organization processes and
2. follow a field of specialization in organizational behavior or strategy.

Admission requirements for the Ph.D. include:

1. a minimum grade point average of 3.0,
2. a minimum GMAT score of 600, and
3. for nonnative speakers of English, a minimum score of 550 on the TOEFL. Although these are the minimum requirements, most students accepted into the Ph.D. in management have a GPA above 3.5 and a GMAT score above 650.

The research interests of the faculty are quite broad and details of current research interests can be found on the management departments' faculty

page. Students will also have exposure to scholars and faculty members from other universities, and from other departments in the University, who are invited to give workshops in the Department.

Breadth Requirement: It is preferred, but not required that students pursuing the Ph.D. be well versed in the structure and functioning of business organizations and the environment within which they operate. This expectation may be met through undergraduate or master's level work in business administration, but a background in business administration is not required for the Ph.D.

Research Skills Requirement: The general nature of the research requirement has been specified by the Graduate Committee of the Warrington College of Business. Students must take at least six methods and statistical courses, some which are offered in the department and college, and some which are taken through other colleges. The specific program is determined by the Ph.D. Coordinator in conjunction with the student's advisor and will be tailored to fit the student's prior preparation and the specialization that the student chooses.

Major Course Requirements: The program of study for each student will include required management seminars covering topics in both Organizational Behavior and Strategy.

Program Milestones: To maintain acceptable progress in the Ph.D. program, each student is required to present a first year research project in the second year and a second year research project in the third year. Procedures for these qualifying papers, dissertation, and final examination are given in the Requirements for the PhD. section of this catalog.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/phd-mgt> (<http://warrington.ufl.edu/graduate/academics/phd-mgt/>).

Degrees Offered

Degrees Offered with a Major in Business Administration

- Doctor of Philosophy
 - concentration in Management

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2

ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2

ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1

FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2

QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5

MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

International Business

Program Information

The Master of International Business (M.I.B.) is a non-thesis interdisciplinary graduate business program designed to enhance a student's knowledge and understanding of global business trends and problems.

All M.I.B. candidates must complete the 30-credit curriculum, which consists of 14 core credits and 16 elective credits, with a grade point average (major and overall) of 3.0 or higher. The curriculum includes a mandatory global immersion experience and a non-thesis capstone project.

Combination Degree: The Master of International Business offers a combination bachelor's/master's degree option for students pursuing a bachelor's degree in a business discipline or minor in business administration.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/mib> (<http://warrington.ufl.edu/graduate/academics/mib/>).

Degrees Offered

Degrees Offered with a Major in International Business

- Master of International Business
 - without a concentration
 - with a concentration in Human Resources

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4

MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4
FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4

FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2
ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2

MAN 6511	Contemporary Issues in Supply Chain Analytics	2	MAR 6457	Business to Business Marketing	3
MAN 6528	Principles of Logistics/Transportation Systems	2	MAR 6479	Professional Selling	2
MAN 6573	Purchasing and Materials Management	2	MAR 6508	Customer Analysis	2
MAN 6575	Purchasing and Supplier Relationship Management	3	MAR 6509	Customer Insights and Analysis	3
MAN 6581	Project Management	2	MAR 6590	Managerial and Consumer Decision Making	3
MAN 6598	Logistics and Distribution Management	3	MAR 6591	Consumer and Managerial Decision-Making	2
MAN 6617	International Operations/Logistics	2	MAR 6646	Marketing Research for Managerial Decision Making	3
MAN 6619	International Logistics	3	MAR 6648	Marketing Research for Managerial Decision Making	2
QMB 5303	Managerial Statistics	3	MAR 6667	Marketing Analytics Methods	2
QMB 5304	Introduction to Managerial Statistics	2	MAR 6668	Marketing Analytics 1	2
QMB 5305	Advanced Managerial Statistics	2	MAR 6669	Marketing Analytics 2	2
QMB 6317	Artificial Intelligence Methods in Business	2	MAR 6722	Web-Based Marketing	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2	MAR 6816	Advanced Marketing Management (MBA)	3
QMB 6359	Statistical Analysis for Managerial Decisions II	2	MAR 6818	Advanced Marketing Management	2
QMB 6616	Business Process Analysis	3	MAR 6833	Product Development and Management	2
QMB 6693	Quality Management and Control Systems	2	MAR 6838	Brand Management	3
QMB 6755	Managerial Quantitative Analysis I	2	MAR 6839	Product Development and Management	3
QMB 6756	Managerial Quantitative Analysis II	2	MAR 6861	Customer Relationship Management	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2	MAR 6862	Customer Relationship Management	3
QMB 6905	Individual Work in Information Systems and Operations Management	1-5	MAR 6905	Individual Work	1-4
QMB 6910	Supervised Research	1-5	MAR 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4	MAR 6930	Special Topics in Marketing	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1	MAR 6940	Supervised Teaching	1-5
QMB 6940	Supervised Teaching	1-5	MAR 6942	Marketing Consulting Experience	2
QMB 6941	Internship	1-4	MAR 6957	International Studies in Marketing	1-4
QMB 6942	Analytics Projects Practicum 1	1	MAR 6971	Research for Master's Thesis	1-15
QMB 6943	Analytics Practicum 2	1	MAR 7507	Perspectives on Consumer Behavior	3
QMB 6944	Analytics Practicum 3	1	MAR 7588	Consumer Information Processing and Decision Making	3
QMB 6945	ISOM Department Business Practicum	2	MAR 7589	Judgment and Decision Making	3
QMB 6957	International Studies in Quantitative Methods	1-4	MAR 7626	Multivariate Statistical Methods in Marketing	3
QMB 6971	Research for Master's Thesis	1-15	MAR 7636	Research Methods in Marketing	3
QMB 7565	Stat Research Methods	3	MAR 7666	Marketing Decision Models	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4	MAR 7671	Artificial Intelligence and Machine Learning	3
QMB 7933	Seminar in Information Systems and Operations Management	1-4	MAR 7925	Workshop in Marketing Research	3
QMB 7979	Advanced Research	1-12	MAR 7932	Consumer Psychology Seminar	3
QMB 7980	Research for Doctoral Dissertation	1-15	MAR 7979	Advanced Research	1-12
			MAR 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2

ADDITIONAL COURSES FOR MAJOR CREDIT IN International Business

Code	Title	Credits
ECO 5715	Open Economy Macroeconomics	2
ECO 6409	Game Theory Applied to Business Decisions	2
ECP 6708	Cases in Competitive Strategy	2
ECP 5702	Managerial Economics	2

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3

GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

International business (MIB)

SLO 1 Knowledge

Examine the nature of competition and macro-environmental changes, and the effect of these elements to evaluate claims in a specialized industry.

SLO 2 Skills

Identify strategies used for the multinational corporation to examine and make recommendations for future growth and direction.

SLO 3 Skills

Identify cultural and business issues that impact organizations in a foreign environment.

SLO 4 Professional Behavior

Write business documents clearly, concisely, and analytically..

SLO 5 Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids.

Management

Program Information

Master of Science degree with a major in Management, non-thesis

option: This M.S. program is designed to afford general business competency to students who possess little or no educational business background. The M.S. with a major in management program is only open to non-business majors. Students must complete the 32-credit curriculum, which consists of 22 core credits and 10 elective credits, with a grade point average (major and overall) of 3.0 or higher.

Combination Degree Program: The M.S. with a major in management offers a combination bachelor's/master's degree option.

For more information, please see our website: <http://warrington.ufl.edu/graduate/academics/msm> (<http://warrington.ufl.edu/graduate/academics/msm/>).

Degrees Offered

Degrees Offered with a Major in Management

- Master of Science
 - without a concentration
 - with a concentration in Human Resources

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Management Program Core Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5075	Managerial Accounting	2
BUL 5811	Law, Ethics, and Organizations	2

ECO 5715	Open Economy Macroeconomics	2
ECO 6409	Game Theory Applied to Business Decisions	2
ECP 5702	Managerial Economics	2
ECP 6708	Cases in Competitive Strategy	2
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
MAN 5246	Organizational Behavior	2
MAN 5502	Production and Operations Management	2
MAN 6636	Global Strategic Management	2
MAR 5806	Problems and Methods in Marketing Management	2
QMB 5304	Introduction to Managerial Statistics	2

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5

MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4
MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3
ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2

TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macroeconomics	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2
FIN 6729	Economics Organizations and Markets	3
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2
FIN 6905	Individual Work in Finance	1-4
FIN 6930	Special Topics in Finance	1-4
FIN 6935	Finance Professional Speaker Series	1
FIN 6936	Special Topics In Investment Finance	2
FIN 6957	International Studies in Finance	1-4

FIN 6958	International Finance Study Tour	2
FIN 7446	Financial Theory I	4
FIN 7447	Financial Theory II	4
FIN 7808	Corporate Finance	4
FIN 7809	Investments	4
FIN 7938	Finance Research Workshop	1-4
FIN 7979	Advanced Research	1-12
FIN 7980	Research for Doctoral Dissertation	1-15
FIT 6335	Blockchain and Cryptocurrencies	2
FIT 6356	Decentralized Finance Project	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2
REE 6007	Fundamentals of Real Estate Development	2
REE 6045	Introduction to Real Estate	2
REE 6058	Real Estate Research and Technology	1
REE 6105	Real Estate Appraisal	2
REE 6206	Primary Mortgage Markets and Institutions	2
REE 6208	Secondary Mortgage Markets and Securitization	2
REE 6315	Real Estate Market and Transaction Analysis	2
REE 6395	Real Estate Private Equity	2
REE 6397	Real Estate Securities and Portfolios	2
REE 6455	Law of Real Estate Transactions	2
REE 6705	Geographic Information Systems and Location Analysis	2
REE 6737	Real Estate Development	2
REE 6905	Individual Work in Real Estate	1-6
REE 6930	Special Topics in Real Estate	1-4
REE 6935	Real Estate Case Studies	1-2
REE 6948	Capstone Seminar and Applied Project	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits
ISM 5021	Information Systems in Organizations	3
ISM 6022	Management Information Systems	2
ISM 6128	Advanced Business Systems Design and Development I	2
ISM 6129	Advanced Business Systems Design and Development II	2
ISM 6215	Business Database Systems I	2
ISM 6216	Business Database Systems II	2
ISM 6222	Business Telecom Strategy and Applications I	2
ISM 6223	Business Telecom Strategy and Applications II	2
ISM 6224	Business Telecom Strategy and Applications III	2
ISM 6226	Business Telecom Strategy and Applications	3
ISM 6236	Business Objects I	2
ISM 6239	Business Objects II	2
ISM 6251	Programming for Business Analytics	2
ISM 6257	Intermediate Business Programming	2
ISM 6258	Advanced Business Programming	2
ISM 6259	Business Programming	2
ISM 6405	Business Intelligence	2
ISM 6413	Introduction to Python	2
ISM 6423	Data Analysis for Decision Support	2
ISM 6485	Electronic Commerce and Logistics	2
ISM 6486	eCommerce Technologies	2
ISM 6487	Risks and Controls in eCommerce	2

ISM 6562	Business Data Presentation and Visualization	2
ISM 6942	Electronic Commerce Practicum	2
MAN 5501	Management	3
MAN 5502	Production and Operations Management	2
MAN 6508	Management of Service Operations	2
MAN 6511	Contemporary Issues in Supply Chain Analytics	2
MAN 6528	Principles of Logistics/Transportation Systems	2
MAN 6573	Purchasing and Materials Management	2
MAN 6575	Purchasing and Supplier Relationship Management	3
MAN 6581	Project Management	2
MAN 6598	Logistics and Distribution Management	3
MAN 6617	International Operations/Logistics	2
MAN 6619	International Logistics	3
QMB 5303	Managerial Statistics	3
QMB 5304	Introduction to Managerial Statistics	2
QMB 5305	Advanced Managerial Statistics	2
QMB 6317	Artificial Intelligence Methods in Business	2
QMB 6358	Statistical Analysis for Managerial Decisions I	2
QMB 6359	Statistical Analysis for Managerial Decisions II	2
QMB 6616	Business Process Analysis	3
QMB 6693	Quality Management and Control Systems	2
QMB 6755	Managerial Quantitative Analysis I	2
QMB 6756	Managerial Quantitative Analysis II	2
QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2
QMB 6905	Individual Work in Information Systems and Operations Management	1-5
QMB 6910	Supervised Research	1-5
QMB 6930	Special Topics in Information Systems and Operations Management	1-4
QMB 6938	Analytics Processes for Business – Bootcamp	1
QMB 6940	Supervised Teaching	1-5
QMB 6941	Internship	1-4
QMB 6942	Analytics Projects Practicum 1	1
QMB 6943	Analytics Practicum 2	1
QMB 6944	Analytics Practicum 3	1
QMB 6945	ISOM Department Business Practicum	2
QMB 6957	International Studies in Quantitative Methods	1-4
QMB 6971	Research for Master's Thesis	1-15
QMB 7565	Stat Research Methods	3
QMB 7931	Special Topics in Information Systems and Operations Management	1-4
QMB 7933	Seminar in Information Systems and Operations Management	1-4
QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2

MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Management (MS)

SLO 1 Knowledge

Produce a significant business knowledge gain compared to knowledge at program entry.

SLO 2 Skills

Identify the essential elements of core business principles to examine and evaluate problems and to construct and implement solutions in the business environment.

SLO 3 Skills

Identify appropriate analytical models and critical reasoning processes to evaluate evidence, select among alternatives, and generate creative options to advance effective decision making.

SLO 4 Professional Behavior

Write business documents clearly, concisely, and analytically.

SLO 5 Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids.

Marketing Department

Chair: R.J. Lutz

Graduate Coordinator: A. Sela

The Marketing Department at the University of Florida is a recognized leader in the discipline of marketing. For over a decade, our faculty has ranked as one of the most productive and influential in the field. Our faculty is known for conducting provocative, cutting-edge research that contributes both to the scientific understanding and practice of marketing. Our Ph.D. program has produced many leading researchers in the discipline. And the David F. Miller Center for Retailing Education and Research is known as one of the foremost centers for developing the science of retailing.

The Marketing Department offers a graduate program leading to the degree of Ph.D. in Business Administration (Marketing). Requirements for the Ph.D. degree are described in the Graduate Degrees (p. 778) section of this catalog.

For more information, please see our website: <http://warrington.ufl.edu/departments/mkt> (<http://warrington.ufl.edu/departments/mkt/>).

Majors

- Business Administration (Marketing - Master's) (p. 484)
- Business Administration (Marketing - Ph.D.) (p. 485)

Faculty

Professor

- Lutz, Richard J.
- Sela, Aner

Associate Professor

- Brenner, Lyle A.
- Cooke, Alan David

- Shin, Woochoel
- Yang, Yang

Assistant Professor

- Hosseininasab, Amin
- Tomaino, Geoffrey Kenneth
- Yin, Mingzhang
- Zou, Tianxin

Eminent Scholar

- Shugan, Steven Mark

Distinguished Professor

- Alba, Joseph W.
- Janiszewski, Christopher Allen

Clinical Professor

- Podsakoff, Philip M.

Affiliated Faculty

- Carrillo, Michael A.
Clinical Assistant Professor
- Hoover, James H.
Clinical Professor

Business Administration (Marketing - Master's)

There are two distinct master's programs in marketing, offered at the Warrington College of Business. Please read this information carefully to determine which one is suitable for you.

The first program is the specialized Master of Science (M.S.) in Business Administration with a concentration in Marketing. The Master of Science Marketing program is intended for students whose objective is to work in the field of marketing in a corporate, non-profit, or entrepreneurial setting. For additional information and to apply for this program, visit the program website: <https://warrington.ufl.edu/master-of-science-in-marketing/>

The second program is the Master of Art (M.A.) in Business Administration with a concentration in Marketing. This program is intended for students whose ultimate goal is to earn a Ph.D. in Marketing at another institution. This program does not train students for a marketing career in the industry. Students admitted to this program take classes at the Ph.D. level and can specialize in either consumer behavior or quantitative research (empirical or analytical). The Marketing Department only accepts M.A. students into this research-oriented program in special cases, based on applicant quality and faculty availability and fit. Applicants must show evidence of a strong interest in academic research in marketing. If you are interested in this program, please contact the Marketing Department PhD Coordinator in the first instance. Do not submit an online application to this program without first contacting the graduate coordinator. Contact information can be found here: <https://warrington.ufl.edu/phd-in-business-administration-marketing/>

Combination Degrees: The College offers combination bachelor's/master's degree options for students pursuing a Bachelor of Science

Degree with a major in Marketing and a Master of Science degree with a major in Business Administration and a concentration in Marketing; a Master of Science (M.S.) with a major in Business Administration and a concentration in Marketing with a Bachelor of Arts in Business Administration (B.A.B.A.); a Master of Science (M.S.) with a major in Business Administration and a concentration in Marketing with a Bachelor of Science in Business Administration (B.S.B.A.) with a major in Finance; a Master of Science (M.S.) with a major in Business Administration and a concentration in Marketing with the Bachelor of Science in Business Administration (B.S.B.A.) with a major in Marketing; a Master of Science (M.S.) with a major in Business Administration and a concentration in Marketing with a Bachelor of Science in Business Administration (B.S.B.A.) with a major in Information Systems; and a Master of Science (M.S.) with a major in Business Administration and a concentration in Marketing with a Bachelor of Science in Business Administration (B.S.B.A.) with a major in Management.

Degrees Offered

Master's Degrees Offered through the Department of Marketing with a Major in Business Administration

- Master of Arts
 - concentration in Marketing
- Master of Science
 - concentration in Marketing

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3
MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3

MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Student Learning Outcomes

Business Administration--Marketing (Master's degree)

SLO1

Knowledge

Identify, describe, and explain the concepts, methods, and tools in marketing.

SLO2

Skills

Apply relevant marketing principles to analyze strategic problems in marketing, and to construct, evaluate, and implement appropriate solutions.

SLO3

Skills

Apply critical reasoning and analytical tools & methods to evaluate evidence in the service of marketing decision-making.

SLO4

Professional Behavior

Write business documents clearly, concisely, and analytically

SLO5

Professional Behavior

Speak in groups and in public clearly, concisely, and analytically, with appropriate use of visual aids

Business Administration (Marketing - Ph.D.)

The doctoral program is research-focused and offers the opportunity for concentrated study in consumer behavior or in quantitative or analytical modeling of marketplace phenomena.

The Ph.D. curriculum consists of course work in three areas: research foundations, the major field, and electives. In addition, students are required to complete a first-year summer research project, a second year summer paper, a third-year review paper, and a dissertation. Other requirements are outlined in the Graduate Degrees (p. 778) section of this catalog.

The research foundations requirement comprises a set of research methods and data analysis courses chosen from statistics, psychology, and/or economics. The major field course work is made up of a set of four required marketing seminars that are completed during the student's first 2 years in the program. Electives are selected from both advanced marketing seminars and other related disciplines to complement the student's research program.

Degrees Offered

Doctoral Degree through the Department of marketing Offered with a Major in Business Administration

- Doctor of Philosophy
- concentration in Marketing

Requirements for these degrees are given in the Graduate Degrees (p. 778) section of this catalog.

Courses

Marketing Departmental Courses

Code	Title	Credits
MAR 5805	Problems and Methods in Marketing Management	3
MAR 5806	Problems and Methods in Marketing Management	2
MAR 6105	Marketing Ethics	2
MAR 6157	International Marketing	2
MAR 6158	International Marketing	3
MAR 6237	The Art and Science of Pricing	2
MAR 6256	Strategy and Tactics of Pricing	3
MAR 6335	Building and Managing Brand Equity	2
MAR 6456	Business-to-Business Marketing	2
MAR 6457	Business to Business Marketing	3
MAR 6479	Professional Selling	2
MAR 6508	Customer Analysis	2
MAR 6509	Customer Insights and Analysis	3
MAR 6590	Managerial and Consumer Decision Making	3

MAR 6591	Consumer and Managerial Decision-Making	2
MAR 6646	Marketing Research for Managerial Decision Making	3
MAR 6648	Marketing Research for Managerial Decision Making	2
MAR 6667	Marketing Analytics Methods	2
MAR 6668	Marketing Analytics 1	2
MAR 6669	Marketing Analytics 2	2
MAR 6722	Web-Based Marketing	2
MAR 6816	Advanced Marketing Management (MBA)	3
MAR 6818	Advanced Marketing Management	2
MAR 6833	Product Development and Management	2
MAR 6838	Brand Management	3
MAR 6839	Product Development and Management	3
MAR 6861	Customer Relationship Management	2
MAR 6862	Customer Relationship Management	3
MAR 6905	Individual Work	1-4
MAR 6910	Supervised Research	1-5
MAR 6930	Special Topics in Marketing	1-4
MAR 6940	Supervised Teaching	1-5
MAR 6942	Marketing Consulting Experience	2
MAR 6957	International Studies in Marketing	1-4
MAR 6971	Research for Master's Thesis	1-15
MAR 7507	Perspectives on Consumer Behavior	3
MAR 7588	Consumer Information Processing and Decision Making	3
MAR 7589	Judgment and Decision Making	3
MAR 7626	Multivariate Statistical Methods in Marketing	3
MAR 7636	Research Methods in Marketing	3
MAR 7666	Marketing Decision Models	3
MAR 7671	Artificial Intelligence and Machine Learning	3
MAR 7925	Workshop in Marketing Research	3
MAR 7932	Consumer Psychology Seminar	3
MAR 7979	Advanced Research	1-12
MAR 7980	Research for Doctoral Dissertation	1-15

Accounting Departmental Courses

Code	Title	Credits
ACG 5005	Financial Accounting	2
ACG 5025	Financial Accounting	3
ACG 5065	Financial and Managerial Accounting	3
ACG 5075	Managerial Accounting	2
ACG 5076	Managerial Accounting	3
ACG 5226	Advanced Accounting	2
ACG 5505	Governmental Accounting	2
ACG 5637	Auditing I	2
ACG 5647	Auditing II	2
ACG 5815	Accounting Regulation	2
ACG 6107	Accounting for Income Taxes	2
ACG 6136	Accounting Theory	2
ACG 6175	Financial Reporting and Analysis	2
ACG 6207	Accounting for Risk	2
ACG 6635	Issues in Audit Practice	2
ACG 6685	Forensic Accounting	2
ACG 6691	International Auditing	2
ACG 6697	Information Systems Assurance	2
ACG 6841	Data Analytics for Accounting	2
ACG 6905	Individual Work in Accounting	1-4
ACG 6935	Special Topics in Accounting	1-4
ACG 6940	Supervised Teaching	1-5
ACG 7399	Accounting Research and Analysis	3

ACG 7848	Data Analysis Skills	2
ACG 7849	Web Crawling and Textual Analysis	2
ACG 7850	Advanced Data and Regression Techniques	3
ACG 7885	Overview of Accounting Research	4
ACG 7886	Accounting Research II	4
ACG 7887	Research Analysis in Accounting	3
ACG 7939	Theoretical Constructs in Accounting	3
ACG 7979	Advanced Research	1-12
ACG 7980	Research for Doctoral Dissertation	1-15
TAX 5025	Federal Income Tax 1	2
TAX 5027	Federal Income Tax 2	2
TAX 5065	Tax Professional Research	2
TAX 6105	Corporate Taxation	2
TAX 6115	Advanced Corporate Taxation	2
TAX 6205	Partnership Taxation	2
TAX 6526	International Taxation	2
TAX 6877	State and Local Taxation	2

Finance, Insurance, and Real Estate Departmental Courses

Code	Title	Credits
FIN 5405	Business Financial Management	3
FIN 5437	Finance I: Asset Valuation, Risk, and Return	2
FIN 5439	Finance II: Capital Structure and Risk Management Issues	2
FIN 6108	Personal Financial Management	1
FIN 6246	Money and Capital Markets	3
FIN 6296	Capitalism	2
FIN 6306	Investment Banking	2
FIN 6314	Financial Intermediation, Financial Services and Technology	2
FIN 6425	Corporation Finance	3
FIN 6427	Measuring and Managing Value	2
FIN 6429	Financial Decision Making	2
FIN 6432	Asset Valuation and Corporate Finance	2
FIN 6438	Study in Valuation	2
FIN 6465	Financial Statement Analysis	2
FIN 6477	Entrepreneurial Finance	2
FIN 6489	Financial Risk Management	2
FIN 6496	Mergers & Acquisitions	2
FIN 6518	Investment Concepts	2
FIN 6525	Asset Management Project	1
FIN 6526	Portfolio Theory	2
FIN 6528	Asset Allocation and Investment Strategy	2
FIN 6537	Derivative Securities	2
FIN 6545	Fixed Income Security Valuation	2
FIN 6547	Interest Rate Risk Management	2
FIN 6549	Special Topics in Fixed Income Securities	2
FIN 6575	Emerging Markets Finance I	2
FIN 6576	Emerging Markets Finance II	2
FIN 6585	Securities Trading	2
FIN 6586	Behavioral Finance	2
FIN 6596	Introduction to Computational Methods & Derivative Pricing	2
FIN 6597	Financial Modeling for Investments	2
FIN 6608	Financial Management of the Multinational Corporation	2
FIN 6626	International Finance	3
FIN 6636	Open Economy Macrofinance	2
FIN 6638	International Finance	2
FIN 6728	Capitalism and Regulation	2

FIN 6729	Economics Organizations and Markets	3	ISM 6236	Business Objects I	2
FIN 6779	Artificial Intelligence & Machine Learning Applications for Finance & FINTECH	2	ISM 6239	Business Objects II	2
FIN 6785	Investment Banking and Corporate Financial Modeling I	2	ISM 6251	Programming for Business Analytics	2
FIN 6786	Investment Banking and Corporate Financial Modeling II	2	ISM 6257	Intermediate Business Programming	2
FIN 6905	Individual Work in Finance	1-4	ISM 6258	Advanced Business Programming	2
FIN 6930	Special Topics in Finance	1-4	ISM 6259	Business Programming	2
FIN 6935	Finance Professional Speaker Series	1	ISM 6405	Business Intelligence	2
FIN 6936	Special Topics In Investment Finance	2	ISM 6413	Introduction to Python	2
FIN 6957	International Studies in Finance	1-4	ISM 6423	Data Analysis for Decision Support	2
FIN 6958	International Finance Study Tour	2	ISM 6485	Electronic Commerce and Logistics	2
FIN 7446	Financial Theory I	4	ISM 6486	eCommerce Technologies	2
FIN 7447	Financial Theory II	4	ISM 6487	Risks and Controls in eCommerce	2
FIN 7808	Corporate Finance	4	ISM 6562	Business Data Presentation and Visualization	2
FIN 7809	Investments	4	ISM 6942	Electronic Commerce Practicum	2
FIN 7938	Finance Research Workshop	1-4	MAN 5501	Management	3
FIN 7979	Advanced Research	1-12	MAN 5502	Production and Operations Management	2
FIN 7980	Research for Doctoral Dissertation	1-15	MAN 6508	Management of Service Operations	2
FIT 6335	Blockchain and Cryptocurrencies	2	MAN 6511	Contemporary Issues in Supply Chain Analytics	2
FIT 6356	Decentralized Finance Project	2	MAN 6528	Principles of Logistics/Transportation Systems	2
FIT 6710	Natural Language Processing & Generative AI for Finance	2	MAN 6573	Purchasing and Materials Management	2
REE 6007	Fundamentals of Real Estate Development	2	MAN 6575	Purchasing and Supplier Relationship Management	3
REE 6045	Introduction to Real Estate	2	MAN 6581	Project Management	2
REE 6058	Real Estate Research and Technology	1	MAN 6598	Logistics and Distribution Management	3
REE 6105	Real Estate Appraisal	2	MAN 6617	International Operations/Logistics	2
REE 6206	Primary Mortgage Markets and Institutions	2	MAN 6619	International Logistics	3
REE 6208	Secondary Mortgage Markets and Securitization	2	QMB 5303	Managerial Statistics	3
REE 6315	Real Estate Market and Transaction Analysis	2	QMB 5304	Introduction to Managerial Statistics	2
REE 6395	Real Estate Private Equity	2	QMB 5305	Advanced Managerial Statistics	2
REE 6397	Real Estate Securities and Portfolios	2	QMB 6317	Artificial Intelligence Methods in Business	2
REE 6455	Law of Real Estate Transactions	2	QMB 6358	Statistical Analysis for Managerial Decisions I	2
REE 6705	Geographic Information Systems and Location Analysis	2	QMB 6359	Statistical Analysis for Managerial Decisions II	2
REE 6737	Real Estate Development	2	QMB 6616	Business Process Analysis	3
REE 6905	Individual Work in Real Estate	1-6	QMB 6693	Quality Management and Control Systems	2
REE 6930	Special Topics in Real Estate	1-4	QMB 6755	Managerial Quantitative Analysis I	2
REE 6935	Real Estate Case Studies	1-2	QMB 6756	Managerial Quantitative Analysis II	2
REE 6948	Capstone Seminar and Applied Project	2	QMB 6845	Supply Chain Analytics: Gaming the Supply Chain	2

Information Systems and Operations Management Departmental Courses

Code	Title	Credits			
ISM 5021	Information Systems in Organizations	3	QMB 6905	Individual Work in Information Systems and Operations Management	1-5
ISM 6022	Management Information Systems	2	QMB 6910	Supervised Research	1-5
ISM 6128	Advanced Business Systems Design and Development I	2	QMB 6930	Special Topics in Information Systems and Operations Management	1-4
ISM 6129	Advanced Business Systems Design and Development II	2	QMB 6938	Analytics Processes for Business – Bootcamp	1
ISM 6215	Business Database Systems I	2	QMB 6940	Supervised Teaching	1-5
ISM 6216	Business Database Systems II	2	QMB 6941	Internship	1-4
ISM 6222	Business Telecom Strategy and Applications I	2	QMB 6942	Analytics Projects Practicum 1	1
ISM 6223	Business Telecom Strategy and Applications II	2	QMB 6943	Analytics Practicum 2	1
ISM 6224	Business Telecom Strategy and Applications III	2	QMB 6944	Analytics Practicum 3	1
ISM 6226	Business Telecom Strategy and Applications	3	QMB 6945	ISOM Department Business Practicum	2
			QMB 6957	International Studies in Quantitative Methods	1-4
			QMB 6971	Research for Master's Thesis	1-15
			QMB 7565	Stat Research Methods	3
			QMB 7931	Special Topics in Information Systems and Operations Management	1-4
			QMB 7933	Seminar in Information Systems and Operations Management	1-4

QMB 7979	Advanced Research	1-12
QMB 7980	Research for Doctoral Dissertation	1-15

Management Departmental Courses

Code	Title	Credits
BUL 5810	Legal Environment of Business	3
BUL 5811	Law, Ethics, and Organizations	2
BUL 5832	Commercial Law for Accountants	2
BUL 6441	Business Ethics and Corporate Social Responsibility	2
BUL 6516	Law of Real Estate Transactions	2
BUL 6841	Employment Law	2
BUL 6852	International Business Law	2
BUL 6905	Individual Work	1-5
BUL 6930	Special Topics	1-3
ENT 6006	Entrepreneurship	2
ENT 6008	Entrepreneurial Opportunity	2
ENT 6116	Business Plan Formation	2
ENT 6416	Venture Finance	2
ENT 6506	Social Entrepreneurship	2
ENT 6616	Creativity in Entrepreneurship	2
ENT 6621	Strategy and Disruption in Technology Industries	2
ENT 6905	Individual Work in Entrepreneurship	1-4
ENT 6930	Special Topics	1-4
ENT 6933	Entrepreneurship Lecture Series	1-4
ENT 6946	Entrepreneurial Consulting Project	2
ENT 6950	Integrated Technology Ventures	1-4
ENT 7932	Entrepreneurship	3
GEB 5114	Entrepreneurship and Venture Finance	3
GEB 6366	Fundamentals of International Business	2
MAN 5245	Organizational Behavior	3
MAN 5246	Organizational Behavior	2
MAN 6149	Developing Leadership Skills	2
MAN 6266	Managing Groups and Teams in Organizations	2
MAN 6331	Compensation in Organizations	2
MAN 6365	Organizational Staffing	3
MAN 6366	Organizational Staffing	2
MAN 6375	Human Capital Analytics	2
MAN 6446	Negotiations	3
MAN 6447	Art and Science of Negotiation	2
MAN 6635	International Aspects of Human Resource Management	2
MAN 6636	Global Strategic Management	2
MAN 6637	Global Strategic Management	3
MAN 6721	Business Policy	3
MAN 6724	Strategic Management	2
MAN 6900	Capstone Project	2
MAN 6905	Individual Work in Management	1-5
MAN 6910	Supervised Research	1-5
MAN 6930	Special Topics	1-3
MAN 6940	Supervised Teaching	1-5
MAN 6973	Project in Lieu of Thesis	1-4
MAN 7058	Affect, Cognition, and Organizational Decision Making	1-4
MAN 7108	Seminar in Research Concepts and Methods in Management	1-4
MAN 7109	Seminar in Motivation, Attitudes and Leadership	1-4

MAN 7208	Seminar in Contemporary Approaches to Entrepreneurship and Organizations	1-2
MAN 7249	Org Behavior	3
MAN 7267	Seminar on Groups and Teams Research	1-2
MAN 7328	Seminar on Staffing and Selection	1-3
MAN 7778	Seminar in Behavioral Approaches to Strategy	1-2
MAN 7779	Seminar in Strategic Processes, Innovation, and Entrepreneurship	1-2
MAN 7934	Org Res Methods Sem	4
MAN 7935	Strategic Management	3
MAN 7979	Advanced Research	1-12
MAN 7980	Research for Doctoral Dissertation	1-15

Warrington College of Business Courses

Code	Title	Credits
BTE 7171	Preparing to Teach in Business	2
GEB 5212	Professional Writing in Business	1-3
GEB 5215	Professional Communication in Business	1-3
GEB 5929	Foundations Review	1-3
GEB 6229	Professional Communication for Accountants	2
GEB 6365	International Business	3
GEB 6905	Individual Work	1-4
GEB 6930	Special Topics	1-3
GEB 6941	Internship	1-4
GEB 6957	International Studies in Business	1-4

Financial Information

For current financial information, please consult <https://www.sfa.ufl.edu/cost/graduate-costs>. (<https://www.sfa.ufl.edu/cost/graduate-costs/>)

Fees

Specific current-year fee information from UF's Bursar's Office can be found by visiting here: <https://www.fa.ufl.edu/directive-categories/current-year-tuition-and-fees/>. (<https://www.fa.ufl.edu/directive-categories/current-year-tuition-and-fees/>)

Admission Application Fee

An individual who applies for admission to the University of Florida shall pay a non-refundable application fee of \$30. (<https://admissions.ufl.edu/apply/graduate/>).

Registration and Tuition Fees Liability

Pursuant to Section UF-3.037 Regulations of the University of Florida, registration shall be defined as consisting of two components:

1. formal enrollment in one or more credit courses approved and scheduled by the university; and
2. fee payment or other appropriate arrangements for fee payment (deferment or third-party billing) for the courses in which the student is enrolled as of the end of drop/add period.

Registration must be completed on or before the date specified in the university calendar. Students are not authorized to attend class unless they are on the class roll or have been approved to audit. Unauthorized class attendance will result in tuition and fee liability.

In addition to the matriculating term, a student must be registered during the terms of the qualifying examination and the final examination, and during the term the degree is awarded.

Tuition and Fee Liability – Pursuant to Section UF-3.037 Regulations of the University of Florida, a student is liable for all tuition fees associated with all courses for which the student is registered at the end of the drop/add period or for which the student attends after that deadline. The fee payment deadline is 3:30 p.m. on Friday of the second week of classes.

Assessment of Tuition Fees

Pursuant to UF-3.0375 Regulations of the University of Florida, tuition shall be assessed to students for enrollment in credit courses. In some instances, tuition waivers accompanying assistantships or fellowships include only the matriculation fee, and where applicable, the non-resident fee. All other fees must be paid by the student.

Students can pay their own tuition fees on ONE.UF (<https://one.uf.edu/>) portal.

Students can estimate their tuition and fees on the University Bursar website: <http://www.fa.ufl.edu/bursar/current-students/>.

Lack of written notification of the tuition fee debt does not negate the student's responsibility to pay by the published fee payment deadline.

For purposes of discussion, the word *term* refers to the fall semester, the spring semester and any of the summer semesters.

University personnel will not be held accountable for the assessment or accuracy of calculations.

Assessment of Student Tuition and Fees

Resident Tuition Cost, comprising the following, shall be defined as the tuition and fees charged an enrolled student who qualifies as a Florida resident as defined in Section 1009.21 Florida Statute.

Non-Resident Tuition Cost, comprising the following, shall be defined as the tuition and fees charged an enrolled student who does not qualify as a Florida resident as defined in Section 1009.21 Florida Statute.

Activity and Service Fee: All students must pay an activity and service fee that is assessed on a per-credit-hour basis or semi-annual basis and is included in the basic rate per credit hour (UF-3.0372 Regulations of the University of Florida).

Athletic Fee: All students must pay an athletic fee that is assessed on a per-credit-hour basis or semiannual basis and is included in the basic rate per credit hour. Half-time graduate research and teaching assistants enrolled for eight (8) or more credits during the fall or spring semesters and all other students enrolled for nine (9) or more credits are eligible to purchase athletic tickets at the student rate (UF-3.0372 Regulations of the University of Florida).

Audit Fee: Tuition and fees are assessed at the applicable resident or non-resident cost (UF-3.0376 Regulations of the University of Florida).

Diploma Replacement Fee: Each diploma ordered after a student's initial degree application can result in a diploma replacement charge not to exceed \$10 (UF-3.0376 Regulations of the University of Florida).

Distance Learning Fee: Online courses may be assessed a per-credit-hour amount (1009.24 Florida Statutes).

Health Fee: All students must pay a health fee that is assessed on a per-credit-hour basis or semiannual basis and is included in the basic rate per credit hour. The health fee maintains the university's Student Health Service and is not part of any health insurance a student may purchase (UF-3.0372 Regulations of the University of Florida).

Library ETD Processing Fee: Students pay \$12.80 in their final term for the administrative costs of processing the thesis or dissertation through the UF Libraries; this fee is in no way associated with the services provided to students through the UFIT HelpDesk T&D Support Center or the Graduate School's Thesis, Dissertation, and Publications Office. This fee will appear and is payable on the student account on ONE.UF (<https://one.uf.edu/>) only after making the first submission of their thesis or dissertation to the Graduate School; <https://grad.ufl.edu/academics/graduation/>. Architecture project students should contact their department regarding the project option fee and how these fees will be processed.

Material and Supply: Material and supply fees are assessed for certain courses to offset the cost of materials or supply items consumed in the course of instruction. A list of approved courses and fees (<https://one.uf.edu/soc/>) is published in the Schedule of Courses each semester (UF-3.0374 Regulations of the University of Florida). More Info (<http://www.registrar.ufl.edu/soc/>)

The equipment use fee program allows units to charge for courses that use equipment in the educational process, which is used to prepare students for their careers or professions and is used for instructional purposes only, with direct use by students. Material and supply and equipment use fee information is available from the academic departments or from the schedule of courses (Florida Statutes 1009.24).

Off-Campus Educational Activities: The president or designee will establish fees for off-campus course offerings when the location results in specific, identifiable increased costs to the university. These fees will be in addition to the regular tuition and fees charged to students enrolling in these courses on campus. The additional fees charged are for the purpose of recovering the increased costs resulting from off-campus vs. on-campus offerings. As used herein, *off campus* refers to locations other than main campus, branch campuses, and centers (UF-3.0376 Regulations of the University of Florida).

Registration for Zero Credits: The student is assessed the applicable resident or non-resident cost as set forth in Regulation UF-3.0375, for one credit hour (UF-3.0376 Regulations of the University of Florida).

Technology Fee: All students must pay a technology fee that is assessed on a per-credit-hour basis or semiannual basis (UF-3.0375 Regulations of the University of Florida).

Transcript Fee: An official transcript may be purchased on the Registrar website or your ONE.UF (<https://one.uf.edu/>) account for a charge. (UF-3.0376. Regulations of the University of Florida) More Info (<https://registrar.ufl.edu/services/transcripts/>)

Transportation Access Fee: All students must pay a transportation access fee that is assessed on a per-credit-hour basis or semiannual basis (UF-3.0372 Regulations of the University of Florida).

All charges may be subject to change without notice.

Payment of Tuition and Fees

Tuition and fees are payable on the dates listed on the Academic Calendar (<https://catalog.ufl.edu/UGRD/dates-deadlines/pdfs/>); Dates

and Deadlines. Deadlines are enforced. Tuition and fee payments (<http://www.fa.ufl.edu/bursar/current-students/payments/>) are processed by **the University Bursar**.

Payments sent via U.S. mail must be received in the university cashier's office by the established fee payment deadline. An on-time payment for the tuition deadline date is a receipt date, not a postmark date.

According to university policy, university cashiers will accept checks only for the amount due in payment of tuition fees, accounts receivable, loans, and other student debts.

Checks from international countries must be payable through a United States bank in U.S. dollars.

The university can refuse two-party checks, altered checks, and checks that will not photocopy. The university does not have the authority to waive late payment fees unless extraordinary circumstances warrant such a waiver or the university is primarily responsible for the delinquency (UF-3.0022 Regulations of the University of Florida).

Online payment for tuition and other charges can be made at ONE.UF.

Payment options on ONE.UF (<https://one.uf.edu/>):

- Electronic check; there is no service charge for the electronic check payments.
- Credit or debit cards: MasterCard, Discover, American Express, or Visa will include a 2.6% service charge for tuition, fees, and accounts receivable charges (e.g., laser print, library fees, parking decals, etc.).
- International Payment via Convera is a wire transfer, provides a competitive rate of exchange for many international currencies.
- In-person payments: check, money order, or cashier's check. International paper checks or demand drafts must be drawn on a U.S. bank in U.S. dollars, and amounts cannot be greater than the amount due. Any payment that is more than the amount due will not be refunded and will automatically be applied to a future debt.
- Cash is not an available payment option.

Returned Payments

Returned electronic checks or paper checks will be charged a service fee of \$25 if the returned payment is less than \$50; \$30 if the returned payment is \$50.01 - \$299.99 and \$40 if the returned payment is \$300 or more. Payments for returned electronic check payments, returned paper checks and the returned service fee must be paid by money order or cashier's check.

A \$10 service fee will be charged if the bank information provided for the electronic check payment is inaccurate for electronic funds transfer. Payment for this type of return does not require a money order or a cashier's check.

All financial obligations to the university will be applied on the basis of age of the debt. The oldest debt will be paid first.

Late Registration and Late Payment Fees

Late Registration Fee: If the student fails to register prior to the late registration date published in the academic calendar (<https://gradcatalog.ufl.edu/graduate/calendar/>) will be subject to the late registration fee of \$100 (UF-3.037 Regulations of the University of Florida).

Late Payment Fee: Any student who fails to pay all tuition fees due or to make appropriate arrangements for tuition fee payment (deferment or

third-party billing) by the fee payment deadline published in the academic calendar (<https://gradcatalog.ufl.edu/graduate/calendar/>) will be subject to a late payment fee of \$100 (UF-3.037 Regulations of the University of Florida).

Waiver of Late Fees: A student who believes that a late fee should not be assessed because of university error or extraordinary circumstances that prevented all conceivable means of compliance by the deadline may petition for a waiver. Late registration fee: Office of the University Registrar; Late payment fee: University Bursar. The university reserves the right to require documentation to substantiate these circumstances.

Deferment of Tuition and Fees

Deferment extends the deadline for payment of tuition fees for a specific term. A tuition fee deferment is granted based on information from Student Financial Affairs (financial aid deferments), the Office of the University Registrar (veterans) or Graduate Assistant and Fellowship Waivers; departments may provide Letters of Appointment (LOA) and tuition waivers to teaching, research, or graduate assistants, and fellowship students. Refer questions on eligibility to the appropriate office. A tuition fee deferment must be established by the tuition fee payment deadline for each term.

A tuition fee deferment is provided to students in the following circumstances:

- Students receiving benefits from state or federal financial assistance programs (1009.27, Florida Statutes).
- Students receiving veterans or other educational benefits under Chapter 30, Chapter 31, Chapter 32, Chapter 33, Chapter 34, Chapter 35, Chapter 1606 Title 10, U.S.C.; or
- Students for whom formal arrangements have been made with the university for payment by an acceptable third-party sponsor.

A \$100 late payment fee will be assessed if a student fails to pay all tuition fees due by the deferment deadline.

Non-payment of Tuition and fees: The university shall temporarily suspend further academic progress of any student who has not satisfied the entire balance of their tuition and fee liability by the established deadlines. This will be accomplished by placing a financial hold on the student's record, which will prevent the student from receiving grades, transcripts, and/or diploma, and the student's registration will be denied for future terms until the account has been satisfied (UF-3.037 Regulations of the University of Florida).

Students who have not paid any portion of their tuition fee liability by the established university payment deadline will be withdrawn from all courses. Students will continue to be held fee liable for these courses, but will not be allowed to attend these courses until payment is made in full and the student has been re-registered.

To re-register for courses, students must submit a Current Term Re-Enrollment Request Petition to the Office of the University Registrar. Students who re-register after being withdrawn for non-payment of tuition and fees will be subject to both late registration and late payment fees.

Refund of Tuition and Fees

The following circumstances may constitute a tuition and fees refund (UF-3.0371 Regulations of the University of Florida):

- If notice of withdrawal from the University is approved prior to the end of the drop/add period and written documentation is received from the student
- Credit hours dropped during drop/add
- Courses canceled by the university
- Involuntary call to active military duty
- Death of the student or member of the immediate family (parent, spouse, child, sibling)
- Illness of the student of such severity or duration, as confirmed in writing by a physician, that completion of the semester is precluded
- Exceptional circumstances, upon approval of the university president or their designee

A refund of twenty-five percent (25%) of the total fees paid (less late fees) is available for withdrawal of enrollment from the university prior to the deadlines listed in the academic calendar (<https://gradcatalog.ufl.edu/graduate/calendar/>).

Refunds are issued by the University Bursar and will be initially applied against any university debts. The university reserves the right to set minimum amounts for which refunds will be produced for overpayments on student accounts.

Tuition refunds due to cancellation, withdrawal, or termination of attendance for students receiving financial aid will first be refunded to the appropriate financial aid programs. If the student is a recipient of federal financial aid, such as Grad Plus Loan, Pell Grant, TEACH Grant, Supplemental Educational Opportunity Grant (SEOG), Perkins Loan, Federal Direct Stafford Loans, or PLUS loans, federal rules require that any unearned portion of the federal aid must be returned to the U.S. Department of Education.

Direct Deposit Requirement: Due to the university's continuing support for sustainable practices, as well as the costs associated with producing, mailing, and tracking undelivered checks, direct deposit is now required for the delivery of refunds, whether financial aid or student overpayments. This electronic method will deposit any overpayments to the student's checking account. Students must give authorization on their ONE.UF (<https://one.ufl.edu/>), select the Campus Finances (Bursar) card > Related Links > Sign up for Direct Deposit to have financial aid or overpayments electronically credited to a US bank or other US financial institution checking account.

Deadlines: Deadlines are enforced. The university does not have the authority to waive late payment fees unless extraordinary circumstances warrant such a waiver or the university is primarily responsible for the delinquency.

For more information about potential waivers available, please visit <https://www.fa.ufl.edu/directives/waivers/>.

General Fiscal Information

Students can pay online at ONE.UF (<https://one.ufl.edu/>) the exact amount of tuition fees and/or other amounts owed the university. The online payment system accepts the following payment methods: American Express, MasterCard, Discover, or Visa credit cards and electronic checks from checking and international payments via wire transfer.

Students can pay at the University Bursar office with personal checks, cashier's checks and money orders, which can be placed in the 24-hour drop box located outside 113 Criser Hall. Payments on all financial

obligations to the university will be applied on the basis of age of the debt. The oldest debt will be paid first.

University Bursar is not able to accept cash or debit card payments and does not cash checks or make cash refunds.

It is the student's responsibility to maintain a correct current address (<https://registrar.ufl.edu/address-change/>) in the UF directory.

Address changes should be made online at ONE.UF (<https://one.ufl.edu/>).

Past-Due Student Accounts

All student accounts are payable at the University Bursar office or on ONE.UF (<https://one.ufl.edu/>) at the time such charges are incurred. Graduating students with outstanding financial obligations will have a hold placed on their records withholding the release of a diploma, transcript, and other university services until the debt is satisfied.

University regulations prohibit the following for any student whose account with the university is delinquent until the debt has been satisfied:

- Registration
- Release of transcript, diploma, grades, or schedules
- Loans
- The use of UF facilities and/or services
- Admission to UF functions and athletic events

Delinquent accounts, including those debts for which the student's records have a financial hold, may require payment by cashier's check or money order.

Delinquent debts may be placed with a billing agent, reported to a credit bureau, and referred to collection agencies without further notice or litigated, at which time additional collection costs will be assessed in accordance with UF-3.0376 Regulations of the University of Florida. All payments received are applied to the oldest debt first.

Graduate Academic Regulations

Adherence to Guidelines and General Regulations

The student is responsible for becoming informed and observing all program regulations and procedures. The student must be familiar with Graduate Catalog general regulations and requirements, specific degree program requirements, and offerings and requirements of the major academic unit. *Rules are not waived for ignorance.* Any exceptions to the policies stated in the Graduate Catalog must be approved by the Dean of the Graduate School. After admission to the Graduate School, but before the first registration, the student should consult the college and/or the graduate coordinator in the major academic unit about courses and degree requirements, deficiencies if any, and special regulations of the academic unit. The dean (or representative) of the college where the degree program is located must oversee all registrations. Once a supervisory committee is appointed, registration approval is the responsibility of the committee chair. Key information is contained or disseminated through several electronic sites. Each student **must** regularly check the Graduate Information Management System (GIMS) (<https://gradschool.ufl.edu/gimsportal/gatorlink/portal.aspx>) for accuracy and currency of the degree program and associated milestones. In addition, each student is required to create, maintain, and regularly check a GatorLink email account (<http://gatorlink.ufl.edu>). Critical

information is sent directly to the address listed as the student's UF Business Email.

Academic Integrity

In 1995, the UF student body enacted an Honor Code and voluntarily committed itself to the highest standards of honesty and integrity. In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. Student and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code. The University of Florida is committed to preserving an open learning environment for all those who participate in the university community. Such an environment requires respect for self-expression, civil discourse in and out of the classroom, and trust, from all members of UF. All students must participate in academic research and learning at the university in a manner consistent (in accordance) with these values. Dishonesty, plagiarism, and other forms of misconduct are serious violations of academic integrity, and should be discouraged by all members of the university community.

Please review the Student Honor Code found at the following site: <https://gradcatalog.ufl.edu/graduate/regulations/>. The process steps can be found by visiting <https://sccr.dso.ufl.edu/students/student-conduct-code/>. All students are expected to follow these expectations.

Academic Honesty

UF students are bound by The Honor Pledge, which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. To better understand the University's expectations regarding academic integrity, view the Dean of Students Academic Integrity Module found at the following site: <https://sccr.dso.ufl.edu/process/resources/academic-integrity/>.

Research Expectations

Plagiarism includes but is not limited to quoting oral or written materials, including but not limited to those found on the Internet. UF expects all of its students to pursue research with integrity and responsibility. All research to be submitted for a grade should follow UF's Honor Code. For those students working on research that requires IRB approval, UF provides training throughout the year. For those students supported by NSF funding, you must participate in UF's Responsible Conduct of Research Training.

Attendance at Commencement

Graduates who are to receive advanced degrees are urged to attend Commencement to accept in person the honor indicated by the appropriate hood. Through the University Bookstore, the student may arrange to rent or buy the proper academic attire to be worn at Commencement. For more information regarding commencement,

please speak with your academic unit's advisor and visit <https://commencement.ufl.edu/>.

Attendance Policies

Absences

Students may only participate in classes if they are registered officially or approved to audit with evidence of having paid audit fees. The Office of the University Registrar provides official class rolls to instructors.

Students are responsible for satisfying all academic objectives as defined by the instructor. Absences count from the first class meeting.

Acceptable reasons for absence from or failure to engage in class include illness; Title IX-related situations; serious accidents or emergencies affecting the student, their roommates, or their family; special curricular requirements (e.g., judging trips, field trips, professional conferences); military obligation; severe weather conditions that prevent class participation; religious holidays; participation in official university activities (e.g., music performances, athletic competition, debate); and court-imposed legal obligations (e.g., jury duty or subpoena). Other reasons (e.g., a job interview or club activity) may be deemed acceptable if approved by the instructor.

For all planned absences, a student in a situation that allows an excused absence from a class or any required class activity must inform the instructor as early as possible prior to the class. For all unplanned absences because of accidents or emergency situations, students should contact their instructor as soon as conditions permit.

Students shall be permitted a reasonable amount of time to make up the material or activities covered during absence from class or inability to engage in class activities because of the reasons outlined above.

If a student does not participate in at least one of the first two class meetings of a course or laboratory in which they are registered, and they have not contacted the department to indicate their intent, the student can be dropped from the course. Students must not assume that they will be dropped, however. The department will notify students if they have been dropped from a course or laboratory.

The university recognizes the right of the instructor to make attendance mandatory and require documentation for absences (except for religious holidays), missed work, or inability to fully engage in class. After due warning, an instructor can prohibit further attendance and subsequently assign a failing grade for excessive absences.

Religious Holiday

At the University of Florida, students and faculty work together to allow students the opportunity to observe the holy days of their faith. A student should inform the faculty member of the religious observances of their faith that will conflict with class attendance, with tests or examinations, or with other class activities prior to the class or occurrence of that test or activity. The faculty member is then obligated to accommodate that particular student's religious observances. Because students represent a myriad of cultures and many faiths, the University of Florida is not able to assure that scheduled academic activities do not conflict with the holy days of all religious groups. Accordingly, individual students should make their need for an excused absence known in advance of the scheduled activities.

The Florida Board of Education and state law govern university policy regarding observance of religious holidays.

The following guidelines apply:

- Students, upon prior notification to their instructors, shall be excused from class or other scheduled academic activity to observe a religious holy day of their faith.
- Students shall be permitted a reasonable amount of time to make up the material or activities covered in their absence.
- Students shall not be penalized due to absence from class or other scheduled academic activity because of religious observances.

If a faculty member is informed of or is aware that a significant number of students are likely to be absent from class because of a religious observance, the faculty member should not schedule a major exam or other academic event at that time.

A student who is to be excused from class for a religious observance is not required to provide a second party certification of the reason for the absence. Furthermore, a student who believes that they have been unreasonably denied an education benefit due to religious beliefs or practices may seek redress through the student grievance procedure.

Illness

A student who is absent from class or any required class-related activity because of illness should contact their instructor, if feasible, as early as possible prior to the missed class or activity.

Students shall be permitted a reasonable amount of time to make up the material or activities covered during an excused absence.

Students should contact their college by the deadline to drop a course for medical reasons. Students can petition the Dean of Students Office to drop a course for medical reasons. The university's policy regarding medical excuse from classes is maintained by the Student Health Care Center.

Twelve-Day Rule

Students who participate in university-sponsored athletic or scholarly activities are permitted to be absent 12 scholastic days per semester without penalty. A scholastic day is any day on which regular class work is scheduled as defined in the approved university calendar.

The student or student's advisor must notify the instructor as early as possible prior to the anticipated absence to allow ample time for accommodations. Instructors must be flexible and not penalize students when re-scheduling during-term and final exams, class assignments, and other required activities and must follow the UF Attendance Policy herein and UF Examination Policies. As noted in the UF Examination Policies, during-term exams should be re-scheduled no later than before the end of the semester, while final exams no later than 90 days after the originally scheduled exam time. However, instructors are encouraged to re-schedule final and during-term exams, assignments, and other activities as soon as possible after the last day of the absence and must not penalize the student in any way.

A group's schedule that requires absence of more than 12 scholastic days should be adjusted so that no student is absent from campus more than 12 scholastic days. Students who previously have been warned in writing by their instructor about the impact of absences on their individual class performance should not incur additional absences, even if they have not been absent 12 scholastic days. The student is responsible to maintain satisfactory academic performance and attendance.

Awarding of Degrees

The Graduate School authorizes a candidate to be awarded the degree appropriate to the course of study under the following conditions (see degree descriptions for details):

- The candidate must have completed all course requirements, including an internship or practicum if required, in the major and minor fields while observing time limits and limitations on transfer credit, on nonresident work, and on level of course work.
- The candidate's grade point averages must be at least B (3.00, truncated) in the major and overall (all courses eligible to count toward the graduate degree), including a minor where appropriate.
- All grades of H, I, N and NG must be changed. Furthermore, all grades of I assigned to course numbers 6971, 7979, and 7980 must be resolved with a final grade assignment of Satisfactory (S) or Unsatisfactory (U).
- The candidate must have satisfactorily completed all required examinations (qualifying, comprehensive, and final) and be recommended for the degree by the supervisory committee, major academic unit, and college.
- The dissertation or thesis must have been approved by the supervisory committee and accepted by the Graduate School. Projects must be approved by the academic unit, which then certifies completion to the Graduate School.
- Recommendations for awarding a degree include meeting all academic and professional qualifications as judged by the faculty of the appropriate academic unit.

All requirements for the degree must be met while the candidate is a registered graduate student. Degrees are certified 3 times per year: December, May, and August.

Program designation on the student's transcript: Programs are the students' primary fields of study; a program is the student's major. The degree and program (major) name appear on the student's transcript. Concentrations are subprograms within the major. The concentration, degree, and major *may* appear on student transcripts. Specializations are informal designations, used by academic units, to indicate areas of research or scholarly strength, and have no formal significance. Tracks and emphases are similar unofficial terms. No tracks, emphases, or specializations appear in official lists in this catalog or on the student transcript. Please take note of the following: Taking multiple courses within a discipline does not constitute admission to that discipline's graduate programs. The primary/home academic unit must contact the Graduate School's Student Records Unit for procedural details and deadlines. In all cases, each academic unit must submit appropriate programs of study to the Graduate School for review. Graduate School approval for participation must be obtained prior to the published Midpoint deadline of the term in which the first degree is to be awarded. Retroactive requests will not be considered. Ultimately, it is the student's responsibility to follow up with the academic units to verify that all Graduate School approvals and deadlines have been met.

Catalog Year

The catalog year determines the set of academic requirements that must be fulfilled for graduation. Students graduate under the catalog in effect when they first enroll as degree-seeking students at UF provided they maintain continuous enrollment. Students who are not registered for 3 or more consecutive terms (including any summer term) must reapply for admission and will be assigned the catalog in effect when enrollment

is resumed. With the approval of their college dean’s office, students may opt to graduate under the requirements of a later catalog, but they must fulfill all graduation requirements from that alternative year. The University will make every reasonable effort to honor the curriculum requirements appropriate to each student’s catalog year. However, courses and programs are sometimes discontinued and requirements may change as a result of curricular review or actions by accrediting associations and other agencies.

Change of Graduate Degree Program

If a student is seeking to move from a graduate degree program in one major into a graduate degree program in another major, the student must submit a new graduate admission application through the UF Office of Admissions website.

If a student is advancing from a master’s degree program to a Ph.D. degree program within the same major, graduate staff in that academic unit ought to add a new “program plan” to the student’s current active record in the Student Information System (SIS). See the instructions in the Student Program/Plan Training toolkit at this link: <https://learn-and-grow.hr.ufl.edu/toolkits-resource-center/student-information-systems/student-program-plan/>.

If a student is non longer pursuing a graduate degree in a particular program, the academic unit must request that “program plan” be discontinued in SIS. See the instructions in the Student Program/Plan Training toolkit at this link: <https://learn-and-grow.hr.ufl.edu/toolkits-resource-center/student-information-systems/student-program-plan/>.

Any changes to a graduate student’s degree program, including, but not limited to thesis/non-thesis/project option, MUST occur before the published midpoint deadline of the student’s final term.

Contact the Graduate School at graddata@ufl.edu for further assistance.

Courses and Credits

Undergraduate courses (1000-2999) may not be used to satisfy any graduate degree requirements. All 1000- and 2000-level courses may be taken on a satisfactory/unsatisfactory (S/U) basis.

Six credits of undergraduate courses (3000-4999) outside the major may count when taken as part of an approved graduate program. Consult the Academic Unit before registering.

Courses numbered 5000 and above are limited to graduate students, with the exception described under *Undergraduate Registration in Graduate Courses*. Courses numbered 7000 and above are normally for advanced graduate students.

No more than 5 credits each of 6910 (Supervised Research) and 6940 (Supervised Teaching) may be taken by a graduate student at UF. Students who have taken 5 credits of 6910 cannot take 7910; the rule also applies to 6940 and 7940. Courses numbered 7979 and 7980 are not eligible to count toward a master-level degree program.

Audited courses at any level do not count toward any graduate degree requirements.

For a complete list of approved graduate courses, see the courses page (<https://gradcatalog.ufl.edu/graduate/courses-az/>) within this catalog. Academic units decide which of these graduate courses to offer in

a given term. Contact the academic unit for information on available courses.

Generally, graduate courses may not be repeated for credit. However, there is no limit on courses numbered 6971 (but the Graduate School will only count a maximum of 6 credits of 6971 toward a thesis master’s-level degree), 6972, 6979, 7979, and 7980. Other courses repeated for credit will list a lifetime “max” **after the single-term credit**.

Professional course work: Graduate students may receive credit toward their degrees for courses in professional programs (e.g., J.D., D.V.M., or M.D.) when their advisers and graduate coordinators certify that the course work is appropriate for their programs and when the students receive permission from the academic units and colleges offering the courses. The courses must be letter-graded and earned with a grade of B or better. However, the associated grades in these professional courses are not included in the calculations of the overall GPA, major GPA, and minor GPA. Professional courses earned at other institutions must be approved by the Graduate School via the transfer credit process. In all cases, these credits are limited to a maximum of 9 credits toward the master’s degree and 30 credits toward the doctorate.

Classification of Students

Classification	Explanation
6	Postbaccalaureate students: Degree-holding students who have been admitted to postbaccalaureate status
7	Graduate students seeking a first master's degree
8	Graduate students who have earned a master's degree, or who have earned 36 or more credits while seeking a graduate degree, and who have not been admitted to doctoral candidacy
9	Graduate students who have been admitted to doctoral candidacy

Confidentiality of Student Records

The University ensures the confidentiality of student educational records in accordance with State University System rules, state statutes, and FERPA (<https://www2.ed.gov/policy/gen/guid/fpco/ferpa/?src=rn>), the Family Educational Rights and Privacy Act of 1974, as amended, also known as the Buckley Amendment.

Student directory information that can be released to the public is limited to

- Student name
- Local/permanent addresses
- Listed telephone number(s)
- Email address
- Class and college
- Major
- Minor
- Certificates
- Concentrations

- Enrollment status (e.g., undergraduate or graduate level; full-time or part-time)
- Dates of attendance at UF
- Degree(s) and awards received at UF
- Most recent previous educational institution attended
- Weight and height of university athletes
- Publication titles (theses and dissertations)
- Nature and place of employment at UF

Currently enrolled students must contact the appropriate agency/agencies **to restrict the release of directory information**. The Office of the University Registrar, the Department of Housing and Residence Education, and Human Resource Services routinely release directory information to the public. Directory information may also be released by other university departments and/or employees.

- Students who want to restrict directory information must do so at the Office of the University Registrar in 222 Criser Hall.
- Students who live on campus also must request this restriction from the Department of Housing and Residence Education (next to Beaty Towers).
- Students who are university employees also must request this restriction from Human Resource Services.
- Students who do not want their addresses, phones or personal information published on the Web should update their directory profile (<https://registrar.ufl.edu/address-change/>).

Student **educational records may be released** without your consent to school officials who have a legitimate educational interest in accessing the records. *School officials* shall include:

- An employee, agent or officer of the university or State University System of Florida in an administrative, supervisory, academic, research or support staff position;
- Persons serving on university committees, boards and/or councils; and
- Persons employed by or under contract to the university to perform a special task, such as an attorney or an auditor.

Legitimate educational interest shall mean any authorized interest or activity undertaken in the name of the university for which access to an educational record is necessary or appropriate to the operation of the university or to the proper performance of the educational mission of the university.

The university also may disclose information from your educational record without your consent to individuals or entities permitted such access under applicable federal and state law.

You have the right to review your own educational records for information and to determine accuracy. A photo I.D., other equivalent documentation or personal recognition by the custodian of record will be required before access is granted. Parents of dependent students, as defined by the Internal Revenue Service, have these same rights upon presentation of proof of your dependent status. Each spring when the catalog is published, students are notified of their FERPA rights (<https://catalog.ufl.edu/UGRD/academic-regulations/ferpa-confidentiality-student-records/>).

If you believe your educational record contains information that is inaccurate, misleading or in violation of your rights, you can ask the institution to amend the record. The UF Student Guide (<http://>

sccr.dso.ufl.edu/students/student-conduct-code/) outlines the procedures for challenging the content of a student record, as well as the policies governing access to and maintenance of student records.

If you believe the university has not maintained the confidentiality of your educational record as required by law, you may file a complaint by contacting:

The Family Policy Compliance Office
U.S. Department of Education
400 Maryland Avenue SW
Washington, D.C. 20202-5901

Examinations

Foreign Language Examination

A foreign language examination is not required for all degree programs. For specific information on foreign language requirements, contact the graduate coordinator of your academic unit.

Examinations

The student must register for sufficient and appropriate graduate credits during the term any examination is taken. The student's supervisory committee is responsible for administering the written and oral qualifying examinations and the final oral examination for the defense of the thesis, project, or dissertation.

On rare occasion by virtue of scheduling conflicts beyond the control of the student, examinations may occur on days between terms (break period) with the approval of the supervisory committee. This approval does not, by any means, replace existing requirements to meet published registration and deadlines for degree certification in a particular term.

Qualifying Examinations and Final Examinations administered during a break period are only valid if the student was enrolled in at least one of the terms on either side of the break. The examination will always be associated with the term immediately preceding the break, provided the student was enrolled for that term. Otherwise, the examination will be associated with the term immediately following the break.

All members of the supervisory committee must sign the appropriate forms, including the Electronic Thesis and Dissertation (ETD) Signature Page, for the student to meet the requirements of the examination. Once a successful defense has occurred, the academic unit should submit the Final Exam form via the Student Information System (SIS); signed forms are to remain in the student's folder in the academic unit. Electronic information will be forwarded to the Graduate School via (SIS). Next, the student will then submit the UF Publishing Agreement with their preferred restriction selected via the Graduate Information Management System (GIMS). The signed ETD Signature Page should be held by the Academic Unit until all Committee stipulations have been met regarding the document; however, it should be posted electronically to GIMS no later than the Final Submission Deadline for the intended term of degree award.

The qualifying and comprehensive oral examinations and the oral defense of a thesis, project, or dissertation may be conducted using video and/or other appropriate forms of telecommunication in rare circumstances. For the full policy regarding physical presence at the defense, please see <https://grad.ufl.edu/media/gradufl.edu/pdf/phys-pres.pdf>.

Supervisory Committees or academic units may set their own standards for attendance at oral examinations that exceed the minimum requirement stated above.

Students are responsible for coordinating the scheduling of oral examinations with their committee or academic unit and must follow the policies set by their committee or academic unit, and the Graduate School.

The written comprehensive examination for the non-thesis master's degree may be taken at a remote site. The academic unit's policy must specify arrangements for electronic security, proctoring, and the identification of the candidate.

Grades

Passing, Non-Punitive and Failing Grades: The Office of the University Registrar records student grades. The word "credit" refers to one semester hour, generally representing one hour per week of lecture or two or more hours per week of laboratory work.

The only passing grades for graduate students are A, A-, B+, B, B-, C+, C, and S. Grades of B-, C+ or C count toward a graduate degree if an equal number of credits in courses numbered 5000 or higher have been earned with grades of B+, A- and A, respectively. Grade points are not given for S and U grades; S and U grades are not used to calculate grade point averages. All letter-graded courses eligible to count toward the graduate degree, except 1000- and 2000-level courses, are used to calculate the cumulative grade-point average. Letter grades of C-, D+, D, D- or E are not considered passing at the graduate level, although the grade points associated with these letter grades are included in grade point average calculations.

Satisfactory/Unsatisfactory: Grades of S and U are the only grades awarded in courses numbered 6910 (Supervised Research), 6940 (Supervised Teaching), 6971 (Research for Master's Thesis), 6972 (Engineer's Research), 7979 (Advanced Research), and 7980 (Research for Doctoral Dissertation). Additional courses for which S and U grades apply are noted in the academic unit offerings in the Programs Section of this catalog (<https://gradcatalog.ufl.edu/graduate/programs-college/>).

All language courses, regardless of level, may be taken S/U if the student's major is not a language and the courses are not used to satisfy a minor, with approval from the student's supervisory committee chair and the instructor of the course. S/U approval should be made by the published deadline date. All 1000- and 2000-level courses may be taken S/U. No other courses (graduate, undergraduate, or professional) may be taken for an S/U grade.

Deferred grade H: The grade of H is not a substitute for a grade of S, U, or I. Courses for which H grades are appropriate must be so noted in their catalog descriptions, and must be approved by the Graduate Curriculum Committee and the Graduate School. This grade may be used only in special situations where the expected unit of work may be developed over a period of time greater than a single term. All grades of H must be removed before a graduate degree can be awarded.

Incomplete grades: Grades of I (incomplete) carry zero grade points. All grades of I must be changed before a graduate degree can be awarded.

Grades and Grade Points Prior to Summer A 2009

Grades	Grade Points
A	4.0
B+	3.5
B	3.0
C+	2.5
C	2.0
D+	1.5
D	1.0
E	0
WF	0
I	0
NG	0
S-U	0

Grades and Grade Points Effective Summer A 2009

Grades	Grade Points
A	4.0
A-	3.67
B+	3.33
B	3.0
B-	2.67
C+	2.33
C	2.0
C-	1.67
D+	1.33
D	1.0
D-	0.67
E	0
WF	0
I	0
NG	0
S-U	0

Note: The degree-granting college may require a minimum grade of C in particular courses. GPA calculations are truncated (not rounded) and displayed on the transcript to the hundredths place.

Non-Punitive Grades and Symbols:

Non-Punitive Grade, Zero Grade Points, Not Counted in GPA	Grade Points
W	Withdrew
U	Unsatisfactory
H	Deferred grade assigned only in approved sequential courses or correspondence study
N*	No grade reported is not considered a failing grade for non-graduating students. However, if not changed after 150 days, it will be counted as a failing grade and used in grade point average computations. Graduating students receive a failing grade of NG.

I*	Incomplete is not considered a failing grade for non-graduating students. However, if not changed after 150 days, it will be counted as a failing grade and used in grade point average computations. Graduating students receive a failing grade of I.

Failing Grades:

Failing Grade, Zero Grade Points, Counted in GPA	Grade Points
E	Failure
WF	Withdrew failing
NG	No grade reported
I	Incomplete

Unsatisfactory Progress or Unsatisfactory Scholarship

Any graduate student may be denied further registration if progress toward completing the program becomes unsatisfactory to the academic unit, college, or Dean of the Graduate School. Unsatisfactory scholarship is defined as failure to maintain a B average (3.00) in all work attempted. Graduate students need an overall GPA of 3.00 truncated and a 3.00 truncated GPA in their major (and in the minor, if a minor is declared) at graduation. Students with less than a 3.00 GPA may not hold an assistantship or fellowship.

Non-Discrimination/Harassment/Invasion of Privacy Policies

The University of Florida is committed to providing all members of our community with fair treatment, regardless of their sex, gender identity, or sexual orientation. As such, the University strives to protect our students, employees, volunteers, and visitors from any form of discrimination or unwelcome conduct on the basis of sex, including sexual orientation and gender identity. These behaviors will not be tolerated at the University, and any individual who engages in such conduct will be subject to disciplinary action. UF's full Non-Discrimination Policy can be found here (<https://titleix.ufl.edu/wp-content/uploads/2020/08/Non-discrimination-policy-UF.pdf>).

Title IX is a federal civil rights law that prohibits discrimination on the basis of sex, sexual orientation, or gender identity in federally funded education programs or activities. Title IX addresses sexual harassment, sexual violence, or any gender-based discrimination that may deny a person access to educational benefits and opportunities. Under Title IX, schools must ensure that all students and employees have equal access to education and educational facilities, regardless of sex, sexual orientation, or gender identity. Sexual harassment and sexual violence are forms of gender discrimination that are prohibited by Title IX.

For guidance and the full policies related to Title IX protection and gender equity, please visit the following pages:

- <https://titleix.ufl.edu/about/statements> (<https://titleix.ufl.edu/about/statements/>)
- <https://titleix.ufl.edu/about/laws-policies> (<https://titleix.ufl.edu/about/laws-policies/>)
- <https://policy.ufl.edu/policy/gender-equity> (<https://policy.ufl.edu/policy/gender-equity/>)

Complaints and Appeal Procedures

The Title IX Compliance Office provides support to anyone affected by sexual misconduct, discrimination, harassment, or violence. Visit <https://titleix.ufl.edu/report/> to report incidents of sexual misconduct, discrimination, harassment, or violence. This includes sexual assault, sexual exploitation, sex discrimination (discrimination on the basis of gender identity, gender expression, and sexual orientation), sexual harassment, dating and domestic violence, retaliation, and stalking.

If you would prefer to speak to someone or require assistance in completing this form, you may contact (<https://titleix.ufl.edu/contact-us/>) the Title IX Compliance Office. Anyone who feels that they have been subjected to prohibited conduct is encouraged to bring it to the attention of the University's Title IX Coordinator.

Registration Requirements

The University of Florida operates on a semester system consisting of two 16-week terms and two 6-week summer terms. One semester credit equals 1.5 quarter credits. "Term" is used hereafter instead of "semester."

Required Full-Time Registration

Graduate Assistants: The full-time registration requirement is reduced for students who are graduate assistants, based on the appointment's FTE. The most common assistantships have an FTE of .25 - .74 and require the following registration: 9 credits for fall and 9 credits for spring. Summer A appointees must be registered for 3 credits, and Summer B appointees must be registered for 3 credits. For students on appointment for Summer C, registration must equal 6 credits. The chart below provides additional details regarding appropriate registration for various circumstances.

Students on appointment are financially liable for credits in excess of the required number. If a student on appointment drops below the required registration at any time in the semester, the student becomes financially liable for the entire registration. Students who do not register properly are not permitted to remain on appointment.

Graduate Assistantship Tuition Waiver and Registration Requirements

FTE of Graduate Assistantship	Registration Requirements & Waiver
Fall and Spring Semesters	
.01-.24 FTE	12 credits (no waiver - Petition Required by Graduate School)
.25-.74 FTE	9 credits (waiver)
.75-.99 FTE	6 credits (waiver)
1.00 FTE	3 credits (waiver)
Summer A Semester	
.01-.24 FTE	4 credits (no waiver - Petition Required by Graduate School); (A or C; A & C); Cannot be registered in B
.25-.74 FTE	3 credits (waiver) (A or C; A & C); Cannot be registered in B
.75-.99 FTE	2 credits (waiver) (A or C; A & C); Cannot be registered in B
1.00 FTE	2 credits (waiver) (A or C; A & C); Cannot be registered in B
Summer B Semester	
.01-.24 FTE	4 credits (no waiver - Petition Required by Graduate School); (B or C; B & C); Cannot be registered in A

.25-.74 FTE	3 credits (waiver) (B or C; B & C); Cannot be registered in A
.75-.99 FTE	2 credits (waiver) (B or C; B & C); Cannot be registered in A
1.00 FTE	2 credits (waiver) (B or C; B & C); Cannot be registered in A
Summer C Semester	
.01-.24 FTE	4 credits (no waiver - Petition Required by Graduate School); A & B or A & C or B & C or C; Cannot be in A only / Cannot be in B only
.25-.74 FTE	6 credits (waiver) A & B or A & C or B & C or C; Cannot be in A only / Cannot be in B only
.75-.99 FTE	4 credits (waiver) A & B or A & C or B & C or C; Cannot be in A only / Cannot be in B only
1.00 FTE	2 credits (waiver) A & B or A & C or B & C or C; Cannot be in A only / Cannot be in B only

Pre-doctoral Fellowship: Required registration for students who are appointed as pre-doc fellows with stipends of \$4,000 or greater is 12 credits for fall and spring. Required registration for students who are appointed as pre-doc fellows with stipends of less than \$4,000 is 3 credits for fall and spring. Pre-doc fellows, whose stipends are more than \$2,000 are required to register for 4 credits in the appropriate combination of Summer A, B, or C terms (see chart below). Pre-doc fellows with stipends of less than \$2,000 are required to register for 2 credits in the appropriate combination of Summer A, B, or C terms (see chart below).

Students on a pre-doctoral fellowship with a stipend of more than \$4,000 (or \$2,000 for summer terms) are financially liable for credits in excess of the required number. Likewise, if a student on pre-doc fellowship drops below the required registration at any time in the semester, the student becomes financially liable for the entire registration. Students who do not register properly are not permitted to remain on the pre-doc fellowship.

Pre-Doctoral Fellowship Memorandum of Understanding (MOU) Tuition Waiver and Registration Requirements

Stipend	Registration Requirements & Waiver
Fall and Spring Semesters	
Earning \$4,000 or more	12 credits (waiver)
Earning less than \$4,000	3 credits (no waiver)
Summer A Semester	
Earning \$2,000 or more	4 credits in either A or C or A & C (waiver); cannot be in B
Earning less than \$2,000	2 credits in either A or C or A & C (no waiver); cannot be in B
Summer B Semester	
Earning \$2,000 or more	4 credits in either B or C or B & C (waiver); cannot be in A
Earning less than \$2,000	2 credits in either B or C or B & C (no waiver); cannot be in A
Summer C Semester	
Earning \$4,000 or more	8 credits in either A & B or A & C or B & C or C (waiver); Cannot be all in A or all in B

Earning less than \$4,000	2 credits in either A & B or A & C or B & C or C (no waiver); Cannot be all in A or all in B

Registration as Graduate Students

Full-time registration is 9 to 12 credits. Students not on an appointment may want to enroll full time to finish their degrees in the minimum time frame or may be required to enroll full time by external funding agencies or their academic units.

Registration for fewer than 9 to 12 credits may be considered equivalent to full-time enrollment in specific circumstances, such as internships or fieldwork required for all students within the degree program, or lockstep programs (e.g., M.B.A.). Upon petition by the academic unit and under circumstances directed by Graduate Council policy, the Graduate School may certify specified students as meeting full-time equivalency.

Part-time registration: Students not on an appointment and without a specific registration requirement by the academic unit, external funding agency, or government may register as a part-time student. Minimum registration is 3 credits in fall or spring and 2 credits in summer.

Part-time registration and financial aid: Graduate students should be aware that in order to qualify for most financial aid programs (federal, state, or institutional), students must be enrolled at least half-time. For financial aid purposes, a grad student must be enrolled for five hours during fall or spring term, four hours during summer term. In addition, due to limited funds, priority is generally given to full-time students.

- For more information: <http://www.sfa.ufl.edu/receiving/enrollment-requirements/>

Employee registration: UF staff employed on a permanent, full-time basis may be permitted to waive fees up to a maximum of 6 credits per term on a space-available basis. Enrollment is limited to courses that do not increase direct costs to the University. Courses that increase direct costs can include TBA (to be arranged), computer courses, individualized courses, distance learning, internships, and dissertation and master's thesis courses. Laboratory courses are permitted on a space-available basis.

- For updated information: <http://www.hr.ufl.edu/>

Undergraduate registration in graduate courses: Upper-division undergraduate students may enroll in 5000-level courses with consent of the instructor. Normally, a student must have a GPA of at least 3.00. To enroll in 6000-level courses, a student must have senior standing, consent of the instructor, and an upper-division GPA of at least 3.00.

After a student is accepted to graduate school, up to 15 credits of graduate-level courses earned with a letter grade of B or better taken under this provision may be applied toward a graduate degree at UF if credit for the course has not been used for an undergraduate degree, and if the transfer is approved by the academic unit and made as soon as the student is admitted to a graduate program.

Exam and Final-term registration: During the term, the final examination is given, and during the term the degree is awarded, a student must be registered for at least 3 credits in fall or spring and 2 credits in summer. Thesis students must enroll in 6971 and doctoral students must enroll in 7980. Project students are required to take 3 credits of 6973/6979 (Project in Lieu of Thesis) in their final term (2 credits if the final term is summer). Non-thesis students must enroll in coursework that counts

toward a graduate degree. Students on a fellowship, traineeship, or assistantship must be registered appropriately for their appointments.

Clear prior: Clearing prior status is only possible for thesis and dissertation students who have met all published deadlines for the current term except Final Submission and/or Final Clearance from the Graduate School's Thesis, Dissertation, and Publications Office. No other students are eligible. Clear Prior permits students to be exempt from registration for the term in which the degree will be awarded. Although not required to register during the term of degree award, students are required to file a new degree application for that term within all published deadlines for doing so, as degree applications do not carry over from semester to semester and are essential for the degree to be awarded.

A student requesting to clear prior must meet ALL of the following criteria:

- Student has successfully submitted a degree application for the current term within the published deadlines, as confirmed by print screen available from ONE.UF (<https://one.ufl.edu/>)
- Student has appropriately satisfied the current term registration.
- Student has successfully met the current term first submission deadlines for the thesis or dissertation, as confirmed by the the Graduate School's Thesis, Dissertation, and Publications Office, via a confirmation email to the student and committee chair.
- Student has successfully met all other degree and administrative requirements, within the published deadlines for the current term, except Final Submission and/or Final Clearance with the Graduate School's Thesis, Dissertation, and Publications Office.
- Student is in the process of finalizing the thesis or dissertation with the Graduate School's Thesis, Dissertation, and Publications Office. No other students are eligible.

Drop/add: Courses may be dropped or added during drop/add without penalty. This period usually lasts 5 UF business days in the fall and spring semesters or 2 business days for summer semesters, starting with the first day of the term. Classes that meet for the first time after drop/add may be dropped without academic penalty or fee liability by the end of the next business day after the first meeting. This does not apply to laboratory sections. After this period, a course may be dropped and a W appears on the transcript. Students become financially liable for any course added or dropped after the deadline, including students with tuition waivers. Prior to the last day of classes for each term, students should personally verify all registration changes and any required adjustments online on ONE.UF (<https://one.ufl.edu/>). Retroactive drop/add will not be permitted.

Retaking courses: In this context, repeating courses refers only to a repetition of the same course where no significant change in content has occurred. It does not include repetition of seminars, special problems, dissertation, thesis or other courses that have varying content. Normally, Graduate Students may only repeat courses in which a failing grade (C-, D+, D-, or E) was earned. Courses in which a C (2.0) or higher was earned can only be repeated if approved by the academic unit, the college, and the Graduate School via a formal petition process. Effective Spring 2020 term and forward, University of Florida coursework that is repeated will be counted in the computation of the UF grade point average as many times as grades for that course are recorded. Please note, however, credits will only be awarded once. Repeating a course for credit may not be used to resolve an incomplete grade. If enrollment is needed for completion, then auditing the course is the appropriate registration.

Tuition/Fee Waivers

Waivers authorized through the UF Grad Letters of Appointment file for Graduate Research Assistants, Graduate Teaching Assistants, and Fellows will be automatically entered into your student account. Questions concerning the Letter of Appointment file or a graduate or fellow waiver should be directed to your department or to Academic Personnel (<http://aa.ufl.edu/>).

Student Conduct Code and Conflict Resolution

Student Conduct Code

The University of Florida is an institution that encourages the intellectual and personal growth of its students as scholars and citizens. As an educational institution, the University recognizes that the transmission of knowledge, the pursuit of truth and the development of individuals requires the free exchange of ideas, self-expression, and the challenging of beliefs and customs. In order to maintain an environment where these goals can be achieved safely and equitably, the University promotes civility, respect, and integrity among all members of the community. Students are expected to exhibit high standards of behavior and concern for others.

The University strives to protect and guide the educational community by establishing a Student Conduct Code that promotes individual and social responsibility. Choosing to join the University of Florida community obligates each member to a code of civilized behavior. Individuals and student organizations are expected to adhere to the policies and regulations of the University of Florida and the State of Florida. University policies have been designed to protect individuals and the campus community and to create an environment conducive to achieving the academic mission of the institution. Please review the Student Conduct Code found at the following site: (<https://sccr.dso.ufl.edu/students/student-conduct-code/>). All students are expected to follow these expectations. Click the image below to access the most up-to-date version of the Orange Book, or click here (<https://policy.ufl.edu/regulation/4-040/>).

UF Regulation 4.040 Student Honor Code and Student Conduct Code can also be found on the regulations.ufl.edu website (<https://policy.ufl.edu/regulation/4-040/>).

Conflict Resolution

The conflict resolution services provide students an avenue to address and resolve interpersonal conflicts which may include but are not limited to conflicts between members of a student organization, roommates, students within a class or study group, faculty/staff and students, and friends. The UF Conflict Resolution program has become nationally recognized for its work at helping parties successfully resolve conflicts. Conflict resolution staff are also available to come to groups, classes and organizations to present workshops on conflict resolution and to provide training on resolving conflicts. For referral or to request conflict resolution services, visit <https://sccr.dso.ufl.edu/students/conflict-resolution/>

FERPA & the Buckley Amendment (The Family Educational Rights and Privacy Act of 1974)

The university ensures the confidentiality of student records in accordance with the provisions of various federal, state, and university regulations, including the Family Educational Rights and Privacy Act

of 1974 (FERPA), as amended, also known as the Buckley Amendment. The statutes and regulations also provide certain rights to students concerning their education records (<https://registrar.ufl.edu/ferpa/glossary/#educationrecords>). All student records, including but not limited to academic records, counseling records, and disciplinary records, are confidential and cannot be released without the student's consent, except directory information that may be released without the consent of the student. The Office of the University Registrar routinely releases directory information to the public. Currently enrolled students must contact the Office of the University Registrar if they wish to restrict release of directory information. Directory information may also be released by other university departments and/or employees. For further guidance, please consult <https://registrar.ufl.edu/ferpa/>.

Preparation for Final Term

The student is responsible for meeting all requirements and observing every deadline. Deadlines are given in this catalog and online at the Graduate School website.

Thesis and Dissertation students:

When the thesis or dissertation is ready to be put in final form for submission to the Graduate School, the student should review the Format Requirements of the Graduate School's Thesis, Dissertation, and Publications Team (<https://grad.ufl.edu/academics/editorial/etd-specs/>) and should work with the Thesis and Dissertation Formatting Support Center (<http://helpdesk.ufl.edu/application-support-center/>) to format the document in order to meet the minimum submission requirements of the Graduate School's Thesis, Dissertation, and Publications Office.

In order to meet degree requirements, all thesis and dissertation students must gain acceptance status with the Graduate School's Thesis, Dissertation, and Publications Office by each of the posted deadlines (<http://graduateschool.ufl.edu/about-us/offices/editorial/editorial-deadlines/>) for the term in which they intend for the degree to be awarded. Upon submission to the Graduate School, a thesis or dissertation should be near-final and completely formatted. It will not be accepted as meeting the first submission requirements in draft form.

The Thesis and Dissertation Formatting Support Center offers students assistance with troubleshooting their documents free of charge. It is highly recommended that all students writing theses and dissertations use their services in order to alleviate some of the stress felt during the approval process.

Please also note that all master's theses must be orally defended before submission to the Graduate School is possible. Therefore, the Final Exam data must be posted to SIS by departmental staff before the document can be submitted to the Graduate School's Thesis, Dissertation, and Publications Office for the first submission review.

Subsequently, a master's student who does not defend the thesis prior to the first submission deadline (<http://graduateschool.ufl.edu/editorial/deadlines/>) will not be eligible for a degree award in the current term; nor is the student a clear-prior candidate to the following term since they were unable to meet the first submission requirement during the posted deadlines for the term. Upon final submission to the Graduate School, the thesis or dissertation must be of publishable quality as defined by the Graduate School's Thesis, Dissertation, and Publications Office and must be in a form suitable for publication, using the Graduate School's format requirements found here (<http://www.graduateschool.ufl.edu/about-us/offices/editorial/format-requirements/>) and within the Guide for Preparing Theses and Dissertations (<http://www.graduateschool.ufl.edu/media/graduate-school/pdf-files/Guide-for-ETDs-2021.pdf>). All submission documents found on the checklists (<http://graduateschool.ufl.edu/graduate-life/graduation/graduation-checklist/#den240936>) must

be recorded and posted to the student's record within all published deadlines (<http://graduateschool.ufl.edu/about-us/offices/editorial/editorial-deadlines/>) for the term. The student's academic unit is responsible for the academic merit, quality, and scholarship of their student's manuscripts.

All students: All program plan data for degree applicants (other than final examinations) must be finalized prior to the midpoint of the term.

Students must submit a Degree Application (<https://registrar.ufl.edu/services/degreeapp.html>) on ONE.UF (<https://one.ufl.edu/>) before the published deadline of the term and must meet minimum registration requirements. **Degree Applications do not carry over from one semester to the next.** If the degree is not awarded, the student must:

- request that their academic unit remove their name from the current term degree list
- re-apply for the degree award via ONE.UF (<https://one.ufl.edu/>) in a subsequent term, by the published deadline for that term; and
- meet all other requirements for the term the degree will be awarded.

These requirements also apply when a thesis or dissertation student has been approved to clear prior by the Graduate School's Thesis, Dissertation, and Publications Team.

Verification of Degree Candidate Status

This service is provided until 3 weeks before graduation. However, students who have completed all requirements for the degree before that time, have filed the fully signed final examination report with their academic unit, and have achieved final clearance status for the thesis or dissertation with the Graduate School may request verification to that effect.

Verification of Degree Candidate Status Request Forms (<https://grad.ufl.edu/academics/sf/>) are filled out by the candidate and signed by the supervisory committee chair, department chair, and college dean; then, the form is forwarded to the Academic Career Tracking (<https://grad.ufl.edu/academics/act/>) team within the Graduate School for processing. Although a student may have fulfilled academic requirements, the degree is not awarded until the Graduate School certifies the degree to the University Registrar. That is done at the end of fall, spring, and Summer C terms for all students who completed degree requirements and applied to graduate. Some employers and licensure boards require the degree statement on the transcript, available the day after certification in December, May, and August.

Note

Printing/saving a catalog page to PDF: To expand all subheadings on a page and to print/save the fully expanded page, use the print to PDF button on the orange toolbar at the top of each page within this catalog. While the information on the individual online pages may contain recent updates, the information in the archived full-print PDF catalog reflects the requirements as recorded for the current Academic Year. Contact individual programs for further updates.

Catalog updates: Updates to this catalog should be submitted via the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>). Please also feel free to report any revisions or discrepancies via email to grad-catalog@ufl.edu.

Graduate Catalog Publication Policy

The Graduate Catalog is published annually by the University of Florida and has been adopted as a rule of the University pursuant to the provision of Chapter 120 of the Florida Statutes. Published editions of this official record correspond to an academic year and will remain in effect as published from the Fall Term through the following Summer C Term. The Graduate Catalog provides official university rules, policies and regulations; it establishes minimum eligibility requirements for admission and reflects degree requirements; it provides approved calendar and curricular information; and it contains general information about the University community, the University, and its services and facilities.

Updates to the Graduate Catalog

Changes will be made to this academic record to correct errors or omissions. The University is not responsible for information obtained through Internet links from this catalog to other websites. Every effort has been made to ensure the accuracy of information. However, all courses, course descriptions, degree requirements, and fees are subject to change. Updates to the material listed within the Graduate Catalog should be sent to the editors, via an email to grad-catalog@ufl.edu; every effort will be made to ensure the accuracy of the material listed herein.

Saving to PDF and Printing Pages from the Catalog

To view all subheadings on a page and to print or save the fully expanded PDF of the page, please use the print options button on the orange toolbar at the top of the page, reporting any revisions or discrepancies to the page via an email to gradcatalog@aa.ufl.edu (<https://gradcatalog.ufl.edu/graduate/degrees/mail%20to:gradcatalog@aa.ufl.edu>). PDFs can be exported to Microsoft Word in order to use the Tracked Changes feature. The entire archived version of the annual catalog can also be downloaded in full by using the print options button as well.

Graduate Certificates

Graduate Certificate

A Graduate Certificate program is

- a formal collection of courses that together form a coherent program of study offered through an academic unit
- recognition of the acquisition of knowledge and skills in a given field of study
- an academic credential granted by the University of Florida

As such, all Graduate Certificates must follow the requirements of admission, successful completion of approved graduate-level coursework, application to receive the credential, and enrollment during the term in which the certificate is awarded and posted to the transcript.

Additional information can be obtained from the academic unit offering the certificate.

Graduate Certificates List

For the list of available Graduate Certificates, please see below. For UF Certificate Student Learning Outcomes related to those certificates, go to the SLO Dashboard (<https://public.tableau.com/app/profile/uf.oipr4918/viz/UFStudentLearningOutcomesCertificatesOnly/>)

StudentLearningOutcomes/?publish=yes) and use the "Certificate" drop-down menu to filter your search.

Agricultural and Life Sciences

Agriscience Secondary Teaching Preparation
Applications in AI-based SmartAg Systems
Aquaculture and Fish Health
Beekeeping
Biodegradation and Bioremediation
Biosecurity and Biological Invasions
Clinical Laboratory Microbiologist
Ecological Restoration
Environmental Education and Communication
Environmental Microbiology
Fertilizer Science and Technology
Forest Health and Resilience
Geospatial Analysis
Landscape Pest Management
Leadership in Agriculture and Natural Resources
Mapping with Unmanned Aerial Systems
Medical Entomology
Microbiome and Health
Natural Resource Policy and Administration
Nonprofit Leadership
Plant Pest Risk Assessment and Management
Quantitative Fisheries Science
Soil Ecosystem Services
Soil, Water, and Public Health
Sustainable Agroecosystems
Sustainable Land Resource and Nutrient Management
Teaching and Learning in Agricultural and Life Sciences
Tropical Agriculture
Urban Pest Management
Weed Science
Wetland and Water Resource Management
Wildlife Forensic Sciences and Conservation

Arts

Arts in Medicine
Arts in Public Health
Curatorial Studies
Museum Studies
Music Business & Entrepreneurship

Business

Financial Services
Tourism and Hospitality Business Management

Design, Construction and Planning

AI in Architecture
Construction Project Management
Emergency Services/Disaster Management
Geographic Information Systems (GIS) for Urban/Regional Planners
Healthcare Design Integration
Historic Preservation
Public Interest Design
Sustainable Architecture
Sustainable Construction
Sustainable Design
Themed Environments Integration

Urban Analytics

Education

Computer Science K-12 Teaching
 Disabilities in Society
 Dyslexia Assessment & Intervention
 Early Childhood Care and Education Policy
 Early Childhood Studies
 Instructional Design
 K-12 Teaching with Technology
 Language, Education, and Technology
 Learning Analytics
 Managing Distance Education Environments
 Online Teaching and Learning
 Science or Mathematics Teaching
 Secondary English Teaching Preparation
 Secondary Teaching Preparation
 Teacher Leadership

Engineering

Advanced Manufacturing
 Advanced SmartAg Systems
 Advanced Transportation Technologies
 Artificial Intelligence
 Biological Systems Modeling
 Biomaterials and Tissue Engineering
 Civil Infrastructure Assessment
 Coastal Engineering and Management
 Coastal Resilience Engineering
 Control Systems
 Critical Infrastructure Protection
 Energy Management
 Engineering Education
 Engineering Innovation
 Engineering Leadership
 Engineering Project Management
 Financial Math and Optimization
 Financial Risk Analysis and Management
 Financial Technology
 FinTech
 Fundamental Computer Science
 Hardware and System Security
 Information Security
 Machine Learning
 Materials Characterization
 Scientific Computing
 Solar Energy
 Sustainable and Resilient Energy Engineering
 Systems Engineering
 Transportation Operations and Planning
 Wetland Sciences

Health and Human Performance

Artificial Intelligence and Data Analytics in Tourism,
 Hospitality and Event Management
 AI and Sport Science in Human Performance
 Human Performance in Tactical, Flight, and Space Operations
 Integrative Strength and Conditioning Science
 Sport and Exercise Physiology
 Sport Event Management
 Sport Psychology and Elite Human Performance

Sports Media and Communication

Journalism and Communications

Audience Analytics
 Cross-Media Sales
 Global Strategic Communication
 Health Communication
 Science Communications
 Social Media Professional
 Sports Media and Communication
 Web Design and Online Communication

Liberal Arts and Sciences

African Studies
 Applied Atmospheric Sciences
 Chemical Physics
 Digital Geography and GIS
 Digital Humanities
 Gender and Development
 Gerontology
 Global Islamic Studies
 Holocaust Studies
 Latin American Studies
 Medical Anthropology
 Medical Geography and Global Health
 Medieval Archaeology
 Modern European Studies
 Political Campaigning
 Public Affairs
 Public Archaeology
 Second Language Acquisition and Teaching
 Sustainable Development Practice
 Theory, Modeling, and Computation of Molecules and
 Materials
 Translation Studies
 Tropical Conservation and Development Program
 Women's Studies

Medicine

Addiction and Recovery
 Aging and Geriatric Practice
 AI and Data Science in Healthcare
 Anatomical Sciences Education
 Biomedical Informatics
 Biomedical Neuroscience
 Cancer: Biology, Epidemiology, and Outcomes
 Clinical and Translational Science
 Fundamental Aptitude in Clinical and Translational Science
 Implementation Science
 Medical Anatomy and Physiology
 Medical Biochemistry and Molecular Biology
 Medical Human Anatomy
 Medical Microbiology
 Medical Pharmacology and Therapeutics
 Medical Physiology
 Medical Physiology - Cardiovascular/Renal Physiology

Pharmacy

Advanced Forensic DNA Technology
 Applied Pharmacoeconomics
 Artificial Intelligence in Pharmacy

Clinical Pharmacogenomics
 Clinical Pharmacology and Drug Development
 Clinical Research Regulation in Pharmacy
 Clinical Toxicology
 Comprehensive Medication Management
 Forensic Death Investigation
 Forensic DNA and Serology
 Forensic Drug Chemistry
 Fundamentals of Forensic Science
 Health Equity
 Managed Care Pharmacy Systems
 Model-Informed Drug Development
 Occupational Toxicology
 Pharmaceutical Chemistry
 Pharmaceutical Regulation
 Pharmaceutical Value Assessment and Communications
 Precision Medicine

Public Health and Health Professions

Artificial Intelligence in Public Health and Healthcare
 Forensic Vocational Rehabilitation
 Geriatric Care Management
 Global Health
 One Health
 Psychiatric Epidemiology
 Public Health

Veterinary Medicine

Animal Shelter Leadership
 Care and Conservation of Aquatic Animals
 Forensic Toxicology
 Shelter Medicine
 Veterinary Forensic Sciences

Graduate Certificate Policies

For the Graduate Certificate Policy, please download:
<https://grad.ufl.edu/media/gradufl.edu/pdf/certificate-pp.pdf>

For information about the policies governing certificates, please visit the Office of the Provost's website:
<http://aa.ufl.edu/> (<http://aa.ufl.edu/policies/#C>)

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Accounting

ACG 5005 Financial Accounting 2 Credits

Grading Scheme: Letter Grade

Introduction for prospective managers. Primary emphasis on financial reporting and analysis.

ACG 5025 Financial Accounting 3 Credits

Grading Scheme: Letter Grade

Financial reporting and statement analysis including techniques, cash flow, and impact of accounting principles.

ACG 5065 Financial and Managerial Accounting 3 Credits

Grading Scheme: Letter Grade

Financial statement analysis including techniques, cash flow, and impact of accounting principles. Management control systems: planning, budgeting, reporting, analysis, and performance evaluation.

Prerequisite: designed for MBA students.

ACG 5075 Managerial Accounting 2 Credits

Grading Scheme: Letter Grade

Introduction for prospective managers. Primary emphasis on management control systems.

Prerequisite: ACG 5005.

ACG 5076 Managerial Accounting 3 Credits**Grading Scheme:** Letter Grade

Overview of how managers use accounting information for planning, performance evaluation, and decision-making purposes. Topics include product costing methods, activity-based costing, cost-volume-profit analysis, profit planning, performance evaluation, relevant cost analysis, cash flow analysis, and capital investment decisions. The overriding goal of the course is to help non-accountants become competent participants in the managerial decisions of their organizations.

Prerequisite: ACG 5025.**ACG 5226 Advanced Accounting 2 Credits****Grading Scheme:** Letter Grade

Reporting of business combinations, equity method of accounting for investments in stocks, and issues concerning consolidated financial statements.

Prerequisite: 7AC Standing; ACG 5647 (C) and TAX 5027 (C)**ACG 5505 Governmental Accounting 2 Credits****Grading Scheme:** Letter Grade

Reporting by state and local governmental organizations and not-for-profit entities.

Prerequisite: 7AC standing; ACG 5226**ACG 5637 Auditing I 2 Credits****Grading Scheme:** Letter Grade

Concepts and theory underlying the audit of third party assertions. Coverage includes the audit environment, risk assessment, evidential search and evaluation, internal controls, audit programs and audit reporting.

Prerequisite: (ACG 4111 and ACG 4341 with minimum grades of C, senior standing or higher, accounting major) OR (Master of Science in Information Systems and Operations Management student, Auditing Minor student, and ACG 5075 with minimum grade of C).

ACG 5647 Auditing II 2 Credits**Grading Scheme:** Letter Grade

Second of a two course sequence. Applies the concepts and theory of auditing to gain assurance about key business processes and financial statement assertions. Coverage includes: audit sampling, revenue process, acquisition process, human resource management process, inventory management, resource management processes; completion activities, audit reports and subsequent events.

Prerequisite: (ACG 5637 or ACG 4632 with minimum grades of C, senior standing or higher, accounting major) OR (Master of Science in Information Systems and Operations Management student, Auditing Minor student, ACG 5637 with minimum grade of C).

ACG 5815 Accounting Regulation 2 Credits**Grading Scheme:** Letter Grade

Private and public sector accounting institutions and their respective professional literature. Research techniques for addressing accounting issues emphasized through case assignments.

Prerequisite: ACG 5647 (C) and Class GE 7AC.**ACG 6107 Accounting for Income Taxes 2 Credits****Grading Scheme:** Letter Grade

In-depth study of the financial reporting standards for the effects of income taxes on a corporation's operating results and financial position.

Prerequisite: TAX 5065 with a minimum grade of C. Graduate accounting students only

ACG 6136 Accounting Theory 2 Credits**Grading Scheme:** Letter Grade

Theoretical frameworks essential to explore structure, features, and limitations of accounting and financial reporting.

Prerequisite: ACG 5815, 7AC standing.**ACG 6175 Financial Reporting and Analysis 2 Credits****Grading Scheme:** Letter Grade

Analyzing a firm's financial and accounting information from a user's perspective on financial reporting. Topics include: integration of firm strategy with accounting information content, effects of alternative accounting principles, and how accounting measures can be used as anchors for valuation.

Prerequisite: ACG 5226, Class GE 7, and College EQ AC.**ACG 6207 Accounting for Risk 2 Credits****Grading Scheme:** Letter Grade

Overview of risk management, financial instruments used in risk management, and related accounting issues and practices.

Prerequisite: ACG 5815, ACG 5226, 7AC standing.**ACG 6635 Issues in Audit Practice 2 Credits****Grading Scheme:** Letter Grade

In-depth discussion of fundamental concepts underlying audit practice, including introduction to current topics in auditing, advanced audit methods, and trends in auditing practice.

Prerequisite: (Master of Accounting student, ACG 5815 and ACG 5226 with minimum grades of C) OR (Master of Science in Information Systems and Operations Management student, Auditing Minor student, ACG 5647 with minimum grade of C).

ACG 6685 Forensic Accounting 2 Credits**Grading Scheme:** Letter Grade

Analysis of contemporary forensic and investigative accounting. Topics include: fraud auditing, litigation support, valuation, cyber-crime, and other key forensic topics.

Prerequisite: (Master of Accounting Student, ACG 5647 and ACG 5226 with minimum grades of C) OR (Master of Science in Information Systems and Operations Management Student, Auditing Minor student, ACG 5647 with minimum grade of C).

ACG 6691 International Auditing 2 Credits**Grading Scheme:** Letter Grade

Global perspective of auditing issues including international auditing standards and corporate governance practices providing an in depth analysis of the audit of multinational companies, cross border transactions and transfer pricing within affiliated groups of companies.

Prerequisite: ACG 5647 (C) , ACG 5226 , Class GE 7, and College EQ AC**ACG 6697 Information Systems Assurance 2 Credits****Grading Scheme:** Letter Grade

Concepts of risk, control, and assurance in environments with advanced information technology. Technology based audit tools and techniques.

Prerequisite: (Master of Accounting student, ACG 5647 and ACG 5226 with minimum grades of C) OR (Master of Science in Information Systems and Operations Management student, Auditing Minor student, ACG 5647 with minimum grade of C).

ACG 6841 Data Analytics for Accounting 2 Credits**Grading Scheme:** Letter Grade

Application of data analytics techniques to accounting information. It explores how vast amounts of data and programming tools change how management uses data to attain organizational goals, obtain relevant information from public sources, identify the value of innovative ways to apply data to measure firm performance and develop models to gain knowledge from such datasets using machine learning.

Prerequisite: ACG 5226 and Master of Accounting student.**ACG 6905 Individual Work in Accounting 1-4 Credits, Max 7 Credits****Grading Scheme:** Letter Grade

Reading and research in areas of accounting.

Prerequisite: approval of graduate coordinator.**ACG 6935 Special Topics in Accounting 1-4 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Special Topics in Accounting

Prerequisite: consent of associate director.**ACG 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

ACG 7399 Accounting Research and Analysis 3 Credits**Grading Scheme:** Letter Grade

Reviews scholarly accounting research. Topics include the use of accounting information by investors and other stakeholders, the role of accounting in capital markets, accounting standard setting, the use of accounting information in budgeting, compensation, and governance, the role of auditing, and tax compliance and tax policy.

ACG 7848 Data Analysis Skills 2 Credits**Grading Scheme:** Letter Grade

In this course the students are introduced to archival research. The primary focus is on introducing the most commonly used datasets on WRDS (Compustat, CRSP and IBES) and learning SAS to manage and analyze these datasets.

ACG 7849 Web Crawling and Textual Analysis 2 Credits**Grading Scheme:** Letter Grade

In this course students will learn how to automatically retrieve data web pages/data from the internet and perform natural language processing techniques.

ACG 7850 Advanced Data and Regression Techniques 3 Credits**Grading Scheme:** Letter Grade

Topics are related to the construction of variables (based on data in Compustat, CRSP and IBES), econometric issues (dealing with measurement error, scaling issues, clustering of standard errors, testing for multicollinearity, Heckman tests) and special topics (fixed effects regression, propensity score matching, Jackknife procedure, using textual analysis to create new variables) commonly used in finance and accounting, and other research using large archival data.

ACG 7885 Overview of Accounting Research 4 Credits**Grading Scheme:** Letter Grade

Overview of Accounting Research

ACG 7886 Accounting Research II 4 Credits**Grading Scheme:** Letter Grade

Theoretical constructs in accounting, valuation models, information asymmetry and production, and nonmarket information use.

ACG 7887 Research Analysis in Accounting 3 Credits**Grading Scheme:** Letter Grade

Analysis of accounting research and presentation of student research project results. Financial accounting, managerial accounting, auditing, taxation, management information systems, and information economics.

Prerequisite: ACG 7886.**ACG 7939 Theoretical Constructs in Accounting 3 Credits****Grading Scheme:** Letter Grade

Emerging theoretical issues that directly impact research and development of thought in accounting. Theory construction and verification, information economics, and agency theory constitute subsets of this course.

Prerequisite: ACG 7886.**ACG 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ACG 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

TAX 5025 Federal Income Tax 1 2 Credits**Grading Scheme:** Letter Grade

First of a two-course sequence studying the concepts found in the Federal income tax code. Primary emphasis will be using the income tax code to understand gross income, income exclusions, as well as deductions for businesses.

Prerequisite: ACG 4111 (C), ACG 4341 (C), CLASS GE 4, and COLLEGE EQ AC**TAX 5027 Federal Income Tax 2 2 Credits****Grading Scheme:** Letter Grade

Second of a two-course sequence studying the concepts found in the Federal income tax code. Primary emphasis will be using the income tax code to understand property transactions in a business and investment context.

Prerequisite: TAX 5025 (C) or TAX 4001 (C), Class GE 4, and College EQ AC.**TAX 5065 Tax Professional Research 2 Credits****Grading Scheme:** Letter Grade

Use of professional tax literature and technology for problem solving. Case-based to provide experience in dealing with unstructured situations encountered in professional tax practice. Emphasizes problem identification and resolution.

Prerequisite: TAX 5005 (C), GE 7AC standing OR TAX 5027 (C) and GE 7AC.**TAX 6105 Corporate Taxation 2 Credits****Grading Scheme:** Letter Grade

In-depth study of taxation of corporate formations and ongoing operations. In addition, this course provides an introduction to accounting for income taxes.

Prerequisite: TAX 5065, Class GE 7, and College EQ AC.**TAX 6115 Advanced Corporate Taxation 2 Credits****Grading Scheme:** Letter Grade

Second of a two-course sequence that continues the study of corporate taxation. The course emphasizes: liquidations, reorganizations, divisions; it introduces the taxation of S corporations.

Corequisite: TAX 6105, Class GE 7, and College EQ AC

TAX 6205 Partnership Taxation 2 Credits**Grading Scheme:** Letter Grade

Providing depth of knowledge in partnership taxation. Required for students pursuing the "tax" track. Elective for other MAcc. students.

Prerequisite: TAX 5065, Class GE 7, and College EQ AC.**TAX 6526 International Taxation 2 Credits****Grading Scheme:** Letter Grade

Expansion of introduction to international tax, addressing more complex concepts encountered by U.S. multinationals operating abroad. U.S. taxation of foreign persons with U.S. activities included.

Prerequisite: TAX 6105 & GE 7AC**TAX 6877 State and Local Taxation 2 Credits****Grading Scheme:** Letter Grade

Tax issues involved when business enterprises operate in multiple taxing jurisdictions. Principles of both multi-state and international income taxation (and their overlap).

Prerequisite: TAX 6105 and GE 7AC.

African Studies

AFH 5934 Topics in African History 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Topics in African History

AFH 6259 Seminar in Modern Africa 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

In-depth reading and discussion of aspects of modern African history.

Seminar focuses on specific themes, such as ethnicity, colonialism, violence, warfare, gender, religion, and nationalism.

AFH 6805 Theo/Met African Hist 3 Credits**Grading Scheme:** Letter Grade

Theories and methods that underlie the study of African history and change as the field has evolved over the last four or more decades. Attention to changing frameworks for viewing the African past, with a focus on the historians' research methods and techniques.

AFH 6934 Africa 3 Credits**Grading Scheme:** Letter Grade

Africa

AFS 5061 Africana Bibliography 1 Credit**Grading Scheme:** Letter Grade

Survey of advanced reference, specialized research tools (including variety of electronic databases, published paper indexes, and bibliographies), and methods for graduate-level research in all disciplines of African area studies.

AFS 6060 Research Problems in African Studies 3 Credits**Grading Scheme:** Letter Grade

Interdisciplinary seminar on creating individual research designs and preparing funding proposals for research in Africa.

AFS 6062 Design and Methods for Sustainable Development Practice 3 Credits**Grading Scheme:** Letter Grade

Builds practical skills and critical perspectives to engage constructively in planning, implementation and evaluation of sustainable development practice. Designed for Master of Sustainable Development Practice (MDP) students and others whose academic work and future plans address sustainable development challenges.

AFS 6303 Development Administration 3 Credits**Grading Scheme:** Letter Grade

This course for Master of Sustainable Development Practice (MDP) students and others addresses specific tools, processes and concepts linked to the praxis of Development Administration that MDP graduates should be familiar with before embarking on their careers in sustainable development.

AFS 6305 Development Theory and Practice Intro 3 Credits**Grading Scheme:** Letter Grade

Introducing the basic core competencies and practical skills required of a development practitioner. It differs from other development courses at UF by uniquely focusing on the inter-relationship between management, health, natural and social sciences in African development contexts and by emphasizing both theory and practice.

AFS 6306 Gender and Empowerment in Development 3 Credits**Grading Scheme:** Letter Grade

Examines the concepts, and associated practices, of gender equity, women's empowerment and men's involvement. Gender equity is both a goal of development and means for attaining wider societal goals. Critically examines the assumptions underlying development practice and the challenges in integrating gender considerations into development work. Previous coursework or experience in development issues or gender-related topics is recommended.

AFS 6307 Foundations of Economics for Sustainable Development 3 Credits**Grading Scheme:** Letter Grade

Providing students with limited economics background with a foundation in development economics, with attention devoted to sustainable development. Students learn about the major theoretical debates within the discipline, the most current research topics and apply their knowledge to the comparative analysis of development in Africa and Latin America.

Prerequisite: None.**AFS 6346 Conservation and Development Practicum 3 Credits****Grading Scheme:** Letter Grade

Gain competence in applied, professional work in development practice through a guided analysis of the information generated during Master of Sustainable Development Practice field practicums, and in the interpretation of results, linking findings across disciplines and scales.

AFS 6905 Individual Work in African Studies 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Individual Work in African Studies

Agricultural and Biological Engineering

ABE 5009 Control Methods in SmartAg Systems 3 Credits**Grading Scheme:** Letter Grade

Design, analysis, simulation and programming modern control methods for applications in production agriculture, biological and food engineering, land and water resources. Students will learn theoretical concepts, application programming, and simulation techniques using classical and modern control approaches, fuzzy logic, neural networks and other intelligent learning algorithms.

Prerequisite: Elementary Differential Equations or equivalent, Physics with Calculus, Dynamics or equivalent; fluent in general programming language such as C, C++, or Visual Basic, and MATLAB; Engineering graduate student.

ABE 5038 Recent Developments and Applications in Biosensors 3 Credits**Grading Scheme:** Letter Grade

Introduction to biosensors, design and performance analysis. Fundamental application of biosensor theory will be demonstrated, including recognition, transduction, signal acquisition, and post processing/data analysis.

Prerequisite: At least senior status in engineering and background in biology including biomolecules.

ABE 5152 Fluid Power Circuits and Control 3 Credits**Grading Scheme:** Letter Grade

Engineering analysis, design, and experimentation of electro-hydraulic circuits and systems. Design of hydraulic circuits, fluid power system components, hydraulic actuator analysis, servo and proportional valve performance, and electro-hydraulic control theory and applications.

Prerequisite: EML 3100, EGM 3400, 3520

ABE 5310 Advanced Controlled Environment Agriculture Systems Design 3 Credits**Grading Scheme:** Letter Grade

Targets engineering design of controlled environment agriculture systems, including glazing materials selection, fan sizing, lighting distribution, cooling, and heating systems design.

Prerequisite: MAC 1147 and any three-credit university-level course in physics.

ABE 5442 Advanced Agricultural Process Engineering 3 Credits**Grading Scheme:** Letter Grade

Engineering principles, processes, and techniques for using biological agents for production of chemicals, food, biofuels, and pharmaceuticals, and waste treatment.

ABE 5643C Biological Systems Modeling 3 Credits**Grading Scheme:** Letter Grade

Introduction to concepts and methods of process-based modeling of biological systems; physiological, populational, and agricultural applications.

ABE 5646 Biological and Agricultural Systems Simulation 3 Credits**Grading Scheme:** Letter Grade

Basic concepts of systems analysis, modeling, and computer simulation of dynamic biological and agricultural systems. Methods for working with models, including sensitivity analysis, parameter estimation, and model evaluation. Applications of models in agricultural and biological systems.

Prerequisite: MAC 2312, STA 3032 or STA 4322.

ABE 5648 Modeling Coupled Natural-Human Systems 3 Credits**Grading Scheme:** Letter Grade

Approaches to modeling coupled natural-human systems are explored, drawing from both natural and social sciences. Topics include regime shift from dynamical systems and basic concepts from game theory and social-ecological system literature. These are combined in models that operationalize a conceptual framework. Students develop models—with guidance—for final projects.

Prerequisite: basic calculus and college-level probability courses.

ABE 5653 Rheology and Mechanics of Agricultural and Biological Materials 3 Credits**Grading Scheme:** Letter Grade

Relation of biophysical and biochemical structure to rheological and mechanical behavior of biological materials in solid, liquid, and granular form; methods for measuring material properties governing these behaviors.

Prerequisite: MAC 2313, PHY 2048, CHM 2045, or consent of instructor.

ABE 5663 Advanced Applied Microbial Biotechnology 3 Credits**Grading Scheme:** Letter Grade

Principles of microbial biotechnology, emphasizing the application of microorganisms for industrial processes (e.g., energy, environmental, food, pharmaceutical, and chemical).

Prerequisite: general biology and organic chemistry, or consent of instructor.

ABE 5707C Agricultural Waste Management 3 Credits**Grading Scheme:** Letter Grade

Engineering analysis and design of systems for the collection, storage, treatment, transport, and utilization of livestock and other agricultural organic wastes and wastewaters. Field trips to operating systems and laboratory evaluation of materials and processes.

Prerequisite: 4 or higher classification.

ABE 5805 Advanced Life Cycle Assessment in Water-Energy-Food Systems 3 Credits**Grading Scheme:** Letter Grade

Introduction and application of life cycle assessment (LCA) to evaluate the environmental impacts of various products, processes, or services related to the water-energy-food nexus. Additional topics include planetary boundaries, systems thinking, circular economy, mass and energy balances, life-cycle costing, social LCA and sensitivity and uncertainty analysis. This is an interdisciplinary course open to students from any major.

Prerequisite: Knowledge of Calculus.

ABE 5815C Food and Bioprocess Engineering Design 4 Credits**Grading Scheme:** Letter Grade

Engineering design of unit process operations employed in agro/food, pharmaceutical, and biological industries including sterilization/pasteurization, radiation, freezing, drying, evaporation, fermentation, distillation.

ABE 5936 Writing Grant Proposals for Scholarships and Fellowships 2 Credits**Grading Scheme:** Letter Grade

Provides incoming graduate students in the ABE Department an introduction to acquire scholarships, fellowships, internships, and graduate assistantships from federal funding agencies. Students will be introduced to funding sources and opportunities, provided guidelines for proposal writing, and prepare a mock proposal for instructor and peer review.

Prerequisite: ENC3246 or equivalent technical writing course, and graduate status in the Agricultural and Biological Engineering Department.

ABE 6005 Applied Control for Automation and Robots 3 Credits**Grading Scheme:** Letter Grade

Introduction to industrial controls, programmable logic controllers, and manipulator application programming in agricultural and biological engineering. Kinematics, dynamics, and control strategies for serial link manipulators in agricultural applications.

Prerequisite: EML 5311 .

ABE 6017 Stochastic Modeling in Ecology and Hydrology 3 Credits**Grading Scheme:** Letter Grade

Stochastic modeling is introduced through a problem-based approach. Selected papers are studied in depth; derivation of their main results unpacked. Examples include stochastic models of biodiversity, soil moisture, and rainfall. Students pick stochastic models to study for final projects. Students enjoy deeper understanding from unpacking these otherwise seemingly mysterious results.

Prerequisite: MAC 2312 or equivalent.

ABE 6031 Instrumentation in Agricultural Engineering Research 3 Credits**Grading Scheme:** Letter Grade

Principles and application of measuring instruments and devices for obtaining experimental data in agricultural engineering research.

ABE 6035 Advanced Remote Sensing: Science and Sensors 3 Credits**Grading Scheme:** Letter Grade

Develops understanding of remote sensing theory and systems using information obtained from visible/near infrared, thermal infrared, and microwave regions of the EM spectrum.

Prerequisite: MAP 2302.**ABE 6037C Remote Sensing in Hydrology 3 Credits****Grading Scheme:** Letter Grade

Develops practical understanding of remote sensing applications to hydrology using observations in different regions of the EM spectrum. Seminar style with emphasis on literature review and presentation.

Prerequisite: ABE 6035.**ABE 6165 Comp Vis Deep Learn Agri Sys 3 Credits****Grading Scheme:** Letter Grade

The exploration of applied machine vision with a focus on modern deep learning techniques to solve problems in agricultural and food systems (AFS). Learn and apply the principles of machine vision, convolutional neural networks, and recurrent neural networks for image semantic understanding and processing to address challenges in AFS, such as visual navigation of agricultural robots, monitoring and managing crops and livestock, and food postharvest sorting.

Prerequisite: Permission of Instructor.**ABE 6252 Advanced Soil and Water Management Engineering 3 Credits****Grading Scheme:** Letter Grade

Physical and mathematical analysis of problems in infiltration, drainage, and groundwater hydraulics.

ABE 6254 Simulation of Agricultural Watershed Systems 3 Credits**Grading Scheme:** Letter Grade

Characterization and simulation of agricultural watershed systems including land and channel phase hydrologic processes and pollutant transport processes. Investigation of the structure and capabilities of current agricultural watershed computer models.

Prerequisite: CWR 4111 and working knowledge of FORTRAN.**ABE 6265 Vadose Zone Modeling 3 Credits****Grading Scheme:** Letter Grade

Unsaturated zone modeling of water flow and solute transport processes. Comparative analysis of alternative mechanistic modeling approaches of different complexity.

Prerequisite: Recommended basic use of high level computer language or numerical computing environment (i.e., Matlab, Mathematica, etc.) that allows the student to test algorithms and read existing modeling source code.

ABE 6266 Nanotechnology in Water Research 3 Credits**Grading Scheme:** Letter Grade

Applications of environmental nanotechnology to water quality control. Fate and transport of nanomaterials in hydrologic pathways.

Prerequisite: Basic knowledge of hydrology, environmental engineering, and water chemistry.**ABE 6615 Advanced Heat and Mass Transfer in Biological Systems 3 Credits****Grading Scheme:** Letter Grade

Analytical and numerical technique solutions to problems of heat and mass transfer in biological systems. Emphasis on nonhomogeneous, irregularly shaped products with respiration and transpiration.

Prerequisite: COP 2271, ABE 3612C.**ABE 6644 Agricultural Decision Systems 3 Credits****Grading Scheme:** Letter Grade

Computerized decision systems for agriculture. Expert systems, decision support systems, simulations, and types of applications in agriculture.

ABE 6645C Computer Simulation of Crop Growth and Management Responses 3 Credits**Grading Scheme:** Letter Grade

Teaches the background of computer models for the dynamic simulation of crop growth, development, and yield, and soil and plant water, nutrient, and carbon dynamics, and the application of models to real-world problems. The course is based on a systems analysis approach using DSSAT as a platform.

ABE 6649C Advanced Biological Systems Modeling 3 Credits**Grading Scheme:** Letter Grade

This course serves as an advanced graduate class for continued biological modeling and covers topics such as: (1) formulating, solving analytical and numerical problems with programming, (2) dynamic biological models; (3) object-oriented design and agent-based modeling, (4) High Performance Computing and Global Sensitivity and Uncertainty Analysis.

Prerequisite: ABE 5643C.**ABE 6654C Advanced Bio-Based Products from Renewable Resources 3 Credits****Grading Scheme:** Letter Grade

Provides the knowledge for the production of fuels, chemicals and materials from renewable resources. The course includes the fundamental principles and practical applications of bio-based products: biorefinery and biobased products overview, fundamental concepts in understanding biorefinery and biobased products; materials, chemical platforms, and fuels from biomass.

Prerequisite: CHM2045 or equivalent, or instructor permission.**ABE 6840 Data Diagnostics 3 Credits****Grading Scheme:** Letter Grade

Application of nonlinear time series analysis to detect, characterize, and model deterministic structure in real-world time series data. Topics include signal processing, phase space reconstruction, surrogate data testing, causal network analysis, and phenomenological modeling.

Prerequisite: Elementary statistics and Differential equations.**ABE 6905 Individual Work in Agricultural and Biological Engineering 1-4 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Special problems in agricultural engineering.

ABE 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ABE 6931 Seminar 1 Credit, Max 2 Credits**Grading Scheme:** S/U

Preparation and presentation of reports on specialized aspects of research in agricultural engineering and agricultural operations management.

ABE 6933 Special Topics in Agricultural and Biological Engineering 1-4 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Lectures, laboratory, and/or special projects.

ABE 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

ABE 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

ABE 6972 Research for Engineer's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Engineer's Thesis

ABE 6974 Nonthesis Project 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

In-depth project.

ABE 6986 Applied Mathematics in Engineering and Agriculture 3 Credits**Grading Scheme:** Letter Grade

Mathematical methods, including regression analysis, graphical techniques, and analytical and numerical solution of ordinary and partial differential equations, relevant to engineering in agriculture and the related sciences.

ABE 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ABE 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

AGG 5607 Communicating in Academia 3 Credits**Grading Scheme:** Letter Grade

Teaching graduate students about academic writing, specifically focused on research proposals, theses, dissertations, manuscripts, grant proposals, and CVs. Also teaching students about aspects of academic writing that are not normally part of graduate curriculum but are necessary to succeed.

AOM 5456 Applied Methods in SmartAg Systems 3 Credits**Grading Scheme:** Letter Grade

Design, analysis, and evaluation of SmartAg methods for applications in production agriculture, biological and food engineering, forestry, land, and water resources. Students will learn hardware and software concepts used in SmartAg applications with real-world examples (e.g., UAV's, irrigation, controlled environments for plant and animals, crop modeling).

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.**EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits****Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

STA 6348 Bayesian Analysis for Machine Learning and Uncertainty Quantification 3 Credits**Grading Scheme:** Letter Grade

This course emphasizes Bayesian methodology for modeling, inference and prediction using hierarchical/multilevel models, with particular emphasis on computation (Monte Carlo and its flavors) and applications (inference and prediction in models for regression and classification, potentially with various types of statistical dependence) as intended for Master's and doctoral students in data sciences and engineering.

Prerequisite: (i) mathematical statistics emphasizing inference (e.g., PHC6092 or STA6327) and regression (e.g., STA6207) or (ii) a graduate course in machine learning with emphasis on probability/statistics or (iii) permission of the instructor.**STA 6703 Statistical Machine Learning 3 Credits****Grading Scheme:** Letter Grade

Methodology and application of tools of statistical (machine) learning targeted at graduate students in engineering, applied statistics/biostatistics and quantitative life sciences. Statistical approaches to machine learning are emphasized. Application and the intuition behind statistical methods rather than formal derivations and full mathematical proofs of the procedures are prioritized.

Prerequisite: Calculus-based probability and statistics (e.g., EGN6446 or PHC6092 or STA5328). Additionally, knowledge of scientific/statistical computing (e.g., in R or Python) and undergraduate mathematics (multivariate calculus and linear algebra).**STA 6709 Spatial Statistics & Hierarchical Modeling for Dependent Data 3 Credits****Grading Scheme:** Letter Grade

This is a course on analytical and computational methods of spatial statistics for modeling, inference and prediction for dependent data, including point-referenced (geostatistical), areal and point process data. The methods (including uncertainty quantification using hierarchical Bayesian models) generalize to Gaussian process and GMRF models popular in machine learning and other areas of engineering. The course is targeted a students in data sciences, engineering and life sciences.

Prerequisite: Mathematical statistics emphasizing inference (e.g., PHC6092 or STA6327) and regression (e.g., STA6207). Knowledge of scientific/statistical computing and undergraduate mathematics (multivariate calculus and linear algebra).

Agricultural Education and Communication

AEC 5032 Agricultural and Natural Resources Media Writing 3 Credits**Grading Scheme:** Letter Grade

Varied media writing assignments: feature stories, news releases, and video.

Prerequisite: AEC 5541.**AEC 5034 Digital Media Production in Agriculture and Natural Resources 3 Credits****Grading Scheme:** Letter Grade

This course focuses on the role of digital media production in agriculture and natural resources.

AEC 5037 Agricultural and Natural Resources Media Production 3 Credits**Grading Scheme:** Letter Grade

Various agricultural media production assignments. Developing agricultural websites and publications.

AEC 5060 Public Opinion and Agricultural and Natural Resource Issues 3 Credits**Grading Scheme:** Letter Grade

Public opinion measurement and agenda setting. Media treatment, public opinion, and public relations/public information activity on issues affecting agricultural production and trade.

AEC 5074 Agriculture, Resources, People, and the Environment: A Global Perspective 3 Credits**Grading Scheme:** Letter Grade

Interdependence in the global context, and the need to cultivate a lifelong global perspective.

AEC 5206 Teaching Methods in Agricultural Education 3 Credits**Grading Scheme:** Letter Grade

Teaching methodology course that focuses on the selection and use of teaching strategies, methods/ approaches, and techniques; evaluating learning; managing learning environments; and classroom management for teaching agricultural subjects in formal educational settings.

AEC 5227 Teaching in Agricultural Education Laboratory Facilities 3 Credits**Grading Scheme:** Letter Grade

This course is designed to introduce pre-service agricultural education teachers to laboratory integration into the agricultural education curriculum at the middle school and secondary school level.

Prerequisite: Admission to state approved agriculture teacher certification program.

AEC 5302 Professional Skill Development in Agriscience Education I 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Development and enhancement of technical agricultural and scientific knowledge and skills by professional agriscience teachers.

Prerequisite: Teaching experience.

AEC 5324 Philosophy and Development of Agricultural Education 3 Credits**Grading Scheme:** Letter Grade

An analysis of evolving concepts and philosophies of agricultural education programs with emphasis upon history, legislation, and principles underlying organization and practice.

Prerequisite: Admission to AEC state-approved graduate-level teacher certification program.

AEC 5416 Critical and Creative Thinking in Problem Solving and Decision Making 3 Credits**Grading Scheme:** Letter Grade

Creating a foundation for effective leadership practice through the analysis and development of critical and creative thinking skills and dispositions as applied to dynamic organizational and community contexts. Contexts include agriculture, life sciences, natural resources, and related settings.

AEC 5440 Interpersonal Leadership in Agricultural and Life Sciences 3 Credits**Grading Scheme:** Letter Grade

Theory, research, and practices that create a foundation for self-awareness, emotional intelligence, relationship building, and leadership within the broad contexts of agriculture and life sciences and beyond.

AEC 5454 Leadership Development for Extension and Community Nonprofit Organizations 3 Credits**Grading Scheme:** Letter Grade

Application of concepts related to developing leaders for organizing and maintaining extension and community nonprofit organizations.

AEC 5501 Professional Skill Development in Agriscience Education II 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Advanced level of development and enhancement of technical agriculture and scientific knowledge and skills by professional agriscience educators.

Prerequisite: AEC 5302.

AEC 5541 Communication and Instructional Technologies in Agricultural and Life Sciences 3 Credits**Grading Scheme:** Letter Grade

Planning and producing written and visual instructional and communication materials for programs in the agricultural and life sciences.

AEC 5544 Curriculum Development and Assessment Techniques in Emerging Agricultural Technologies 3 Credits**Grading Scheme:** Letter Grade

Principles and practices used in developing agricultural education curriculum from developing objectives through instructional plans. Assessing student learning and implementing curriculum.

AEC 5545 Special Methods in Teaching Agriculture 3 Credits**Grading Scheme:** Letter Grade

Teaching methods for active learning, critical, creative and evaluative thinking in the agricultural education classroom. Strategies for managing student behavior, utilizing instructional technology and utilizing FFA and SAE as teaching tools.

AEC 5546 Program Planning in Agricultural Education 3 Credits**Grading Scheme:** Letter Grade

Principles and practices used in designing agricultural education program plans for effective and total program development.

AEC 6210 Designing Educational Programs in Agricultural Settings 3 Credits**Grading Scheme:** Letter Grade

Designing Educational Programs in Agricultural Settings

AEC 6211 Delivering Educational Programs in Agricultural Settings 3 Credits**Grading Scheme:** Letter Grade

This course will be focusing on delivering educational programs in formal and nonformal settings. Emphasis will be placed on balancing theoretical and practical development and delivery of educational programs.

AEC 6212 Teacher Education in Agriculture 3 Credits**Grading Scheme:** Letter Grade

Preparing future agricultural teacher educators with the knowledge and skills needed to provide leadership in a university teacher education program. Students will investigate various models of teacher education and determine the composition of a well-developed agriculture teacher education program.

AEC 6223 Participatory Arts-Based Research Methods in Agriculture and Natural Resources 3 Credits**Grading Scheme:** Letter Grade

Introduces the alternative qualitative research paradigm of participatory arts-based research (ABR). You will learn about different ABR methods and designs, explore various ABR studies, develop your own conceptualization of an ABR research study in your field, and participate in ABR data analysis.

AEC 6229 Laboratory Instruction: Theory and Practice 3 Credits**Grading Scheme:** Letter Grade

Research and theoretical foundations underlying the aspects of planning, management, teaching, evaluation, safety, and facility design: discussed in the context of laboratory instruction.

AEC 6300 Methodology of Planned Change 3 Credits**Grading Scheme:** Letter Grade

Processes by which professional change agents influence the introduction, adoption, and diffusion of technological changes. Applicable to those who are responsible for bringing about change.

AEC 6316 From America to Zimbabwe: An Overview of International Extension Systems 3 Credits**Grading Scheme:** Letter Grade

Various extension models and delivery systems, extension partners; linkages and issues affecting extension internationally. Field trip.

AEC 6321 The Land Grant University and University Governance 3 Credits**Grading Scheme:** Letter Grade

Implications of change and future pathways for teaching, research and extension, including global perspectives, and the role and philosophy of administrators in governing a complex university.

Prerequisite: None.**AEC 6325 History and Philosophy of Agricultural Education 3 Credits****Grading Scheme:** Letter Grade

Analysis of evolving concepts and philosophies. Emphasis on history, legislation, and principles underlining organization and practice. Participation in field experience required.

AEC 6327 Partisanship in Agriculture and Natural Resources 3 Credits**Grading Scheme:** Letter Grade

Stakeholder conflict and political division contribute to and impede the resolution of agriculture and natural resources issues. Students will learn the aspects of human nature that promote division and conflict and how to use those natural inclinations to promote communication and collaboration toward agricultural and environmental objectives. In addition, students will gain cultural domain analysis research skills for evaluating stakeholders' mental models of partisan issues.

AEC 6411 Organizational Leadership in Agriculture and Life Sciences 3 Credits**Grading Scheme:** Letter Grade

Leadership will be examined as it relates to agriculture and life science based organizations and will provide a knowledge base for effective leadership. Topics will focus on: organizational leadership, culture, structure, relationships, change, conflict and issues within agriculture and life sciences that can impact organizations.

AEC 6419 Communication and Competencies for Global Leadership 3 Credits**Grading Scheme:** Letter Grade

Identifying and developing the personal and professional competencies required for effective leadership in an increasingly global society. International communication is included.

AEC 6426 Development of a Volunteer Leadership Program 3 Credits**Grading Scheme:** Letter Grade

Identification, recruitment, training, retention, and supervision of volunteer leaders.

AEC 6501 Developing and Conducting Needs Assessments in Extension Settings 3 Credits**Grading Scheme:** Letter Grade

This course is intended to help educators in the field of extension and other non-formal education organizations: (a) acquire an understanding of needs assessments from theory to practice and (b) strengthen or develop their skills in planning and conducting needs assessments within extension settings.

AEC 6512 Program Development in Extension Education 3 Credits**Grading Scheme:** Letter Grade

Concepts and processes drawn from the social sciences that are relevant to the development of extension education programs.

AEC 6540 Agricultural and Natural Resources Communications Theory and Strategies 3 Credits**Grading Scheme:** Letter Grade

Communication theory and concepts as they apply to important agricultural/natural resources issues.

AEC 6543 Teaching and Learning Theory: Applications in Agricultural Education 3 Credits**Grading Scheme:** Letter Grade

Contemporary and foundational theory and research on teaching and learning.

AEC 6552 Evaluating Programs in Extension Education 3 Credits**Grading Scheme:** Letter Grade

Concepts and research drawn from the social sciences relevant to evaluating youth and adult extension programs.

AEC 6611 Agricultural and Extension Adult Education 3 Credits**Grading Scheme:** Letter Grade

Concepts and principles related to design, implementation, and evaluation of education programs for adults.

AEC 6704 Extension Administration and Supervision 3 Credits**Grading Scheme:** Letter Grade

Principles and practices for effective administration and supervision of the cooperative extension service program at the county and state levels.

AEC 6767 Research Strategies in Agricultural Education and Communication 3 Credits**Grading Scheme:** Letter Grade

Application of principles, practices, and strategies for conducting behavioral research in agricultural and natural resource professions.

AEC 6905 Problems in Agricultural and Extension Education 1-3 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

For advanced students to select and study a problem related to agricultural and/or extension education.

Prerequisite: consent of department chair.**AEC 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

AEC 6912 Nonthesis Research in Agricultural and Extension Education 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Library and workshop related to methods in agricultural and extension education, including study of research work, review of publications, development of written reports.

AEC 6932 Special Topics In Agricultural Education and Communication 1-3 Credits**Grading Scheme:** Letter Grade

Explores contemporary and emerging topics in agricultural education and communication.

AEC 6933 Seminar in Agricultural Education and Communication 1-3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Exploration of current topics and trends.

AEC 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

AEC 6945 Practicum in Agricultural Education and Communication 1-9 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

An individual program whereby students are apprenticed to expert teachers to gain practical experience in a school-based agriscience program.

Prerequisite: Successful completion of all three portions of the Florida Teacher Certification Examination (FTCE) - General Knowledge, Professional Education, and Agriculture 6-12.**AEC 6947 Experiential Learning in Agricultural Education 3 Credits****Grading Scheme:** Letter Grade

Focuses on applying experiential learning theory in agricultural education through classroom-based lessons, project-based learning, service learning, guided inquiry, field trips, internships/externships, study abroad and outdoor/adventure learning.

Prerequisite: Graduate standing or consent of instructor.**AEC 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

AEC 6980 Thesis/Dissertation Proposal Development 3 Credits**Grading Scheme:** Letter Grade

Designed to assist students in the preparation of their thesis or dissertation research proposal. Students will submit an acceptable draft of the first three chapters of their thesis/dissertation proposal by the end of the course.

Prerequisite: AEC 6767 or equivalent.**AEC 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

AEC 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Agricultural Operations Management

AOM 5334C Agricultural Chemical Application Technology 3 Credits**Grading Scheme:** Letter Grade

Equipment and methods used to apply pesticides in agriculture.

Emphasis on techniques to avoid misapplication and pesticide drift.

AOM 5431 GIS and Remote Sensing in Agriculture and Natural Resources 3 Credits**Grading Scheme:** Letter Grade

Principles and applications of geographic information systems (GIS) and global positioning system (GPS) technologies supporting land use/cover assessment, agricultural production, and natural resource conservation.

Prerequisite: working knowledge of computer or consent of instructor.**AOM 5435 Advanced Precision Agriculture 3 Credits****Grading Scheme:** Letter Grade

Principles and applications of technologies supporting precision farming and natural resource data management planning. Global positioning systems (GPS), geographic information systems (GIS), variable rate technologies (VRT), data layering of independent variables, automated guidance, Internet information access, computer software management.

AOM 6061 Agri-food Systems Innovation 3 Credits**Grading Scheme:** Letter Grade

Students explore the role of innovation in food systems from a reverse chain perspective. Students will gain knowledge of the food system framework from a multi-level (i.e., individual, organizational, etc.) perspective, identify current, innovative business and technological practices, as well as present and think critically about future trends in food.

AOM 6735 Irrigation Principles and Management 3 Credits**Grading Scheme:** Letter Grade

Designed to teach graduate students about irrigation and gain skills to evaluate an irrigation system, identify parts of a system, and develop an irrigation schedule based on system characteristics. This course is designed for nonengineers although quantitative ability will be required for calculations and analysis. Prerequisites Students must be proficient in Microsoft Excel and Word. Students should be able to use equation functions and graphing functions in Excel. It is recommended that students have basic understanding of hydrology, unit conversions, and algebra.

AOM 6736 Principles and Issues in Environmental Hydrology 3 Credits**Grading Scheme:** Letter Grade

Principles and issues in environmental hydrology.

AOM 6905 Individual Work in Agricultural Operations Management 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Special problems.

AOM 6932 Special Topics in Agricultural Operations Management 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Lectures, laboratory, and /or special projects.

Agronomy

AGR 5230C Florida Grassland Agroecosystems 4 Credits**Grading Scheme:** Letter Grade

Comprehensive overview of planted and native grassland ecosystems in Florida emphasizing their growth, species diversity, management, and use by ruminant animals. Offered spring term.

AGR 5266C Field Plot Techniques 3 Credits**Grading Scheme:** Letter Grade

Techniques and procedures used in design and analysis of field plot, greenhouse, and laboratory research experiments. Application of research methodology, the analysis and interpretation of research results. Offered fall term.

Prerequisite: STA 3023.

AGR 5277C Tropical Crop Production 3 Credits**Grading Scheme:** Letter Grade

Ecology and production practices of selected crops grown in the tropics. Offered spring term.

Prerequisite: consent of instructor.**AGR 5307 Molecular Genetics for Crop Improvement 3 Credits****Grading Scheme:** Letter Grade

Lectures and laboratory demonstrations for a thorough understanding of concepts and applied aspects of plant molecular and cellular biology. Discussion of current research in plant biotechnology and functional genomics. Offered spring term.

Prerequisite: AGR 3303.**AGR 5321C Genetic Improvement of Plants 3 Credits****Grading Scheme:** Letter Grade

Genetic basis for crop improvement including methods for improving crop yield, pest resistance, and adaptability. Emphasis on manipulating genetic variability in self- and cross-pollinate, annual and perennial crop plants. Offered fall term.

Prerequisite: AGR 3303.**AGR 5444 Ecophysiology of Crop Production 3 Credits****Grading Scheme:** Letter Grade

Physiological, ecological, and environmental responses that impact growth, development, and yield formation of cultivated crops. Offered spring term.

Prerequisite: AGR 3005 or equivalent.**AGR 5511 Crop Ecology 3 Credits****Grading Scheme:** Letter Grade

Relationships of ecological factors and climatic classifications to agroecosystems, and crop modeling of the major crops. Offered fall term.

Prerequisite: AGR 4210, BOT 3503, PCB 3043C, or equivalent.**AGR 6233 Tropical Grassland Agroecosystems 3 Credits****Grading Scheme:** Letter Grade

Potential of natural grasslands of tropical and subtropical regions. Development of improved pastures and forages and their use in livestock production. Offered fall term in odd-numbered years.

Prerequisite: AGR 4231C and ANS 5446 or consent of instructor.**AGR 6237C Research Techniques in Forage Evaluation 3 Credits****Grading Scheme:** Letter Grade

Experimental techniques for field evaluation of forage plants. Design of grazing trials and procedures for estimating yield and botanical composition in the grazed and ungrazed pasture. Offered summer C term in odd-numbered years.

Prerequisite: STA 6166. ;**Corequisite:** STA 6166.**AGR 6305 Plant Chromosomes and Genomes 3 Credits****Grading Scheme:** Letter Grade

This course is designed to introduce students to plant chromosome structures, inheritance, basic genomic tools to analyze plant genomes. Main topics include DNA organization in chromosomes, cytogenetics, genomic DNA structure and function, DNA sequencing technologies, transcriptome, basic bioinformatic tools, high throughput DNA marker development, and genomic database exploring.

AGR 6322 Advanced Plant Breeding 3 Credits**Grading Scheme:** Letter Grade

Theory and use of biometrical genetic models for analytical evaluation of qualitative and quantitative characteristics, with procedures applicable to various types of plant species. Offered spring term in even-numbered years.

Prerequisite: AGR 3303, 4231, AGR 6311 , and STA 6167.**AGR 6325L Plant Breeding Techniques 1 Credit****Grading Scheme:** Letter Grade

Examination of various breeding techniques used by agronomic and horticultural crop breeders in Florida. Field and lab visits to active plant breeding programs, with discussion led by a specific breeder each week. Hands-on experience in breeding programs. Offered spring term in odd-numbered years.

Prerequisite: AGR 3303 or equivalent ;**Corequisite:** AGR 6322.**AGR 6422C Environmental Crop Nutrition 3 Credits****Grading Scheme:** Letter Grade

Design of cost-effective and environmentally sound crop nutrient management strategies. Diagnostic nutrient analysis, nutrient uptake, BMPs, and sustainable agriculture. Offered fall term.

Prerequisite: BOT 3503.**AGR 6442C Physiology of Agronomic Plants 4 Credits****Grading Scheme:** Letter Grade

Yield potentials of crops as influenced by photosynthetic efficiencies, respiration, translocation, drought, and canopy architecture. Plant response to environmental factors. Offered spring term.

Prerequisite: BOT 3503.**AGR 6905 Agronomic Problems 1-5 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Special topics for classroom, library, laboratory, or field studies of agronomic plants.

AGR 6913 Supervised Extension-Agronomy 3 Credits**Grading Scheme:** Letter Grade

Learn and develop extension skills on agricultural systems issues through effective communication with growers/land managers, policymakers, and the public. Students will create and deliver (i.e. oral, written, hands-on activity) an extension project to the targeted clientele.

AGR 6932 Topics in Agronomy 1-3 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Critical review of selected topics in specific agronomic areas.

AGR 6933 Graduate Agronomy Seminar 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Current literature and agronomic developments.

AGR 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

AGR 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

AGR 7306 Multi-Omic Integration for Applied Prediction Breeding 3 Credits**Grading Scheme:** Letter Grade

Intended for students in Plant and Animal Sciences with emphasis on breeding applications. Students will learn the basis for modeling trait performance of genotypes assisted by the integration of multiple data types 'omics' under different approaches (parametric, non-parametric AI). Relevant topics for private industry and research institutions will be covered (AI methods implemented for genomic prediction GP, G×E Interactions, multi-trait prediction, sparse testing designs, etc.)

Prerequisite: STA 6166 or equivalent.**AGR 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

AGR 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ALS 5155 Global Agroecosystems 3 Credits**Grading Scheme:** Letter Grade

Focusing on the principles of agroecology and presentation of topics that integrate ecological with agricultural principles to optimize resource conservation, productivity, societal benefit, and profitability.

Prerequisite: SWS 3022 or SWS 5050 & ALS 3153 & AGR 4214C or equivalents.**ALS 5932 Special Topics 1-4 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Special Topics

ALS 6031 Project Team Research: Building Skills in Agrobiolgy 3 Credits**Grading Scheme:** Letter Grade

Hands-on experience in addressing a real-world problem faced by an agricultural industry partner. Production of a detailed plan, project design, and preliminary data for evaluating and solving the problem. Offered every term.

IPM 5305 Principles of Pesticides 3 Credits**Grading Scheme:** Letter Grade

Basic knowledge of pesticides and their use. Practical working knowledge of pesticides used in agricultural and horticultural settings. Offered spring term.

Prerequisite: Graduate standing or instructor's permission to register.**PLS 5625 Upland Invasive Plant Management 3 Credits****Grading Scheme:** Letter Grade

This course will provide students with a better understanding of upland invasive plant management. Students will learn about upland plant ecosystems, focusing on the role and impacts of nuisance and exotic plants, and how to manage nuisance and invasive plants.

Prerequisite: Botany (BOT 2010C) and Plant Physiology (BOT 3503 or HOS 4304 or AGR 4512).**PLS 5632C Integrated Weed Management 3 Credits****Grading Scheme:** Letter Grade

Overview of weed science principles and practices, emphasizing strategies for southeastern cropping systems. Situations unique to the State of Florida. Offered fall term.

PLS 5633 Aquatic Plant Management 3 Credits**Grading Scheme:** Letter Grade

Provides students with a better understanding of aquatic plant management. Students will learn about aquatic ecosystems, focusing on the role and impacts of nuisance aquatic plants, and how to manage aquatic weeds.

Prerequisite: BOT 2010C and (BOT 3503 or HOS 4304 or AGR 4512).**PLS 6626 Invasive Plant Ecology 3 Credits****Grading Scheme:** Letter Grade

Mechanisms and hypotheses to explain non-native plant invasions. Impacts of invasions on communities and ecosystems, including natural and agricultural areas, management approaches, design and analysis of experiments.

Prerequisite: PCB 4043C, equivalent general ecology course, or permission of instructor**PLS 6655 Plant/Herbicide Interaction 3 Credits****Grading Scheme:** Letter Grade

Herbicide activity on plants: edaphic and environmental influences, absorption and translocation, response of specific physiological and biochemical processes as related to herbicide mode of action. Offered spring term in odd-numbered years.

Prerequisite: PLS 4601 and BOT 3503.

Anatomical Sciences Education

Animal Sciences

ANS 5446 Animal Nutrition 3 Credits**Grading Scheme:** Letter Grade

Carbohydrates, fats, proteins, minerals, and vitamins and their functions in the animal body. Offered fall term.

Prerequisite: ANS 3440, BCH 4024, or consent of instructor.**ANS 5935 Reproductive Biology Seminar and Research Studies 1 Credit, Max 4 Credits****Grading Scheme:** S/U

Invited speakers on a wide range of topics. Student-faculty participation in research projects.

Prerequisite: ANS 3319C or equivalent.**ANS 6040 Concepts in Applied Ethology 3 Credits****Grading Scheme:** Letter Grade

Introduces concepts and methods used to conduct research in the field of applied ethology. Course content includes an overview of mechanisms of animal behavior and approaches to measuring and modeling animal behavior. The focus is on developing skills necessary to conduct, analyze, and interpret research in applied ethology.

Prerequisite: CALS major**ANS 6255L Dairy Farm Evaluation 2 Credits****Grading Scheme:** Letter Grade

Enables students to learn the basics about dairy farm evaluation. We will evaluate all aspects of a dairy farm including farm financials, management, health, reproduction, nutrition and feeding, facilities, and milking. Throughout the course, the students should be able to analyze, present and discuss case studies, and by the end of the course, students should be able to present a summary of a dairy farm's weaknesses and be able to present opportunities for improvement with a budget.

Prerequisite: ANS 3006 Introduction to Animal Science.

ANS 6288 Experimental Techniques and Analytical Procedures in Meat Research 3 Credits**Grading Scheme:** Letter Grade

Experimental design, analytical procedures; techniques; carcass measurements and analyses as related to livestock production and meats studies. Offered spring term in even-numbered years.

ANS 6312C Applied Livestock Reproduction 3 Credits**Grading Scheme:** Letter Grade

Applied Livestock Reproduction is a course that provides unique experiences in applied reproductive techniques and management of livestock. Rotation through numerous animal teaching units reinforces classroom curriculum in beef, dairy, equine, small ruminants, and porcine reproduction. Topics include estrus detection, synchronization, management, artificial insemination, ultrasonography, assisted reproductive technologies, semen collection and evaluation, sperm freezing and embryo handling.

Prerequisite: ANS 3319C**ANS 6313 Current Concepts in Reproductive Biology 2 Credits****Grading Scheme:** Letter Grade

Lectures prepared by students and discussion of current review articles. Offered spring term in odd-numbered years.

Prerequisite: ANS 3319C or equivalent; consent of instructor.**ANS 6379L Techniques Genetics 2 Credits****Grading Scheme:** Letter Grade

Techniques Genetics

ANS 6387 Genetic Analysis of Complex Traits in Livestock 3 Credits**Grading Scheme:** Letter Grade

Comprehensive examination of principles of livestock inheritance, QTL mapping strategies and functional genomic approaches used for genomic selection and improvement programs in farm animals.

ANS 6447 Ruminant Nutrition 4 Credits**Grading Scheme:** Letter Grade

The anatomy and physiology of the ruminant digestive system as well as the digestion and metabolism of dietary nutrients for the purposes of growth, pregnancy, and lactation. Ration formulations using computer software.

Prerequisite: ANS 5446: Animal Nutrition**ANS 6449 Vitamins 3 Credits****Grading Scheme:** Letter Grade

Historical development, properties, assays, and physiological effects.

Prerequisite: organic chemistry.**ANS 6452 Principles of Forage Quality Evaluation 3 Credits****Grading Scheme:** Letter Grade

Definition of forage quality in terms of animal performance, methodology used in forage evaluation, and proper interpretation of forage evaluation data. Offered spring term in even-numbered years.

Prerequisite: ANS 5446, AGR 4231C.**ANS 6636 Meat Technology 3 Credits****Grading Scheme:** Letter Grade

Chemistry, physics, histology, bacteriology, and engineering involved in the handling, processing, manufacturing, preservation, storage, distribution, and utilization of meat. Offered fall term in odd-numbered years.

ANS 6637 Quantitative Microbial Risk Assessment of Pathogens in Food Systems 3 Credits**Grading Scheme:** Letter Grade

Modeling principles of microbial risk assessment in food chains. Model implementation in stochastic simulation software (R). Focus is on the bottom-up food chain approach and basic principles of the top-down approach.

Prerequisite: STA 6166 or similar statistics course & knowledge of the R programming environment.**ANS 6702 Physiology of the Mammary Gland and Lactation 2 Credits****Grading Scheme:** Letter Grade

Offers insights into the endocrinology and physiology of the defining characteristics of mammals: the mammary gland and lactation, focusing on the anatomy and development of the mammary gland with an overview of the biochemical, cellular and molecular processes controlling lactation emphasizing on livestock species.

Prerequisite: ANS 6704 or permission of instructor**ANS 6704 Mammalian Endocrinology 2 Credits****Grading Scheme:** Letter Grade

Physiologic systems of farm animals. Emphasizes the impact of endocrinology and cell biology on animal physiology, development and performance.

Prerequisite: BCH 4024 or BCH 3025, or equivalent.**ANS 6711 Current Topics in Equine Nutrition and Exercise Physiology 2 Credits****Grading Scheme:** Letter Grade

Equine science with emphasis on current topics of interest. Offered fall term in odd-numbered years.

ANS 6714 Current Topics in Microbial Physiology in Animals 1 Credit**Grading Scheme:** Letter Grade

Insights into microbial pathogenesis, microbial genetics, and molecular microbiology with particular reference to livestock species.

ANS 6715 Gastrointestinal and Feed Microbiology 3 Credits**Grading Scheme:** Letter Grade

Microbiology of the rumen, hindgut, and feed; relation to livestock production and food safety.

Prerequisite: ANS 5446.**ANS 6716 Physiology in Farm Animals 1 Credit****Grading Scheme:** Letter Grade

Physiology and function of the gastrointestinal system in monogastrics and ruminants.

Prerequisite: ANS 6704**ANS 6723 Mineral Nutrition and Metabolism 3 Credits****Grading Scheme:** Letter Grade

Physiological effect of macro- and micro-elements, and mineral interrelationships.

ANS 6751 Physiology of Reproduction 3 Credits**Grading Scheme:** Letter Grade

Conceptual relationship of the hypothalamus, pituitary, and reproductive organs during the estrous cycle and pregnancy. Influence of exteroceptive factors and seasonal reproduction. Offered fall term in even-numbered years.

Prerequisite: BCH 5045 or equivalent.**ANS 6775 Essentials of Livestock Immunology 1 Credit****Grading Scheme:** Letter Grade

Basic immunological concepts and their relation to immunity for livestock and other species.

ANS 6905 Problems in Animal Science 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Problems in Animal Science

ANS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ANS 6932 Special Topics in Animal Science 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

New developments in animal nutrition and livestock feeding, animal genetics, animal physiology, and livestock management.

ANS 6933 Graduate Seminar in Animal Science 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

Graduate Seminar in Animal Science

ANS 6936 Graduate Seminar in Animal Molecular and Cell Biology 1-2 Credits, Max 2 Credits**Grading Scheme:** Letter Grade

Seminar attendance and 1-hour presentation on graduate research project.

ANS 6939 Animal Molecular and Cellular Biology Journal Colloquy 1 Credit, Max 5 Credits**Grading Scheme:** S/U

Critical evaluation, presentation and discussion of recent scientific journal articles on a specified topic in cellular and/or molecular biology.

ANS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** Letter Grade

Helping students develop teaching skills in the animal sciences under the guidance of faculty member.

ANS 6942 Supervised Extension in the Animal Sciences 1-3 Credits**Grading Scheme:** Letter Grade

Develops extension skills in the Animal Sciences under the guidance of faculty member.

ANS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

ANS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ANS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PCB 6816 Thermal Physiology 1 Credit**Grading Scheme:** Letter Grade

Exploring the processes by which homeotherms produce heat and regulate its exchange with the environment, and the consequences of thermal biology for animal production.

Anthropology

ANG 5012 Fantastic Anthropology and Fringe Science 3 Credits**Grading Scheme:** Letter Grade

Examination of paranormal and pseudoscientific theories concerning human condition. Critical examination of fringe science claims and their perpetuation in contemporary society.

ANG 5126 Zooarcheology 3 Credits**Grading Scheme:** Letter Grade

Human use of animal resources, emphasizing prehistoric hunting and fishing practices. Origins of animal domestication.

Prerequisite: consent of instructor.**ANG 5164 The Inca and Their Ancestors 3 Credits****Grading Scheme:** Letter Grade

Evolution of the Inca empire traced archeologically through earlier Andean states and societies to the beginning of native civilization. Not open to students who have taken ANT 3164.

ANG 5172 Historical Archeology 3 Credits**Grading Scheme:** Letter Grade

Methods and theoretical foundations of historical archeology as it relates to the disciplines of anthropology, history, historic preservation, and conservation. Introduction to pertinent aspects of material culture during the historic period.

Prerequisite: ANT 3141 or consent of instructor.**ANG 5184 Principles of Archaeology 3 Credits****Grading Scheme:** Letter Grade

Foundational principles of methods and practice in contemporary anthropological archaeology including field research, interpretation of archaeological materials, temporal and spatial scales, and archaeological ethics.

ANG 5265 Methods in Ethnoecology 3 Credits**Grading Scheme:** Letter Grade

Acquainting students with the methods and analyses used by ethnoecologists to research contemporary issues between humans and the environment. Topics include community-based management of resources, co-evolution of cultural and biological diversity, ethnobiological classification, historical ecology and landscape modification, indigenous peoples and protected areas, traditional ecological knowledge, agrobiodiversity and traditional subsistence.

Prerequisite: Graduate status or permission of the instructor**ANG 5266 Economic Anthropology 3 Credits****Grading Scheme:** Letter Grade

Anthropological perspectives on economic philosophies and their behavioral bases. Studies of production, distribution, and consumption; money, savings, credit, peasant markets; and development in a cross-cultural context from perspectives of cultural ecology, Marxism, formalism, and substantivism. Not open to students who have taken ANT 4266.

ANG 5303 Women and Development 3 Credits**Grading Scheme:** Letter Grade

Influence of development on women in rural and urban areas. Women's participation in the new opportunities of modernization.

ANG 5336 The Peoples of Brazil 3 Credits**Grading Scheme:** Letter Grade

Ethnology of Brazil. Historical, geographic, and socioeconomic materials and representative monographs from the various regions of Brazil as well as the contribution of the Indian, Portuguese, and African to modern Brazilian culture. Not open to students who have taken ANT 4336.

ANG 5354 Anthropology of Modern Africa 3 Credits**Grading Scheme:** Letter Grade

Continuity and change in contemporary African societies, with special reference to cultural and ethnic factors in modern nations. Not open to students who have taken ANT 4354.

ANG 5393 Media Anthropology 3 Credits**Grading Scheme:** Letter Grade

Anthropological approach to cultural practices of media production, circulation, and consumption. Examination of media as an assemblage of culturally and spatio-temporally specific entities and practices. Use of contemporary theory and ethnographic case studies to distinguish the anthropological inquiry of media from other disciplines, such as cultural studies and mass communications.

Prerequisite: Graduate standing.**ANG 5395 Visual Anthropology 3 Credits****Grading Scheme:** Letter Grade

Photography and film as tools and products of social science. Ways of describing, analyzing, and presenting behavior and cultural ideas through visual means, student projects, and laboratory work with visual anthropology. Not open to students who have taken ANT 3390.

Prerequisite: basic knowledge of photography, or consent of instructor.**ANG 5420 Social Network Analysis in Cultural Anthropology 3 Credits****Grading Scheme:** Letter Grade

Social network analysis is a set of theories and methods to analyze social structure. Participants will learn about whole network analysis (relations within groups) and personal network analysis (relations surrounding individuals). This is an introductory hands-on course, employing examples germane to anthropological research, using software such as Ucinet and Egonet.

Prerequisite: graduate status or permission of instructor**ANG 5464 Culture and Aging 3 Credits****Grading Scheme:** Letter Grade

Cross-cultural perspectives of adult development and aging in traditional and industrial society. Comparative assessment of culturally mediated, life-cycle transformations into old age and health related and human service policy issues. Not open to students who have taken ANT 4464.

Prerequisite: two of following: ANT 2410, SYG 2000, or introductory psychology course.**ANG 5485 Research Design in Anthropology 3 Credits****Grading Scheme:** Letter Grade

Examination of empirical and logical basis of anthropological inquiry. Analysis of theory construction. Research design. Problems of data collection, processing, and evaluation.

ANG 5488 Geospatial Analysis in Cultural Anthropology 3 Credits**Grading Scheme:** Letter Grade

Geospatial analysis and their integration and application in anthropology including remote sensing, geographic information systems, and global positioning systems. Covering concepts necessary to work with geospatial data including research set-up and design and the use of specialized software, such as ArcGIS, Erdas Imagine, and Multispec.

ANG 5494 Text Analysis 3 Credits**Grading Scheme:** Letter Grade

Methods for the systematic analysis of textual data including written texts, photos, audio, and video data. Explores inductive and deductive approaches to theme identification, code definition, construction of codebooks, and teamwork in text analysis. Also examines schema analysis, grounded theory, content analysis and dictionaries, word-based analysis, and semantic network analysis.

ANG 5525 Human Osteology and Osteometry 3 Credits**Grading Scheme:** Letter Grade

Human skeletal identification for the physical anthropologist and archeologist. Techniques for estimating age at death, race, and sex from human skeletal remains. Measurement of human skeleton for comparative purposes. Not open to students who have taken ANT 4525.

Prerequisite: ANT 3514.**ANG 5531 Culture and Nutrition 3 Credits****Grading Scheme:** Letter Grade

Theory, methodology, and substantivRemoved e material of nutritional anthropology. Emphasizes cross-cultural bio-behavioral patterns.

ANG 5536 Bioarchaeology 3 Credits**Grading Scheme:** Letter Grade

Provides a review of bioarchaeology in considerable detail. Focus will be the analysis of human remains in archaeological context. Starting with the history of biological anthropology within current lines of inquiry in anthropology and archaeology. Also explores the development of method and theory in bioarchaeology.

ANG 5595 Proseminar in Biological and Archaeological Anthropology 3 Credits**Grading Scheme:** Letter Grade

Designed to introduce first-year Anthropology graduate students to the fields of Biological Anthropology and Archaeological Anthropology. This course covers the history, core components, and contemporary issues in the two sub fields.

ANG 5620 Language and Culture 3 Credits**Grading Scheme:** Letter Grade

Principles and problems of anthropological linguistics. The cross-cultural and comparative study of language. Primarily concerned with the study of non-Indo-European linguistic problems.

ANG 5621 Proseminar in Cultural and Linguistic Anthropology 3 Credits**Grading Scheme:** Letter Grade

History and theory of subfields of cultural and linguistic anthropology and their conceptual relationship to each other. Emphasis on current issues and their historical foundations.

ANG 5702 Anthropology and Development 3 Credits**Grading Scheme:** Letter Grade

Examines key concepts and theories in 'development anthropology' and 'anthropology of development. Focus on intended and prescribed development initiatives undertaken by governments, national, transnational actors and NGOs, and on more subtle developments occurring independent of specific intentions. Key-words: globalization, neoliberalism, global policies, health, education, gender, human rights, religion, participation, empowerment.

ANG 5802 Methods for the Observation of Behavior 3 Credits**Grading Scheme:** Letter Grade

Instruction on the use of behavior observation methods of data collection to answer questions of anthropological interest. Methods include traditional ethnographic direct observations, time diary techniques, and Internet mediated recordings and storage. Students learn the variable utility of different methods for specific research question

Prerequisite: Graduate status or permission of instructor

ANG 5824L Field Sessions in Archeology 6 Credits**Grading Scheme:** Letter Grade

Excavating archeological sites, recording data, laboratory handling and analysis of specimens, and studying theoretical principles that underlie field methods and artifact analysis. Not open to students who have taken ANT 4124 or equivalent.

Prerequisite: 6 hours of anthropology, or consent of instructor.**ANG 5931 Special Topics 1-6 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Special topics in Anthropology. May be repeated as topics vary.

ANG 6034 Seminar in Anthropological History and Theory 3 Credits**Grading Scheme:** Letter Grade

Theoretical principles and background of anthropology and its subfields.

ANG 6070 Digital Methods in Archaeology 3 Credits**Grading Scheme:** Letter Grade

Focus on acquiring and using digital data in archaeology. Addresses questions of what digital data are, where they come from, and what they are used for, as well as how archaeologists collect, manipulate, and display digital data. Surveys digital methods of archaeological documentation and exploration through hands-on practice and critical discussion of published case studies

ANG 6086 Historical Ecology 3 Credits**Grading Scheme:** Letter Grade

Relationship between human social and physical environments over long time spans. Theoretical and methodological relationships of cultural ecology to biology, geographical, and historical issues.

ANG 6110 Archaeological Theory 3 Credits**Grading Scheme:** Letter Grade

Theoretical approaches in social sciences and philosophies, developed and applied in anthropological archaeology through the 20th century and into the 21st. Relationship of archaeology to anthropology.

Prerequisite: Proseminar in archaeology or consent of instructor; not open to students who have taken ANG 5110.**ANG 6113 Ideology and Symbolic Approaches in Archaeology 3 Credits****Grading Scheme:** Letter Grade

Critical examination of the development of thought in archaeology extending beyond a materialist interpretation of culture. Explores causality and the role of mind and culture as mediators between the environment and political, economic, and social structures.

ANG 6120C Environmental Archaeology 3 Credits**Grading Scheme:** Letter Grade

Theory and case studies integrating zooarchaeology, archaeobotany, and geoarchaeology to interpret past human interactions with the natural environment.

ANG 6122C Archaeological Ceramics 3 Credits**Grading Scheme:** Letter Grade

Technofunctional analysis and interpretation of archaeological ceramics. Emphasizes the life cycle of pottery.

ANG 6128 Lithic Technology 3 Credits**Grading Scheme:** Letter Grade

Flintworking techniques and uses of stone implements for two million years. Emphasis on stoneworking technology in prehistoric Florida.

ANG 6146 Archaeology of Maritime Adaptations 3 Credits**Grading Scheme:** Letter Grade

Archaeological and ethnographic cross-cultural examination of the nature of coastal adaptations.

ANG 6155 Southeastern U.S. Prehistory 3 Credits**Grading Scheme:** Letter Grade

Prehistory of the southeastern United States, emphasizing problem-oriented research of broad anthropological significance.

ANG 6161 Problems in Caribbean Prehistory 3 Credits**Grading Scheme:** Letter Grade

Theories and methods for study of prehistoric human societies. Case studies drawn primarily from Caribbean islands.

ANG 6165 Problems in South American Archaeology 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Problems and issues raised by new research on cultural evolution in South America. Topics vary significantly by professor, and students may take one or all of the topics in any sequence.

ANG 6183 Laboratory Training in Archeology 3 Credits**Grading Scheme:** Letter Grade

Processing of data recovered in field excavations; cleaning, identification, cataloging, classification, drawing, analysis, responsibilities of data reporting. Not open to students who have taken ANT 4123 or equivalent.

Prerequisite: an introductory level archeology course.**ANG 6185 Ethnoarchaeology 3 Credits****Grading Scheme:** Letter Grade

Case studies examining theoretical and methodological approaches to ethnoarchaeology, with applications to field exercises.

ANG 6186 Seminar in Archeology 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Selected topic.

ANG 6187 Experimental Archaeology 3 Credits**Grading Scheme:** Letter Grade

Principles and applications of experimental archaeology. Draws on a broad range of case studies to show the numerous experimental methods archaeologists have used to solve analytic or interpretive problems.

ANG 6191 Archaeology of Death 3 Credits**Grading Scheme:** Letter Grade

Archaeological literature on mortuary data. History, cultural anthropology, and ethnography offer insights into the origin of religion, the nature of society, and the structure of ritual.

ANG 6192 Archaeological Data Analysis and Visualization 3 Credits**Grading Scheme:** Letter Grade

Introduces students to the basic quantitative methods required to describe and analyze archaeological data. Asks students to practice using statistical techniques to explore archaeological questions. Emphasizes not only statistical methods, but also how to 1) construct and critically evaluate arguments grounded in quantitative data, and 2) explore, analyze, and display data in the open-source R statistical environment.

ANG 6241 Special Topics in Ecology of Religion 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Cross-cultural examination of development of religious practices and their relationship to the environment.

ANG 6267 Anthropology, Geographic Information System, and Human Ecosystems 3 Credits**Grading Scheme:** Letter Grade

Sociocultural processes and interactions in large scale spatial/ ecosystems context.

ANG 6273 Legal Anthropology 3 Credits**Grading Scheme:** Letter Grade

Examines the relationship between philosophy of law and anthropology. Students will question what law has meant through time and today. This course and examines the legal entanglements of neoliberalism, postcolonial, and the aftermaths of counterinsurgency wars to understand how these movements shape and alter social life.

ANG 6274 Principles of Political Anthropology 3 Credits**Grading Scheme:** Letter Grade

Problems of identifying political behavior. Natural leadership in tribal societies. Acephalous societies and republican structures. Kingship and early despotic states. Theories of bureaucracy. Not open to students who have taken ANT 4274.

ANG 6286 Seminar in Contemporary Theory 3 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Areas treated are North America, Central America, South America, Africa, Oceania.

ANG 6304 Seminar in Gender and International Development 3 Credits**Grading Scheme:** Letter Grade

Analyses of academic and development concepts and projects in relation to gender. Multi-, bilateral, and NGO agencies considered by sector (health, agriculture, environment, education, political empowerment, etc.). RRA, PRA, GAF methods.

Prerequisite: ANG 5303 recommended.**ANG 6314 Peoples of the Arctic 3 Credits****Grading Scheme:** Letter Grade

Survey of the culture, history, and ethnographic background of circumpolar Arctic. Examines problems of acculturation, human ecology, cultural survival, and self-determination of northern indigenous peoples.

ANG 6366 Family, Gender, and Population in China 3 Credits**Grading Scheme:** Letter Grade

Examines the processes by which the family system, gender relations, and population interact to become powerful forces in shaping contemporary China's political, social, and economic conditions.

ANG 6391 Ethnographic Writing 3 Credits**Grading Scheme:** Letter Grade

An ethnographic writing workshop, focusing on the craft of writing in relation to events, circumstances, and predicaments. The main activity for students will be to write, however, this course also serves as a forum to foster an extended conversation on strategies and techniques for portraying empirical words.

ANG 6394 Hospital Ethnography: Theory, Method, and Ethics 3 Credits**Grading Scheme:** Letter Grade

Serves as a primer in the burgeoning area of hospital ethnography, covering its roots, how it continues to evolve, and methodological and ethical issues unique to doing ethnography in clinical settings, through journal articles and monographs. Uses course texts to analyze how hospital ethnography enables insight into broader public policy issues related to topics such as governance, accountability, gender equity, and sectarian conflict. Students produce content for website on best practices.

Prerequisite: Graduate student status.**ANG 6407 Sickness and Power 3 Credits****Grading Scheme:** Letter Grade

Exploring the problems of culture, power, networks and circulation, and authority as underlying issues of global health. Emphasizing the use of culture histories, illness experiences, and multiscale processes and structures to interrogate how macro processes, institutions, and forces intersect with the micro-worlds of families, localities, and individual experiences.

Prerequisite: Students must have graduate standing.**ANG 6408 Enviro/Culture/Disease 3 Credits****Grading Scheme:** Letter Grade

Enviro/Culture/Disease

ANG 6421 Landscape, Place, Dwelling 3 Credits**Grading Scheme:** Letter Grade

Contemporary theoretical approaches and applications to the social construction of place and space from the macro-scale of landscape to the micro-scale of dwelling. Emphasis on materiality of experience of inhabiting space.

ANG 6426 Cattle Cultures 3 Credits**Grading Scheme:** Letter Grade

Explores the archaeology and anthropology of "cattle cultures." Focuses on the ecological, political, and cultural strategies that have made cattle pastoralism dynamic and sustainable throughout prehistory and into the current era. Case studies of cattle cultures will focus on eastern Africa, the Amazon, India, and Florida.

ANG 6427 The Social Lives of Things 3 Credits**Grading Scheme:** Letter Grade

Anthropological and related theories and approaches to the social relationships and interdependences enacted between people and things.

Prerequisite: Graduate standing.**ANG 6452 Race and Racism in Anthropological Theory 3 Credits****Grading Scheme:** Letter Grade

Critical anthropological approaches to race. Historically contingent material and ideological contexts in which various peoples become racialized in culturally diverse ways.

ANG 6453 Human Rights in Cross-Cultural Perspective 3 Credits**Grading Scheme:** Letter Grade

Anthropological perspectives on the discourses and practices of international human rights.

ANG 6481 Research Methods in Cognitive Anthropology 3 Credits**Grading Scheme:** Letter Grade

Data collection including free lists, pile sorts, triad tests, paired comparisons, rankings, and ratings. Consensus analysis, cluster analysis, and multidimensional scaling.

ANG 6514 Human Origins 3 Credits**Grading Scheme:** Letter Grade

Review of fossil record of human evolution from Miocene to present. "Hands-on" seminar in basics of hominid fossil record.

ANG 6524 Skeletal Mechanics in Biological Anthropology 3 Credits**Grading Scheme:** Letter Grade

Mechanobiology of the primate skeleton. Material and structural basis for the functional behavior of bone. Analytical approaches to functional, allometric, and evolutionary adaptation.

Prerequisite: ANG 5525, and either ANG 5683 or ANG 6740.

ANG 6532 Molecular Genetics of Disease 3 Credits**Grading Scheme:** Letter Grade

Examines the molecular genetics of human disease. Discusses a range of diseases from single-gene recessive defects (such as cystic fibrosis) to complex diseases (such as alcoholism and diabetes). Also discusses detection and treatment.

ANG 6555 Issues in Evolutionary Anthropology 3 Credits**Grading Scheme:** Letter Grade

Current controversies in biological anthropology. Role of evolutionary theory in addressing problems of taxonomy, speciation, systematics, selection, development, and adaptation in primate and human evolution.

ANG 6583 Primate Functional Morphology 3 Credits**Grading Scheme:** Letter Grade

Practical and theoretical approaches to functional morphology in living and fossil primates. Biomechanical techniques. Problems of functional inference in paleontological and archeological records.

ANG 6591L Advanced Molecular Anthropology Laboratory 1-3 Credits**Grading Scheme:** Letter Grade

Research design, experimentation, discussion, and presentation of findings of individual laboratory-based projects.

Prerequisite: consent of instructor.**ANG 6592 Genetic Perspectives on Human Diversity 3 Credits****Grading Scheme:** Letter Grade

Current applications of molecular data to questions of human evolution and genetics, based on most recent journal articles. Possible topics: emergence of modern *Homo sapiens* and population movements.

Prerequisite: consent of instructor.**ANG 6701 Seminar on Applied Anthropology 3 Credits****Grading Scheme:** Letter Grade

Consideration of planned socio-cultural and technological change and development in the United States and abroad; special and cultural problems in the transferral of technologies; community development and aid programs. Comparative program evaluation.

Prerequisite: ANG 5700 or consent of instructor.**ANG 6734 Anthropology of Pregnancy, Birth, & Child Dev 3 Credits****Grading Scheme:** Letter Grade

Uses a medical anthropological lens to examine variability in health among pregnant mothers and early childhood development cross-culturally, drawing on critical and biocultural accounts. Focuses on several aspects of maternal health including reproductive ecology and fetal growth, birth experience, reproductive loss, breastfeeding, and early childhood development.

ANG 6737 Medical Anthropology 3 Credits**Grading Scheme:** Letter Grade

Theory of anthropology as applied to nursing, medicine, hospital organization, and the therapeutic environment. Instrument design and techniques of material collection.

Prerequisite: consent of instructor.**ANG 6740 Advanced Techniques in Forensic Anthropology 3 Credits****Grading Scheme:** Letter Grade

Hands on analysis and clinical diagnoses of human skeletal remains. Analysis of human trauma and other demographic techniques.

Prerequisite: human osteology and forensic anthropology introduction.**ANG 6780 Foundations for a Career in Anthropology 3 Credits****Grading Scheme:** Letter Grade

Prepares graduate students for a career in Anthropology. Students will learn how to develop, fund, present, and publish independent research. Additional topics relevant to a professional career in anthropology, including non-academic job opportunities and ethics will be discussed.

ANG 6801 Ethnographic Field Methods 3 Credits**Grading Scheme:** Letter Grade

Methods of collecting ethnographic data. Entry into the field; role and image conflict. Participant observation, interviewing, content analysis, photography and documents, data retrieval, analysis of data.

ANG 6804 Ethnographic Writing 3 Credits**Grading Scheme:** Letter Grade

Explores the craft of writing for rendering events, circumstances, and predicaments of ethnographic fieldwork. Introduces strategies and techniques for portraying empirical worlds and provides skills needed to make ethnographic representations more discerning, vibrant and adequate to lived encounters of field research.

ANG 6853 Applying GIS in Archaeological Research 3 Credits**Grading Scheme:** Letter Grade

Examines use of Geographic Information Systems (GIS) for management and analysis of geospatial data in anthropology, experimenting with methods and critically examining case studies. Covers both methodology (collecting data in the field, using publicly-available data; integrating and querying them in a GIS) and theory (the nature of spatial data; scales and topics of analysis). Also examines selected case studies and considers critiques that have been leveled at GIS and spatial analysis.

ANG 6905 Individual Work 1-3 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Guided readings on research in anthropology based on library, laboratory, or field work.

ANG 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ANG 6915 Research Projects in Social, Cultural, and Applied Anthropology 1-3 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

For students undertaking directed research in supplement to regular course work.

Prerequisite: consent of instructor.**ANG 6930 Special Topics in Anthropology 1-3 Credits, Max 21 Credits****Grading Scheme:** Letter Grade

Special Topics in Anthropology

Prerequisite: consent of instructor.**ANG 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

ANG 6945 Internship in Anthropology 1-8 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Required of all students registered in programs of applied anthropology. Students are expected to complete 4-8 hours.

Prerequisite: permission of graduate coordinator.**ANG 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ANG 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ANG 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Applied Physiology and Kinesiology

APK 5102 Kinetic Anatomy 3 Credits**Grading Scheme:** Letter Grade

Will provide in-depth coverage of musculoskeletal anatomy as a foundation for learning components of simple and complex motor tasks, with an emphasis on proper execution and analysis of joint movement and common exercises.

APK 5121 Anatomy and Physiology for Sport and Exercise Science 3 Credits**Grading Scheme:** Letter Grade

Studies human anatomy and physiology from an organ-systems approach with direct applications to exercise, sport, training, and clinical practice. Serves as a foundation for learning and applying more advanced principles and concepts related to biomechanics, exercise physiology, and applied kinesiology by using an integrated approach to discuss topics of cell, tissue, and organ structure and function.

Prerequisite: Graduate Level Standing.**APK 5127 Assessment in Exercise Science 3 Credits****Grading Scheme:** Letter Grade

Techniques and methodologies to assess health and physical fitness.

Prerequisite: PET 3351C or equivalent.**APK 5133 Human Pathophysiology for the Exercise Sciences 3 Credits****Grading Scheme:** Letter Grade

Macrotraumatic and microtraumatic inflammatory processes, factors affecting inflammation and healing, and the role of exercise in controlling the onset or course of an inflammatory response.

Prerequisite: PET 2320C, 2350C, 3351C.**APK 5150C Clinical Anatomy for the Exercise Sciences 3 Credits****Grading Scheme:** Letter Grade

Designed for students to learn advanced dissection skills from a whole systems approach with the intent of practical application. The primary focus will involve human cadaver dissection. The role of anatomical structures as they relate to musculoskeletal injury mechanisms, evaluation, and rehabilitation will be emphasized.

Prerequisite: (APK_BS or APK_MS) & (APK 2100c or equivalent).**APK 5166 Sports Supplements 3 Credits****Grading Scheme:** Letter Grade

This course covers sport supplements and their effects on athletes. We examine aspects of diet and how supplements can influence different components. Then the history of sports supplements will be reviewed along with regulations that govern them. Lastly, supplements that are currently being used throughout the world will be discussed.

Prerequisite: APK 3110C with a minimum grade of C.**APK 5171 Clinical Exercise Prescription 3 Credits****Grading Scheme:** Letter Grade

Dedicated to creating exercise prescriptions specifically tailored for various health-related conditions. Students will examine assessments and exercise programming for aerobic, resistance, balance, flexibility, and movement-related aspects of health and fitness. The class will culminate in a module focused on the pharmacology associated with various health conditions and their interaction with exercise interventions.

APK 5177 Strength and Conditioning for Beginning Practitioners 3 Credits**Grading Scheme:** Letter Grade

This course addresses the principles of designing training programs of varying duration aimed at improving muscular strength, power, speed, agility, endurance, balance, stability, and hypertrophy. Emphasis will be placed on creating and administering evidence-based periodized training programs and ensuring safe and productive technique of fundamental exercises in each modality.

Prerequisite: Must be enrolled in applied physiology and kinesiology (APK) degree program.**APK 5404 Sport Psychology 3 Credits****Grading Scheme:** Letter Grade

Survey of current research, learning processes, motivation, performance intervention, strategies, group dynamics, history of sport psychology, and other topics.

Prerequisite: Consent of instructor.**APK 5620 Genetics of Human Performance 3 Credits****Grading Scheme:** Letter Grade

Introduces genomics, genetics principals, and technologies related to sports and human performance. Role of genetic variation in power, endurance, trainability, and injury. Role of sex and gender in sport performance.

Prerequisite: Restricted to APK_BS or APK_MS students.**APK 5702 Applied Sport Science 3 Credits****Grading Scheme:** Letter Grade

Examines fundamental concepts related to the acquisition, analysis, and interpretation of data relevant to the outcome of human performance across myriad physical and cognitive domains including sport, exercise, tactical operations, and medical professions. Addresses the use of statistics and broader fields of data science, artificial intelligence, analytics, and technology management necessary to evaluate performance and strategically adjust training methods to enhance performance.

Prerequisite: Required major of Applied Physiology & Kinesiology.**APK 6116C Physiological Bases of Exercise and Sport Sciences 3 Credits****Grading Scheme:** Letter Grade

Applying fundamental concepts of human physiology to programs of physical education and sports. Recent research developments in sports physiology.

APK 6118 Neuromuscular Adaptation to Exercise 3 Credits**Grading Scheme:** Letter Grade

Research developments; and describing neural and muscular function and adaptation to acute and chronic exercise.

Prerequisite: APK 6110C.

APK 6124 Extreme Environment Physiology 3 Credits**Grading Scheme:** Letter Grade

Examine the responses of the body during and after exposure to extreme environmental conditions. Topics include high-altitude, deep-water diving, extreme temperature environments, microgravity/outer space, and high-stress environments. The course will have sections detailing possible diseases and conditions relating to exposure to those extreme environments.

APK 6145 Movement Disorders 3 Credits**Grading Scheme:** Letter Grade

Covers the sensory and motor systems of the nervous system responsible for regulating movement in movement disorders. We cover movement disorders including Parkinson's disease, tics, Huntington's disease, dystonia, tremor, spinal cord injury, spasticity, cerebellar disorders, and speech and language disorders.

APK 6167 Nutrition Aspects of Human Performance 3 Credits**Grading Scheme:** Letter Grade

Offers an overview of the roles nutrient selection, metabolism, and timing play in supporting and improving physical performance. Evidence-based strategies and recommendations are applied to industry specific examples. Course concepts aid in preparation for certification exams within the exercise sciences that include nutrition as a component.

Prerequisite: MS APK Student OR MS APK Certificate Student.**APK 6170 Advanced Exercise Physiology 3 Credits****Grading Scheme:** Letter Grade

Covers advanced concepts in integrative physiology and exercise focusing on metabolism and endocrine exercise physiology, skeletal muscle contraction and fatigue, cardiovascular and hemodynamics regulations, and respiratory exercise physiology. The course emphasizes acute responses to exercise and environmental challenges in both health and disease.

Prerequisite: APK4112 or APK6116C or equivalent or instructor approval**APK 6176 Strength and Conditioning for Advanced Practitioners 3 Credits****Grading Scheme:** Letter Grade

Addresses advanced physiological, biomechanical, and exercise program design principles relevant to the practice of strength and conditioning. Emphasis is placed on making informed decisions from available data when designing training programs to optimize athletic performance. Prepares students for advanced strength and conditioning certification exams through various professional associations.

APK 6195 Cell Physiology & Biophysics 0 Credits**Grading Scheme:** Letter Grade

Provides a solid understanding of the molecular basis that controls cellular physiology. Emphasis is placed on understanding the basic tenets of genome structure/function and gene expression, protein synthesis and gradation, cell cycle/division and death, cytoskeleton, and cellular metabolism. Attention is placed on understanding the cellular physiology responses to exercise.

APK 6205C Nature and Bases of Motor Performance 3 Credits**Grading Scheme:** Letter Grade

Principles of motor skill development, and conditions affecting motor skill development and retention in physical education activities.

APK 6206 Planning Motor Actions 3 Credits**Grading Scheme:** Letter Grade

Processes and mechanisms involved in planning voluntary human motor actions. Variables that influence movement planning and initiation.

Prerequisite: consent of instructor.**APK 6225 Biomechanical Instrumentation 3 Credits****Grading Scheme:** Letter Grade

Overview of data collection and analysis tools. Hands-on experience conducting projects using EMG, videography, and force transducer technology.

Prerequisite: APK 6220C.**APK 6226C Biomechanics of Human Motion 3 Credits****Grading Scheme:** Letter Grade

Applying the principles of statics, kinematics, and kinetics to kinesiological systems of the human body in movement and sports skills.

Prerequisite: PET 2320C; MGF 1202 or MAC 1142.**APK 6320C Corrective Exercise 3 Credits****Grading Scheme:** Letter Grade

Examines fundamental concepts of human movement and movement impairments on musculoskeletal injury risk. Includes evidence based program design and practical skills necessary to successfully identify and correct movement impairments in active populations. Content will prepare students to sit for the National Academy of Sports Medicine Corrective Exercise Specialist certification.

Prerequisite: HH College**APK 6406 Exercise Psychology 3 Credits****Grading Scheme:** Letter Grade

Overview, examining research evidence on psychological factors associated with adapting and maintaining an exercise program.

APK 6408 Performance Enhancement 3 Credits**Grading Scheme:** Letter Grade

Mental and psychological techniques and strategies to improve performance and achievement in sport and exercise.

Prerequisite: APK 5404.**APK 6417 Attention & Emotion in Tactical Athlete Populations 3 Credits****Grading Scheme:** Letter Grade

Covers the fundamental links between emotion and attention, and the role these psychological factors play influencing motivation, behavior, decision-making, and human movement in elite performance within physically and psychologically demanding tactical performance environments.

APK 6611 Tactical Strength & Conditioning 3 Credits**Grading Scheme:** Letter Grade

Examines fundamental concepts in bioenergetics, biomechanics, cardiopulmonary responses, and skeletal muscle function adaptation. Includes evidence based program design and practical skills in fire and rescue, law enforcement, and military careers. Content prepares students to sit for the National Strength and Conditioning Association (NSCA) Tactical Strength and Conditioning Facilitator certification.

Prerequisite: HH College.**APK 6704 MATLAB for Biomedical Sciences 3 Credits****Grading Scheme:** Letter Grade

This course introduces MATLAB foundations to code, compute, analyze, and plot research data in biomedical sciences. Each week, the course consists of a 1-hour didactic lecture and a 2-hour lab session dedicated to Q As and troubleshooting non-working codes.

APK 6715 Grant Writing in Health & Human Performance 3 Credits**Grading Scheme:** Letter Grade

Acquaints students with grant submission requirements. We will focus on NIH predoctoral (F31) specific aims and research strategy, but more general grant writing tips and approaches will also be discussed. Topics and examples will cover health and human performance. The course will conclude with the formation of "study sections" to peer review proposals.

Prerequisite: There are no prerequisites for this course, but doctoral student status is strongly recommended.

APK 6725 AI for Sport & Movement Sciences 3 Credits**Grading Scheme:** Letter Grade

Applies AI technologies to the study of sport movement sciences in healthy and diseased human populations. This course introduces students to programming and data visualization techniques while covering classical concepts of machine learning (e.g. linear regression and classification, ensemble-based algorithm, clustering, and neural networks) and modern machine learning methods for images and video processing (e.g. convolutional neural networks and transformers)

APK 6900 Directed Independent Study 1-5 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual research projects under faculty guidance.

APK 6940 Advanced Practicum in Exercise and Sport Science 3-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

On-site practical experience in exercise and sport science.

Prerequisite: Limited to students enrolled in the MS APK degree concentration in Strength and Conditioning Practitioner.

APK 7107 Cardiovascular Exercise Physiology 3 Credits**Grading Scheme:** Letter Grade

Basic mechanisms of cardiovascular dynamics at rest and in response to exercise.

Prerequisite: APK 6110C/6356L or equivalent.

APK 7108 Environmental Stress Exercise Physiology 3 Credits**Grading Scheme:** Letter Grade

Energetics of environmental stress on cardiovascular, respiratory, metabolic, and muscle physiology as they pertain to physical performance.

Prerequisite: APK 6110C/6356L or equivalent.

APK 7117 Exercise Metabolism 3 Credits**Grading Scheme:** Letter Grade

Principles of metabolic regulation during exercise; effects of chronic exercise on muscle metabolism.

Prerequisite: APK 6110C or equivalent.

ATR 6124 Clinical Anatomy for the Exercise Sciences 3 Credits**Grading Scheme:** Letter Grade

Cadaver dissection and lectures. Appreciation of clinical applications of anatomical knowledge for those pursuing careers in exercise science fields.

Prerequisite: PET 2320C, 2350C, 3351C.

ATR 6215 Evidence-Based Orthopedic Exam I: Upper-Extremity 3 Credits**Grading Scheme:** Letter Grade

Identifying, evaluating, and managing acute athletic injuries.

Prerequisite: for students who are BOC-certified athletic trainers.

ATR 6216 Evidence-Based Orthopedic Exam II: Lower-Extremity 3 Credits**Grading Scheme:** Letter Grade

Orthopedic and biomechanical assessment of lower-extremity function and dysfunction. Students develop skills and study the principles and procedures used in advanced evaluation techniques. Students examine components of lower-extremity function from biomechanical, neuromuscular and anatomical perspectives. Topics include advanced orthopedic special tests, 3-dimensional kinematics, interpreting contemporary diagnostic tests and treatment of lower-extremity pathology/dysfunction and critical reviews of related research.

Prerequisite: ATR 6215

ATR 6304 Rehabilitation and Modalities of Athletic Injuries 3 Credits**Grading Scheme:** Letter Grade

Rehabilitation and therapeutic modalities in the field of athletic training.

ATR 6624 Athletic Training Research and Technology I 3 Credits**Grading Scheme:** Letter Grade

Current theory and practical application of techniques (cardiovascular testing, isokinetic strength testing, and EMG testing) for understanding and designing research projects related to athletic training and sports medicine.

ATR 6625 Athletic Training Research and Technology II 3 Credits**Grading Scheme:** Letter Grade

Current theory and practical application of techniques (modalities in research, proprioception testing, and force plate and balance testing) for understanding and designing research projects related to athletic training and sports medicine.

Prerequisite: NATA certified or eligible, or related degree or certification.

ATR 6934 Seminar in Athletic Training 3 Credits, Max 5 Credits**Grading Scheme:** Letter Grade

Research topics or contemporary issues in athletic training.

Prerequisite: NATA certification.

HLP 6515 Evaluation Procedures in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Evaluation and interpretation of tests and analysis of research data.

HLP 6535 Research Methods in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Introduction to research methodology and design.

HLP 6911 Research Seminar 1 Credit**Grading Scheme:** S/U

Research presentations by graduate students and faculty in the College.

HLP 6935 Variable International Topics 1-6 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Opportunity to study in a wide range of cultural settings.

Prerequisite: adviser's approval.

HLP 7939 HHP PhD Professional Development Seminar 3 Credits**Grading Scheme:** Letter Grade

Designed to complement the scholarly emphases of the HHP PhD program by providing insight into key considerations for professional development and personal growth. Best practices will be shared for developing professional aptitude and the skills necessary for successful matriculation through graduate studies and future professional careers.

HLP 7979 Advanced Research in Health and Human Performance 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field, or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HLP 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PET 5064 Athlete Sexual Health and Wellness 3 Credits**Grading Scheme:** Letter Grade

Explore the ways sexual agency, sexual misconduct, healthcare services for athletes, and other related topics directly impact athlete wellness and how sexual health is made a priority alongside physical, psychological, and financial health.

Prerequisite: 7HH or 8HH**PET 5936 Special Topics/Seminars 1-3 Credits****Grading Scheme:** Letter Grade

Special Topics/Seminars

PET 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

PET 6947 Graduate Internship in Exercise and Sport Sciences 3-9 Credits, Max 9 Credits**Grading Scheme:** S/U

On-site full-time practical experience in field of study.

Prerequisite: completion of 2 terms of course work applicable to specialization; permission of adviser, written application, and site approval.

PET 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

Architecture

ARC 5040 Introduction to Themed Environments 3 Credits**Grading Scheme:** Letter Grade

A historical and theoretical interpretation of the industry is provided through a survey of its peculiar practice, process, guest experience, and legal aspects. Course structure foreshadows following coursework; design, documentation, construction, fabrication, execution, development operations. Students focus their new knowledge to produce an illustrated research project.

ARC 5041 Design and Documentation of Themed Environments 3 Credits**Grading Scheme:** Letter Grade

Survey of the interrelated expertise in designing and documenting the "Show Support Environment". It addresses conventions of drawing and the interaction of architecture, landscape, interiors, engineering, codes/standards, products/procurement, and sustainability to support the story and guest experience. Students research the integration of systems in a themed environment.

ARC 5042 Fabrication and Execution for Themed Environments 3 Credits**Grading Scheme:** Letter Grade

Introduction to the responsibilities and processes of themed environment design, fabrication and execution. In this project-based course students learn the complex roles, disciplines, risks, strategies, and techniques, while applying them in a full-scale experiential installation.

ARC 5043 Integration Practices for Built Environments 3 Credits**Grading Scheme:** Letter Grade

An active immersion into practices of creativity and innovation enhanced through integration. Collaboration, a precondition, is furthered with the application of integration methods; sharing decision-making knowledge. In this project-based learning course, students create individual works, perform group projects, map integrative practices, and measure team performance outcomes.

ARC 5921 Fundamentals of Coding and Computation - Introduction to Computer Programming for Architects 3 Credits**Grading Scheme:** Letter Grade

Learn the fundamentals of coding and computation to understand concepts such as variables, conditions, loops, algorithms, and libraries. Then, implement these concepts in design exercises to create hands-on projects using coding to solve design problems.

ARC 6044 Development and Operations for Themed Environments 3 Credits**Grading Scheme:** Letter Grade

A focus on legal, business, and operational issues peculiar to themed environment projects and how they impact decisions of owners. Legal topics include intellectual property, contracts, enforceability, and jurisdictions. Business topics include incentives/penalties, financial management. Operations topics include, insurance, liabilities, maintenance and safety. Students gain knowledge behind top level direction.

ARC 6045C Project Development Studio for Themed Environments 6 Credits**Grading Scheme:** Letter Grade

A project-based application of integrative thinking methods. Students identify a need which underpins story development, program and specification, and creative process toward meaningful design concepts and projects that meet budget and timeframe constraints. Students iterate and evaluate solutions resulting in project metrics.

ARC 6116 Drawing toward Architecture 1-2 Credits, Max 2 Credits**Grading Scheme:** Letter Grade

Freehand drawing skills as generative and analytical architectural methodologies.

ARC 6212 Topics in Phenomena and Architecture 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Relationships between the philosophy of phenomenology and specific phenomena and architecture studied. Current and historic examples of theoretical and design applications considered.

ARC 6228 Film and Architecture 3 Credits**Grading Scheme:** Letter Grade

Survey of the representation of architecture and urbanism in cinema and an investigation of how discourses of cinema construct urbanism and architecture.

Prerequisite: consent of instructor or DCP majors.**ARC 6241 Advanced Studio I 1-9 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

An investigation of architecture as a systematic integration of program, space and tectonic systems to make public places in specific cultural and climatic contexts, culminating in a highly resolved spatial order and material resolution.

ARC 6242 Research Methods 3 Credits**Grading Scheme:** Letter Grade

Research Methods

Prerequisite: Required of all graduate students as preparation for thesis.

ARC 6281 Professional Practice 3 Credits**Grading Scheme:** Letter Grade

Principles and processes of office practice management, investment and financing, project phases, building cost estimation, contracts.

ARC 6306C Public Interest Design: Contemporary Issues and Practice 3 Credits**Grading Scheme:** Letter Grade

An introduction to contemporary issues and practice of Public Interest Design (PID), an interdisciplinary and collaborative field focused on the built environment. The need and potential for PID to address social, economic, and environmental justice issues engages a range of geographies, communities, and project types. Modes of practice and case studies are explored in relationship to benefits and barriers to the practice.

ARC 6311C Building Information Modeling 3 Credits**Grading Scheme:** Letter Grade

Building information modeling (BIM) in the context of advanced architectural design development and documentation.

Prerequisite: ARC2180**ARC 6355 Advanced Studio II 6 Credits****Grading Scheme:** Letter Grade

Emphasis on architecture, program the experience of place. Introduces emergent paradigms for practice and the built environment as well as speculative methods and procedures.

ARC 6356 Advanced Studio III 6 Credits**Grading Scheme:** Letter Grade

Developing design methods for synthesizing special aspects of architectural practice: human behavior and space programming, environmental control and energy use, construction materials and structures, project management, preserving and reusing historic structures, and theoretical and philosophical areas of inquiry.

ARC 6357 Advanced Topics in Architectural Design 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Expanding familiar concepts in the conception and production of architecture. Examines the potential for a program to generate architectonic form, bringing a multidisciplinary approach to historical manifestations.

ARC 6386 Introduction to Healthcare Design 3 Credits**Grading Scheme:** Letter Grade

Examine the components and system of environments for health ranging from wellness to acute care environments. We analyze major planning and design strategies enabling students to critique the functional and formal relationships in healthcare environments. Students will differentiate types of healthcare facilities and the programmatic elements of outpatient and inpatient facilities. Students will identify problems, ideate with evidence to develop design proposals.

ARC 6399 Advanced Topics in Urban Design 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Transformations of historic urban form and newly developed urban areas and their cultural, sociological, economic, and technological impact.

ARC 6505 Architectural Structural Systems: Wood, Steel, and Concrete 4 Credits**Grading Scheme:** Letter Grade

Structural components as part of building system. Introduction to typical building components.

Prerequisite: ARC 3503 or equivalent.**ARC 6512 Structural Modeling 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of structural information modeling. Develops the conceptual and theoretical understanding of building information modeling (bim), digital design, and approximate systems analysis and detailing for building structures. Students will learn how to efficiently implement bim to organize, coordinate and communicate information in order to convey data necessary for structural analysis and design. Incorporated are applied projects and case studies related to building design and detailing.

Prerequisite: ARC 3503**ARC 6611 Advanced Topics in Architectural Technology 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Structures, materials, construction systems, or environmental technology. Determining architectural form by available technologies and inventions throughout history.

ARC 6621 Graduate Environmental Technology 2 3 Credits**Grading Scheme:** Letter Grade

Fundamentals of architectural lighting, acoustics, electrical power distribution, and building communications.

Prerequisite: ARC 3610.**ARC 6642 Architectural Acoustic Design Laboratory 3 Credits****Grading Scheme:** Letter Grade

Theories and sciences of architectural acoustics as integral components of an architectural design problem.

Prerequisite: ARC3610 and ARC 4620 or Equivalents**ARC 6643 Architectural Acoustics 3 Credits****Grading Scheme:** Letter Grade

Theory, practice, and application of acoustics in architecture.

ARC 6670 Lighting Design Seminar 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Design problems investigating theoretical, conceptual, and practical applications of illumination systems through speculative and analytical inquiry.

ARC 6680 Architecture Energy and Ecology 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Design challenges investigating theoretical, conceptual, and practical applications of architecture that is responsive to ecology, energy, and resource systems through speculative and analytical inquiry.

ARC 6685 Life Safety, Sanitation, and Plumbing Systems 3 Credits**Grading Scheme:** Letter Grade

Design problems investigating the theory, practice, and applications of fire safety, movement, sanitation, and plumbing systems in architecture.

ARC 6686 LEED for Sustainable Design and Construction 3 Credits**Grading Scheme:** Letter Grade

Focusing on design and construction of high performance buildings, apply green building technologies, and strategies using on campus projects, and understand the economics and market development of building green using green building rating systems with focus on LEED. Successful completion of this course will fulfill the prerequisites for LEED™ Green Associate exam credentials.

ARC 6705 Graduate Architectural History 3 3 Credits**Grading Scheme:** Letter Grade

Examination of key built works from early civilizations, their cultural context, and construction technologies.

Prerequisite: ARC 1702.

ARC 6773 Strains of Modernism 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Examinations of the origins, development and transformations of modernism as known through publications and built work of varying scales.

ARC 6793 Advanced Topics in Regional Architecture 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Critical studies of local, regional, and vernacular buildings and built environments.

ARC 6821 Preservation Problems and Processes 3 Credits**Grading Scheme:** Letter Grade

Preservation in the larger context. Establishing historic districts; procedures and architectural guidelines for their protection.

ARC 6883 Vernacular Architecture & Sustainability 3 Credits**Grading Scheme:** Letter Grade

Investigation of vernacular architecture in the discourse of architectural sustainability, with an emphasis on the way that vernacular architecture has been constructed, represented, and consumed in the environmental histories of architecture.

Prerequisite: consent of instructor or DCP major.**ARC 6911 Architectural Research 1-6 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Special studies adjusted to individual needs.

ARC 6912 Architectural Research II 1-6 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Special studies adjusted to individual needs.

ARC 6913 Architectural Research III 1-6 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Special studies adjusted to individual needs.

ARC 6922 Machine Learning for Architects 3 Credits**Grading Scheme:** Letter Grade

Students will apply state-of-the-art AI and Machine Learning (ML) algorithms in different architectural design processes. They will emphasize AI as a paradigm for critical thinking and idea development, avoiding using AI only for optimization. This course will focus on experimentation and application, fulfilling university requirements to be categorized as "Use Apply AI."

ARC 6923 AI & Ethics in Architecture 3 Credits**Grading Scheme:** Letter Grade

Examines the limitations and opportunities of Bias and Fairness in architecture using AI. It fulfills university requirements to be categorized as "AI Ethics." Students will construct theoretical and philosophical questions related to AI and data-driven algorithms in design and will examine bibliographic works to support their responses. Finally, students will create course syllabi for a design studio, with AI as infrastructure in the curriculum.

ARC 6933 Sustainable Site Design 3 Credits**Grading Scheme:** Letter Grade

Architecture's relationship to landscape environments. Focuses on architecture's interrelationship with the diverse fields of landscape architecture, ecology, and civil engineering.

Prerequisite: must be a graduate student in the College of Design, Construction, and Planning.**ARC 6934 European Approach to Sustainable Design 3 Credits****Grading Scheme:** Letter Grade

Ideas and design strategies used in Europe that might be considered for the United States. Focuses on several countries in Europe that are leaders in sustainable design.

ARC 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

ARC 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

ARC 6979 Master's Research Project 1-10 Credits**Grading Scheme:** Letter Grade

Master's Research Project

LAA 5331 Site Design Methodologies 3 Credits**Grading Scheme:** Letter Grade

Learn, develop, and refine methodologies to effectively evaluate relevant natural, social, and cultural characteristics of a site and its context as an integral part of the planning and design process.

LAA 6231 Landscape Architecture Theory 3 Credits**Grading Scheme:** Letter Grade

Explores theories pertinent to the practice and study of landscape architecture. Aesthetic and cultural principles and values and related ecological aspects. Designated core course.

Prerequisite: consent of instructor. ;**Corequisite:** LAA 6656C.**LAA 6236 Landscape Architecture Research Methods 3 Credits****Grading Scheme:** Letter Grade

multi-faceted exploration of various types and practices of research in landscape architecture, emphasizing methods in scholarship, practice, criticism, and decision-making.

Prerequisite: LAA 6231.**LAA 6322 Landscape Architecture Professional Practice 3 Credits****Grading Scheme:** Letter Grade

This course is designed to prepare students for professional practice and to provide an understanding of the business of landscape architecture in private and public arenas, and of the basic concepts in leadership and organizational management.

LAA 6342 Landscape Architecture Criticism 1 Credit**Grading Scheme:** Letter Grade

A critical exploration of contemporary and historical landscape architecture, examining design theories, methods, and built works through analysis, discussion, and writing.

LAA 6382 Ecological and Environmental Policy 3 Credits**Grading Scheme:** Letter Grade

Survey of major environmental policy and law with particular reference to Florida case studies. Designated core course.

LAA 6383 Landscape Ecology and Management 3 Credits**Grading Scheme:** Letter Grade

This course explores the relationship between planning, design decision-making, and landscape management practices, which are based on the fundamental principles of ecology and landscape ecology.

LAA 6525L Advanced Landscape Construction Design 4 Credits**Grading Scheme:** Letter Grade

Development of current communication and production techniques related to professional landscape architectural construction documentation.

LAA 6656C Advanced Landscape Architectural Design 1-6 Credits**Grading Scheme:** Letter Grade

Complex project design. Emphasizes user issues, ecological concerns, and regional and cultural issues; and determination of form for sustainable environments.

LAA 6713 Cultural Landscapes 3 Credits**Grading Scheme:** Letter Grade

Explores the intersection of human and cultural systems as expressed in physical form, with multi-disciplinary explorations of why a landscape looks the way it does, what landscapes "mean", and how they are active agents/indicators in ongoing changes in cultural products, built environments, and society.

LAA 6905 Directed Study 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Directed Study

LAA 6931 Water Conservation through Site Design and Green Roofs 3 Credits**Grading Scheme:** Letter Grade

Exploration of the impacts of development on the natural systems of a site, particularly water resources. Mitigation of these impacts through sustainable site planning and design methodologies.

LAA 6935 Gardens of the World 3 Credits**Grading Scheme:** Letter Grade

Explores the garden as a complex expression of human relationships with each other and the larger environment, both physical and cultural.

LAA 6941 Supervised Internship 3 Credits**Grading Scheme:** S/U

Work is to be supervised by a registered landscape architect. Internship is to be accomplished in summer between first and second years or second and third years. Students, after completion, register in the next fall term for credit.

Prerequisite: required for all students who do not document a landscape architectural experience.

LAA 6971 Research for Master's Thesis 2-6 Credits**Grading Scheme:** S/U

Research for Master's Thesis

LAA 6979 Terminal Project 1-6 Credits**Grading Scheme:** S/U

This option, in lieu of thesis, is available for a design project that because of magnitude or design complexity does not adapt to thesis format.

Art and Art History

ARE 6049 History of Teaching Art 3 Credits**Grading Scheme:** Letter Grade

History of the theory and practice of teaching art.

ARE 6148 Curriculum in Teaching Art 3 Credits**Grading Scheme:** Letter Grade

Contemporary theories for development of art teaching curricula.

ARE 6246C Principles of Teaching Art 3 Credits**Grading Scheme:** Letter Grade

Social and theoretical foundations of contemporary art education practice.

ARE 6247C Teaching Art: The Study of Practice 3 Credits**Grading Scheme:** Letter Grade

Art teaching practices in the public schools. Emphasizes art curriculum planning, motivational strategies, art room management and alternative assessment in art.

ARE 6386 Teaching Art in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Study of teaching art at the post secondary level.

Prerequisite: graduate standing in art history, or consent of instructor.

ARE 6641 Issues in Art Education 3 Credits**Grading Scheme:** Letter Grade

Exploration of contemporary issues in art, general education, and society that affect teaching of art in public schools.

ARE 6746 Methods of Research in Art Education 3 Credits**Grading Scheme:** Letter Grade

Study of qualitative and quantitative research methods. Review of research literature.

ARE 6905 Individual Study 1-5 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual Study

ARE 6910 Capstone Project 3 Credits, Max 9 Credits**Grading Scheme:** S/U

Repeatable for credit. Completion of an original research project that addresses an identified issue or need with the field of art education.

Prerequisite: Advanced standing in the graduate program, ARE 6705, and consent of Instructor.

ARE 6933 Special Topics in Art Education 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Special Topics in Art Education

ARE 6944 Internship in Teaching Art 3 Credits**Grading Scheme:** S/U

Develops pedagogical knowledge and skills in a school classroom, under the guidance of a K-12 art teacher.

Prerequisite: Student must be accepted into the MA Program in Art Education w/ EPI, have passed his/her first-year review, and have completed ARE 6246C and ARE 6247C.

ARE 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

ARE 6973 Individual Project 1-10 Credits, Max 10 Credits**Grading Scheme:** S/U

Project in lieu of thesis.

ARH 5420 Art in the Age of Revolution 3 Credits**Grading Scheme:** Letter Grade

Late-18th and early-19th century European art, including Neo-Classicism and Romanticism. Works are considered in the cultural, political, social, and aesthetic contexts in which they were created. Emphasizes the politics of style during the period of revolution and reaction.

Prerequisite: Graduate standing in the Art History program, or consent of instructor.

ARH 5667 Colonial Andean Art 3 Credits**Grading Scheme:** Letter Grade

Examination of the colonial art of Peru, Ecuador, Bolivia, and other territories within the Spanish Viceroyalty of Peru.

Prerequisite: graduate standing in Art and Art History or Latin American Studies, or consent of instructor.

ARH 5816 Methods of Research and Bibliography 3 Credits**Grading Scheme:** Letter Grade

Methods of Research and Bibliography

ARH 5877 Gender, Representation, and the Visual Arts: 1600-1900 3 Credits**Grading Scheme:** Letter Grade

Historical and theoretical issues posed for visual media by attention to issues of gender, with particular emphasis on women artists.

Prerequisite: Graduate standing in the Art History program, or consent of instructor.**ARH 5905 Individual Study 1-6 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual Study

ARH 6141 Greek Art Seminar 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Topics in Greek art history.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6292 Medieval Art Seminar 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Topics in medieval art.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6394 Renaissance Art Seminar 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Special topics in the art and visual culture of the 14th through 16th centuries.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6422 Beginnings of Modernism. Realism to Post-Impressionism 1848-1890 3 Credits****Grading Scheme:** Letter Grade

This topic of this course is the history of European painting (French, actually) during the second half of the nineteenth century, considered within the social and political context provided by the Second Republic, Second Empire, the Commune and Third Republic. Major themes to be traced in lectures and readings will include: formation of the avant garde, the shifting social organization of industrial society, and changing structures of artistic personality, practice and consumption. The city of Paris will be our focus, as nearly all the artists we shall study -whether French, Dutch, or Scandinavian spent significant time there.

ARH 6477 Eighteenth-Century European Art Seminar 3 Credits**Grading Scheme:** Letter Grade

Intersecting ideologies of gender and representation in French art.

Prerequisite: graduate standing in the Art History program, or consent of instructor.**ARH 6481 Contemporary Art Seminar 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Topics in contemporary art.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6496 Modern Art Seminar 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Topics in modern art.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6596 Chinese Art Seminar 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Research seminar focusing on a topic or topics in the study of Chinese art.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6597 African Art Seminar 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Research seminar focusing on a topic or topics in the study of African art.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6654 Pre-Columbian Art Seminar 3 Credits****Grading Scheme:** Letter Grade

Rotating topics include topics pertaining to the study of Pre-Columbian art.

Prerequisite: consent of instructor.**ARH 6666 Colonial Latin American Art Seminar 3 Credits****Grading Scheme:** Letter Grade

Rotating topics include issues pertaining to the study of colonial Latin American art.

Prerequisite: consent of instructor.**ARH 6696 American Art Seminar 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Topics in American art.

Prerequisite: graduate standing in art history or consent of instructor.**ARH 6797 Museum Education 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Issues and content related to education in museums and other nontraditional education settings.

ARH 6836 Exhibitions Seminar 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Basic information needed by the museum curator. Exhibition research, planning, interpreting, installing, and organizing and designing museum space.

ARH 6895 Collections Management Seminar 3 Credits**Grading Scheme:** Letter Grade

Information needed to access and conserve objects. Risk management, preparing objects for travel, and legal issues in collections management.

ARH 6900 Independent Study in Museology 1-6 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Independent research topics under faculty guidance.

ARH 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ARH 6911 Advanced Study 3-4 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Advanced Study

Prerequisite: major in art.**ARH 6914 Independent Study in Ancient Art History 3-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Egyptian, Near Eastern, Aegean, Greek, Etruscan, Roman.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ARH 6915 Independent Study in Medieval Art History 3-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Early Christian, Byzantine, Early Medieval, Romanesque, Gothic.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ARH 6916 Independent Study in Renaissance and Baroque Art History 3-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Renaissance, High Renaissance, Mannerism, Baroque, Eighteenth Century art.

Prerequisite: major in art; consent of instructor and graduate program adviser.

ARH 6917 Independent Study in Modern Art History 3-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Major art movements of the 19th and 20th centuries.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ARH 6918 Independent Study in Non-Western Art History 3-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

African, Latin American, American Indian, Asian, and Oceanic.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ARH 6930 Special Topics in Museology 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Contemporary issues pertaining to museums and their social and cultural functions.

ARH 6931 Seminar in Curatorial Studies 3 Credits**Grading Scheme:** Letter Grade

Explores key exhibitions and curators central to the history of art.

Investigations will cover various art collections and exhibition formats, from the emergence of the modern museum in the eighteenth century to present-day global biennial culture.

Prerequisite: Permission of Instructor.**ARH 6938 Seminar in Museum Studies 3 Credits****Grading Scheme:** Letter Grade

History, purposes, and functions of museums in general, and art museums in particular.

Prerequisite: consent of instructor.**ARH 6941 Supervised Internship 1-6 Credits, Max 9 Credits****Grading Scheme:** S/U

Training in an approved regional or national museum, arts organization, institution, or facility. On-site supervision, with periodic reports filed with the instructor of record.

ARH 6946 Museum Practicum 1-6 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Work under museum professionals. Readings and periodic discussions with the coordinating professor.

Prerequisite: consent of graduate program adviser and prior arrangements with professors.**ARH 6948 Gallery Practicum 1-6 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Work under the supervision of gallery professionals. Readings and periodic discussions with the coordinating professor.

Prerequisite: Consent of graduate program adviser and prior arrangements with coordinating professor.**ARH 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ARH 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ARH 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ART 5674C Digital Fabrication 3 Credits**Grading Scheme:** Letter Grade

Interdisciplinary studio combines in-depth analysis of the role of the physical object in diverse conceptual art practices with project-based experimentation using rapid prototyping and manufacturing technologies.

Prerequisite: consent of instructor. Familiarity with 2-D and 3-D software recommended.**ART 5905C Directed Study 1-5 Credits****Grading Scheme:** Letter Grade

Directed Study

ART 5930C Special Topics 3 Credits**Grading Scheme:** Letter Grade

Rotating topics in studio art and studio practice.

ART 6410C Printmaking Seminar: Mastering Process and Content 3 Credits**Grading Scheme:** Letter Grade

Complex ideation, approaches, and material handling to orchestrate a unified series of images that equally support concept and methods.

Prerequisite: graduate standing in studio art or consent of instructor**ART 6411C Printmaking Seminar: Transformation and Change 3 Credits****Grading Scheme:** Letter Grade

Explorations of methodologies toward conceptual and perceptual image transformations.

Prerequisite: graduate standing in studio art or consent of instructor**ART 6412C Printmaking Seminar: Ideation, Studies, and Completed Works 3 Credits****Grading Scheme:** Letter Grade

In-depth investigation of process, form, and content to strengthen previous visual philosophies.

Prerequisite: graduate standing in studio art or consent of instructor**ART 6413C Printmaking Seminar: Interdisciplinary Studio 3 Credits****Grading Scheme:** Letter Grade

Explores diverse media and idea development as a way to develop innovative visual philosophies.

Prerequisite: Graduate standing in studio art or consent of instructor.**ART 6671C Advanced Experiments in Digital Art 3 Credits****Grading Scheme:** Letter Grade

Rotating topics include electronic art forms, with an emphasis on creative and expressive use of emergent digital media, trends in digital media art.

Prerequisite: graduate student in Art and Art History or consent of instructor.**ART 6672 Hypermedia 3 Credits****Grading Scheme:** Letter Grade

Practical and theoretical issues related to the Internet as a medium for making art rather than as tool for delivering information. Emphasizes creation of dynamic and interactive experiences that utilize the Internet including video, graphics, animation, sound, image and typography.

Prerequisite: graduate level in School of Art and Art History or consent of instructor.**ART 6673C Video Art 3 Credits****Grading Scheme:** Letter Grade

Studio intensive course explores digital video through lectures, demonstrations, screenings and reading with a specific overview of concepts and techniques integral to video. Emphasizes conceptual and experimental forms, rather than on conventional narrative.

Prerequisite: graduate level in School of Art and Art History or consent of instructor.

ART 6675C Digital Art and Animation 3 Credits**Grading Scheme:** Letter Grade

Rotating topics explore principles and concepts of animation using traditional methods, digital imaging, and contemporary 2D and 3D software applications. Lectures, demonstrations, screenings and readings provide students with the opportunity to integrate concept, form and technology to explore the possibilities of animation.

Prerequisite: graduate level in SAAH or consent of instructor.**ART 6691 Digital Art Studio 4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Investigation of digital art practices in one or more of the following areas: bit-mapped and object-oriented graphics, 3-D modeling, computer animation, hypermedia and interactivity, and image-processing.

Prerequisite: graduate standing in art, or consent of instructor.**ART 6794C Vessel Aesthetic 1 3 Credits****Grading Scheme:** Letter Grade

Further study of high-fire reduction methods, in throwing and handbuilding practice, and in the formal use of the vessel as an artistic means of expression. This course is for graduate students with basic background in handbuilding and throwing.

Prerequisite: None.**ART 6795C Vessel Aesthetic 2 3 Credits****Grading Scheme:** Letter Grade

Learning how to do intermediate study of in the development and use of ceramic color, forming techniques, and use of the vessel surface as an artistic means of expression. This course is for graduate students with basic background in handbuilding and throwing.

Prerequisite: None.**ART 6797C Ceramic Sculpture 2 3 Credits****Grading Scheme:** Letter Grade

Learning sculpture forming techniques, plaster mold-making, as well as glaze testing to develop color and surface for sculpture. As a graduate class, this course is intended for graduate elective students with a background in hand building who are seeking to do further study sculpting methods and mold making (an original three dimensional duplication technique).

Prerequisite: Prior experience in hand building processes for Ceramics.**ART 6835C Research in Methods and Materials of the Artist 3-4 Credits****Grading Scheme:** Letter Grade

Research in Methods and Materials of the Artist

ART 6849C Reactive Environments 3 Credits**Grading Scheme:** Letter Grade

Explores site specificity and intervention in three-dimensional space through installation, using digital media, producing artworks expanding current body of work, intersecting with course theme.

Prerequisite: graduate level in School of Art and Art History or consent of instructor.**ART 6897 Professional Practices for the Visual Artist 3 Credits****Grading Scheme:** Letter Grade

Professional Practices for the Visual Artist

ART 6910C Supervised Research 1-5 Credits**Grading Scheme:** S/U

Supervised Research

ART 6925C Art + Technology Workshop 3 Credits**Grading Scheme:** Letter Grade

Examines the conceptual ramifications of new technologies, allowing the artist to experiment with new forms, in the context of a projects-based course, producing artworks, expanding their current body of work, as it intersects with the course theme.

ART 6926C Advanced Study I 2-4 Credits**Grading Scheme:** Letter Grade

Applying the basic principles of studio art in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, or multi-media.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ART 6927C Advanced Study II 2-4 Credits****Grading Scheme:** Letter Grade

Investigating selected problems in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, and multi-media.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ART 6928C Advanced Study III 2-4 Credits****Grading Scheme:** Letter Grade

Experimentation in nontraditional approaches to studio art in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, and multi-media.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ART 6929C Advanced Study IV 2-4 Credits****Grading Scheme:** Letter Grade

Stylistic and technical analysis of contemporary studio practices in one of the following areas: ceramics, creative photography, drawing, painting, printmaking, sculpture, graphic design, and multi-media.

Prerequisite: major in art; consent of instructor and graduate program adviser.**ART 6933 Area Methods: Rotating Topics 1-4 Credits, Max 27 Credits****Grading Scheme:** Letter Grade

Readings, discussions, and/or studio exploration of various art issues.

Prerequisite: Consent of instructor and graduate program adviser.**ART 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ART 6973C Individual Project 1-10 Credits**Grading Scheme:** S/U

Creative project in lieu of written thesis.

DIG 5930 Special Topics 3 Credits**Grading Scheme:** Letter Grade

Special Topics

DIG 6746C Graduate Seminar in Sensors and Electronics 3 Credits**Grading Scheme:** Letter Grade

Explores how devices respond to and interact with human physical action. Students create artwork, exploring physical interfaces beyond mouse/keyboard/screen interactions through the use of microcontrollers and sensors.

Prerequisite: digital media art students only, DIG 3130 (or equivalent programming experience) or consent of instructor.

GRA 5905 Individual Directed Study 1-3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

An elective individual study course to investigate a topical area of study beyond regularly offered courses. Coursework is conducted based on a proposal and the plan is developed by the student with the faculty supervisor.

Prerequisite: Major in Design & Visual Communications and permission of faculty supervisor.

GRA 6930 Seminar: Rotating Topics 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Contemporary issues pertaining to design visual communications and related areas. Discussion of literature, development of research questions, and framing methodologies.

Prerequisite: Design and Visual Communication major student or permission of instructor. ;

Corequisite: GRA 6931C.

GRA 6931C Research and Practice 3 Credits**Grading Scheme:** Letter Grade

A rotating topics course focused on the integration of research and practice to address complex problems within diverse contexts. The study and use of qualitative, quantitative, and mixed research methods appropriate for an expanded practice are addressed through discussions, case studies, writing, fieldwork, and presentations.

Prerequisite: Design and Visual Communication major student or permission of instructor. ;

Corequisite: GRA 6930.

GRA 6944 Practicum 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

An opportunity to conduct research and practice in partnership with an approved organization. Students will work on projects for social, cultural, and economic development in partnership with the organization, community, and/or other disciplinary experts.

Prerequisite: Design and Visual Communication major student and permission of faculty supervisor.

GRA 6973 Project in Lieu of Thesis 1-9 Credits, Max 15 Credits**Grading Scheme:** S/U

Supervised research in an area of relevance to design and visual communications that combines design exploration and academic inquiry. Includes presentation of results in a public forum, and documentation of research and findings.

IDC 6505C Programming for Artists 3 Credits**Grading Scheme:** Letter Grade

Fundamental programming concepts that enable the digital artist to take full advantage of the range of computer-mediated interactivity.

Prerequisite: graduate level in School of Art and Art History or consent of instructor.

Astronomy and Astrophysics

AST 6112 Solar System Astrophysics 3 Credits**Grading Scheme:** Letter Grade

Systematic examination of the formation and current state of the solar system.

AST 6215 Stars and the Galaxy 3 Credits**Grading Scheme:** Letter Grade

Stars as constituents of galaxies, with discussion of both the theoretical and observational aspects of the topic.

AST 6245 Stellar Atmospheres and Radiative Processes 3 Credits**Grading Scheme:** Letter Grade

Radiative transfer, spectral line formation and broadening, and other topics applicable to stellar atmospheres and photoionized nebulae.

AST 6309 Galaxies and Cosmology 3 Credits**Grading Scheme:** Letter Grade

Observations and interpretations of the kinematics, dynamics, and structure of the Milky Way Galaxy, extragalactic objects, and galaxy clusters.

AST 6336 Astrophysics of the Interstellar Medium 3 Credits**Grading Scheme:** Letter Grade

Complex interplay of physical processes that determine the structure of the interstellar medium in our galaxy; compares observational data with theoretical prediction.

AST 6725C Fundamentals of Observational Astronomy 3 Credits**Grading Scheme:** Letter Grade

Overview of techniques associated with observational astronomy.

AST 6905 Individual Work 1-6 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Supervised study or research in areas not covered by other courses.

AST 6925 Departmental Colloquium 1 Credit, Max 10 Credits**Grading Scheme:** S/U

Repeatable for credit. Intended for first-year graduate students.

Presentation of topics by visiting and local researchers.

Corequisite: AST 6935, AST 6936

AST 6935 Frontiers in Astronomy 1 Credit, Max 6 Credits**Grading Scheme:** S/U

Repeatable for credit. Recent developments in theoretical and observational astronomy and astrophysics.

Corequisite: AST 6925, AST 6936

AST 6936 Astronomy Journal Club 1 Credit**Grading Scheme:** S/U

Intended for first-year graduate students. Discussion of journal articles.

Prerequisite: AST 6925, 6935.

AST 7939 Special Topics 2-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Assigned reading, programs, seminar, or lecture series in a new field of advanced astronomy.

AST 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

AST 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Biochemistry and Molecular Biology

BCH 5205 Medical Metabolism 3 Credits**Grading Scheme:** Letter Grade

Metabolism will be taught in the context of medical situations. Lecture material will cover basic concepts in carbohydrate, lipid, and nitrogen metabolism. Students will enhance their understanding of human metabolism by applying their knowledge to the analysis and discussion of clinical case studies and primary literature with the metabolism field.

Prerequisite: One undergraduate biochemistry course or BCH 5024.

BCH 5404 Fundamentals of Biochemistry & Molecular Biology 4 Credits**Grading Scheme:** Letter Grade

A survey of the structure, function, and metabolism of amino acids, proteins, carbohydrates, lipids, and nucleic acids and an introduction to concepts in cell structure, replication, growth, and metabolic regulation.

Prerequisite: (CHM 2210 & CHM 2211) or (CHM 2212 & CHM 2213).**BCH 5413 Mammalian Molecular Biology and Genetics 3 Credits****Grading Scheme:** Letter Grade

Biochemical and genetic approaches to understanding vertebrate and particularly mammalian molecular biology, moving from basic processes of replication, transcription, and protein synthesis to signal transduction, cell cycle, cancer, genomics, and developmental genetics.

Prerequisite: BCH 3025, 4014, CHM 3218, 4207, MCB 4303, or PCB 3063 or consent of instructor.**BCH 6040 Research Discussion in Biochemistry and Molecular Biology 1 Credit****Grading Scheme:** S/U

Current research in biochemistry and molecular biology will be presented by departmental faculty and invited speakers.

Prerequisite: Required as students in Biochemistry and Molecular Biology. Open to students in other fields with permission of the instructor.**BCH 6206 Advanced Metabolism 3 Credits****Grading Scheme:** Letter Grade

Reactions of intermediary metabolism, emphasizing their integrations, mechanisms, and control. Extensive examples from current literature.

Prerequisite: BCH 4024, CHM 4207, or consent of instructor. One of three core biochemistry courses.**BCH 6207 Advanced Metabolism: Role of Membranes in Signal Transduction and Metabolic Control 1 Credit****Grading Scheme:** Letter Grade

Fundamentals of membrane biochemistry. Discussions of membrane structure, nutrient and ion transport, protein targeting, and signal transduction. Experimental methods and techniques used to gather and analyze data related to membrane biochemistry and its regulation.

Prerequisite: BCH 3025, 4024, CHM 3218, 4207, GMS 6001, or consent of instructor.**BCH 6208 Advanced Metabolism: Regulation of Key Reactions in Carbohydrate and Lipid Metabolism 1 Credit****Grading Scheme:** Letter Grade

Key reactions in metabolic pathways of carbohydrate and lipid metabolism. Explores the experimental basis for current understanding of these processes. Understanding the interactions between major metabolic pathways and control of these pathways under different physiological conditions.

Prerequisite: BCH 3025, 4024, CHM 3218, 4207, GMS 6001, or consent of instructor.**BCH 6209 Advanced Metabolism: Regulation of Key Reactions in Amino Acid and Nucleotide Metabolism 1 Credit****Grading Scheme:** Letter Grade

Understanding interactions among major metabolic pathways and control of these pathways under different physiological conditions. Structural basis of enzyme function and regulation.

Prerequisite: BCH 3025, 4024, CHM 3218, 4207, GMS 6001, or consent of instructor.**BCH 6415 Advanced Molecular and Cell Biology 3 Credits****Grading Scheme:** Letter Grade

Molecular biology of pro- and eukaryotic organisms. Emphasizes understanding the experimental approaches that led to recent developments. Chromosome structure and organization, advances in recombinant DNA technology, DNA replication, RNA transcription and protein synthesis, and selected aspects of molecular regulation of gene expression.

Prerequisite: BCH 4024, CHM 4207, MCB 4303, or consent of instructor. PCB 3063 or a similar course in genetics recommended. One of three core biochemistry courses.**BCH 6740 Physical Biochemistry/Structural Biology 3 Credits****Grading Scheme:** Letter Grade

Physical chemistry of biological molecules and techniques to study their properties. Approaches to structure determination.

Prerequisite: BCH 4024, CHM 4207, or consent of instructor. Course in physical chemistry recommended. One of three core biochemistry courses.**BCH 6741C Magnetic Resonance Imaging and Spectroscopy in Living Systems 3 Credits****Grading Scheme:** Letter Grade

MR imaging methods used to study the structure of cells, tissues, and whole animals. MR spectroscopy methods for monitoring biochemistry in living animals. Preparing samples, operating the instruments, and analyzing the data.

Prerequisite: Students should have completed courses in chemistry and physics, or the equivalent. The course uses calculus throughout so students should have completed a course in calculus or the equivalent. No experience with electronics is required.**BCH 6744 Molecular Structure Determination by X-ray Crystallography 1 Credit****Grading Scheme:** Letter Grade

Detailed theoretical and practical instruction on technique of x-ray crystallography used for three-dimensional structure determination of macromolecules in studies aimed at structure-function elucidation.

Prerequisite: BCH 6740 or equivalent or consent of instructor.**BCH 6744L Molecular Structure Determination by X-Ray Crystallography Laboratory 1 Credit****Grading Scheme:** Letter Grade

Complement to BCH 744 lectures. Practical experience in sample preparation, operation of instrumentation, data acquisition analysis, phasing and refinement. Hands-on approach reinforces applicability of this methodology in analysis of functional properties of biological macromolecule.

Prerequisite: or coreq: BCH 6744: Molecular Structure Determination by X-ray Crystallography . ;**Corequisite:** Coreq:**BCH 6745 Molecular Structure and Dynamics of NMR Spectroscopy 1 Credit****Grading Scheme:** Letter Grade

Theoretical and practical introduction to macromolecular NMR spectroscopy. Basics of multidimensional NMR for structure and dynamics measurements. Hands-on training in modern NMR.

Prerequisite: BCH 6740 or equivalent or consent of instructor.

BCH 6745L Molecular Structure and Dynamics by NMR Spectroscopy Laboratory 1 Credit**Grading Scheme:** Letter Grade

Complement to BCH 6745 lectures. Emphasizes practical applications of molecular structure and dynamics determination. Extensive use of computer software packages. Training in modern NMR instrumentation, data processing, and data analysis. Completed training sufficient for use of NMR instrumentation in Advanced Magnetic Resonance Imaging and Spectroscopy facility.

Prerequisite: or coreq: BCH 6745.**Corequisite:** undefined**BCH 6746 Structural Biology: Macromolecular Structure Determination 1 Credit****Grading Scheme:** Letter Grade

Experimental approaches to biological macromolecular structure determination. Emphasizes current understanding of protein-protein and protein-nucleic acid structure motifs.

Prerequisite: BCH 3025, 4024, CHM 3218, 4207, GMS 6001 or consent of instructor.**BCH 6747 Structural Biology/Advanced Physical Biochemistry: Spectroscopy and Hydrodynamics 1 Credit****Grading Scheme:** Letter Grade

Applying spectroscopic techniques (circular dichroism, fluorescence, nuclear magnetic resonance) to determine the structure of biological macromolecules. Hydrodynamic approaches including light scattering, molecular diffusion, viscosity, and ultracentrifugation.

Prerequisite: BCH 3025, 4024, CHM 3218, 4207, GMS 6001, or consent of instructor.**BCH 6749C Numerical Methods in Structural Biology 1 Credit****Grading Scheme:** Letter Grade

Introduction to mathematical and computational methods needed to understand current structural models, biophysical processes, data acquisition methods, and analysis of data acquired with current techniques.

Prerequisite: BCH 6740 or equivalent or consent of instructor.**BCH 6876 Recent Advances in Membrane Biology 1 Credit****Grading Scheme:** S/U

Literature presented by students and faculty, discussed in depth. Emphasizes current developments, data, interpretation, and critical analysis.

Prerequisite: general biochemistry or consent of instructor.**BCH 6877 Recent Advances in Structural Biology 1 Credit, Max 8 Credits****Grading Scheme:** S/U

Literature on structural biology presented by students and faculty, discussed in depth. Current developments, data interpretation, and critical analysis.

Prerequisite: general biochemistry or consent of instructor.**BCH 6905 Independent Studies in Biochemistry and Molecular Biology 1-5 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual literature-based or experimental research problem.

Prerequisite: permission of instructor.**BCH 6906 Readings in Medical Biochemistry & Molecular Biology 1 Credit****Grading Scheme:** Letter Grade

A one (1) credit online course in which primary literature articles in medical biochemistry and molecular biology will be assigned for reading and discussion. Homework questions and discussion board post will be used to determine student mastery of the material

Prerequisite: This course is only for students enrolled in the online certificate program.**BCH 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

Prerequisite: consent of instructor.**BCH 6936 Biochemistry Seminar 1 Credit, Max 20 Credits****Grading Scheme:** Letter Grade

Research reports and discussions of current research literature given by graduate students, departmental faculty, and invited speakers.

Prerequisite: required of graduate students in biochemistry; open to others by special arrangement.**BCH 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: consent of instructor.**BCH 7410 Advanced Gene Regulation 1 Credit, Max 3 Credits****Grading Scheme:** Letter Grade

Literature-based assessment of the most recent advances in factors governing eukaryotic gene regulation.

Prerequisite: GMS 6001 or consent of instructor.**BCH 7412 Epigenetics of Human Disease and Development 1 Credit****Grading Scheme:** Letter Grade

BCH 6415 recommended. In-depth assessment of epigenetic mechanisms of mammalian gene regulation: DNA methylation, histone modifications, genomic imprinting, inherited genetic diseases, viral gene regulation, and epigenetic reprogramming in embryonic stem cells and cloning.

Prerequisite: GMS 6001.**BCH 7515 Structural Biology/Advanced Physical Biochemistry: Kinetics and Thermodynamics 1 Credit****Grading Scheme:** Letter Grade

Fundamentals of chemical kinetics and thermodynamic analysis of equilibria. Emphasizes applying this knowledge to understand basic enzyme kinetics, pulse-chase kinetics, protein polymerization, DNA dynamics, protein-nucleic acid interactions, and cooperative ligand binding.

Prerequisite: BCH 4024, CHM 3218, 4207, GMS 6001, or consent of instructor.**GMS 5905 Special Topics in Biomedical Sciences 1-4 Credits, Max 4 Credits****Grading Scheme:** Letter Grade

Analysis and discussion of contemporary topics and the development of biomedical sciences.

Biology

BOT 6276C Phylogenomics 4 Credits

Grading Scheme: Letter Grade

Acquaints graduate students with the mathematical theory and methods underlying modern phylogenetic analyses, particularly those that involve "big" data sets, either in terms of taxa or markers. Covers advanced phylogenetic methods, including comparative methods and the multi-species coalescent.

Prerequisite: BOT 6726C with a minimum grade of C-.

BOT 6656 Plant Symbiosis 3 Credits

Grading Scheme: Letter Grade

Examines the crucial role of symbioses in shaping the diversity of life. Topics include generalities among symbioses, origins and establishment of symbioses, and coevolution and cospeciation, as well as specifics of well-studied exemplars of bacterial, fungal, animal, and plant symbioses with plants.

Prerequisite: BSC2010 (C) & BSC2010L (C) & BSC2011 (C) & BSC2011L (C)

BSC 6038 Broader Impacts of Science on Society 2 Credits

Grading Scheme: Letter Grade

Explores ways in which scientists can increase impacts to society and emphasize the relevance of scientific work. Topics include broadening scientific impacts through exhibits, working with teachers, social media, serving underrepresented groups, and more.

BSC 6451 Computational Tools for Research in Biology 3 Credits

Grading Scheme: Letter Grade

Introduces computational tools for research: Linux command line, Python scripting, databases. Prepares students to conduct large-scale data analysis on high performance computing resources.

BSC 6895 AI in Biology 3 Credits

Grading Scheme: Letter Grade

Examines how Artificial Intelligence has rapidly become ubiquitous in daily life and been applied to diverse areas of Biology. Focuses on machine learning approaches as well as deep learning methods, including transformers. Covers machine learning methods for tabular data, computer vision, transfer learning, natural language processing, and transformer based architectures. Classes are typically applied coding with Jupyter Notebooks on HiPerGator. Prior Python coding experience required.

Prerequisite: BSC 4452 or BSC 6451 or BSC 2891 or other Python programming experience.

PCB 6675C Evolutionary Biogeography 3 Credits

Grading Scheme: Letter Grade

Interpretation of biological data sets in a biogeographical context. Topics and methods in historical and ecological biogeography will be discussed.

Prerequisite: Permission of instructor.

PCB 6685 Population Genetics 4 Credits

Grading Scheme: Letter Grade

Provides a comprehensive introduction to the mathematical theory of allele and genotype frequency dynamics within and between populations and will serve as a springboard to more advanced topics in evolutionary biology. Topics covered include deterministic and stochastic processes in evolution and an introduction to classical quantitative genetics theory.

Prerequisite: Graduate status.

ZOO 6930 Seminar in Molecular Evolution 2 Credits

Grading Scheme: Letter Grade

A seminar course in evolution, genetics, and genomics. The class provides each student the opportunity to lead discussion and to exchange ideas with others on various student-selected topics in any area of the broad interdisciplinary fields of evolution, genetics, and genomics.

Prerequisite: Graduate student standing or permission of the instructor.

Biomedical Engineering

BME 5401 Biomedical Engineering and Physiology I 3 Credits

Grading Scheme: Letter Grade

Physiology of cells, bones, and the circulatory system from a biomaterials, biomechanics, cellular, and tissue engineering perspective. Intellectual property and technology transfer included.

BME 5500 Biomedical Instrumentation 3 Credits

Grading Scheme: Letter Grade

Engineering and medical aspects of measuring and processing signals from living systems. Discusses biomedical transducers for measuring movement, biopotentials, pressure, flow, concentrations, and temperature; and treatment devices like ventilators and infusion pumps. Whenever possible, devices actually used in clinical practice are used in class.

Prerequisite: basic knowledge of physics and calculus, consent of instructor.

BME 5703 Statistical Methods for Biomedical Engineering 3 Credits

Grading Scheme: Letter Grade

Computational methods needed for biomedical engineering research. Students will be acquainted with a variety of techniques for analyzing and modeling experimental data arising in molecular, cellular, physiological, and pathological systems encountered in typical laboratory and clinical settings.

Prerequisite: Knowledge of calculus, linear algebra and basic statistics.

BME 5937 Special Topics 1-4 Credits, Max 6 Credits

Grading Scheme: Letter Grade

Special Topics

BME 6010 Clinical Immersion 1 Credit, Max 6 Credits

Grading Scheme: Letter Grade

Biomedical engineers develop practical solutions to various problems encountered in healthcare and clinical practice. Students learn and identify such problems through direct immersion in the clinical environment. Students will shadow a clinician (one-on-one) for 1-3 hours per week where they will identify a clinical problem and propose a solution.

Prerequisite: BME 6018 Clinical Correlations.

BME 6018 Clinical Correlations in BME 3 Credits

Grading Scheme: Letter Grade

Biomedical engineers develop practical solutions to various problems encountered in healthcare and clinical practice. Students are exposed to clinical problems, learn how to identify unmet needs and will devise engineering solutions to address clinical needs. Topics related to clinical translation of biomedical innovations and medical device commercialization will be covered.

Prerequisite: BME 5401.

BME 6164 Magnetic Biomaterials 3 Credits**Grading Scheme:** Letter Grade

Consists of classroom lectures on fundamental concepts in magnetism and magnetic micro- and nano-materials and their applications in biomedicine. As part of the course, students will present a critical review of recent literature in the field and lead a group discussion on a specific recent paper.

Prerequisite: Undergraduate physics and chemistry**BME 6330 Cell and Tissue Engineering 3 Credits****Grading Scheme:** Letter Grade

Applying engineering principles, combined with molecular cell biology, to developing a fundamental understanding of property-function relationships in cells and tissues. Exploiting this understanding to manipulate cell and tissue properties rationally to alter, restore, maintain, or improve cell and tissue functions; and to design bioartificial tissue substitutes.

BME 6353 Patient Dosimetry in Medical Imaging and Radiotherapy 3 Credits**Grading Scheme:** Letter Grade

Students will review the methods and techniques for assessing organ doses in medical imaging and radiotherapy techniques through the use of computational dosimetry. The L-Series of lectures will discuss various imaging modalities, preceded by a review of how radiation exposure might induce cancer in humans. The latter portion of the course will cover radiotherapy. The P-Series of practicum sessions will give hands-on experience with computational phantoms

BME 6360 Neural Engineering 3 Credits**Grading Scheme:** Letter Grade

Applying engineering to neuroscience including such diverse areas as neural tissue engineering, models of neural function, and neural interface technology. Focuses mainly in the context of neural interfaces and prosthetics, from basic neural physiology and models of neural mechanisms to advanced neural interfaces currently in development or produced commercially.

Prerequisite: consent of instructor.**BME 6522 Biomedical Multivariate Signal Processing 3 Credits****Grading Scheme:** Letter Grade

Statistical analysis of biomedical signals, emphasizing multivariate time series. Introduces analysis concepts and methods in the time domain and the spectral domain. Uses actual recordings from biomedical applications to demonstrate the methods.

Prerequisite: multivariate calculus and a basic knowledge of probability and statistics.**BME 6535 Radiological Physics, Measurements and Dosimetry 3 Credits****Grading Scheme:** Letter Grade

Interacting and measuring techniques for x-rays, gamma rays, neutrons and charged particles with matter; radioactive decay processes ion chamber measurements, scintillation detectors, and dosimetry techniques. Applications of cavity theory and dosimetry measurement in medical physics.

Prerequisite: Upper level college physics**BME 6705 Mathematical Modeling of Biological and Physiological Systems 3 Credits****Grading Scheme:** Letter Grade

Mathematical modeling of biological and physiological phenomena. Starting from basic theory of linear systems, introduces qualitative analysis of nonlinear ordinary differential equations and maps. Examples from biomedical applications show concepts and methods.

Prerequisite: calculus, linear algebra, and passing knowledge of differential equations.**BME 6905 Individual Work in Biomedical Engineering 1-4 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Individual Work in Biomedical Engineering

BME 6907 BME Project 1-9 Credits, Max 12 Credits**Grading Scheme:** S/U

BME Project

Prerequisite: BME MS non-thesis status.**BME 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

BME 6936 Biomedical Engineering Seminar 1 Credit, Max 4 Credits**Grading Scheme:** S/U

Biomedical Engineering Seminar

BME 6938 Special Topics in Biomedical Engineering 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Topics in Biomedical Engineering

BME 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

BME 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

BME 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

BME 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EGR 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.**EGR 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits****Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

Biostatistics

GMS 6827 Advanced Clinical Trial Methods 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Statistical principles and methods used in the design and analysis of clinical trials. Rotating topics include group sequential designs, adaptive clinical trials, and Statistical Monitoring of Clinical Trials.

Prerequisite: consent of instructor.

PHC 6020 Clinical Trial Methods 3 Credits

Grading Scheme: Letter Grade

Basic statistical concepts and methods used in clinical trials and the statistical principles and methods including phase I to IV clinical trials.

Prerequisite: STA 6208/STA 6209 , STA 6326/STA 6327, or equivalent

PHC 6022 Design and Conduct of Clinical Trials 3 Credits

Grading Scheme: Letter Grade

Scientific evaluation of health care interventions by clinical trials and the ethics, principles, and conduct of clinical trials in an epidemiological context. Complex issues in analyzing and interpreting clinical trials.

Prerequisite: STA 2023 (Introduction to Statistics I) or equivalent, and permission of the instructors. Students are expected to have basic statistical knowledge.

PHC 6050C Biostatistical Methods I 3 Credits

Grading Scheme: Letter Grade

Biostatistical data analysis using linear models; theory and practice of regression and analysis of variance in the health sciences.

Prerequisite: basic knowledge of data analysis, linear algebra, and calculus III, and consent of instructor.

PHC 6051 Biostatistical Methods II 3 Credits

Grading Scheme: Letter Grade

Biostatistical data analysis using generalized linear models, generalized linear mixed models, semiparametric and nonparametric regression, and neural networks; theory and practice in the health sciences.

Prerequisite: consent of instructor and Biostatistical Methods I.

PHC 6059 Introduction to Applied Survival Analysis 3 Credits

Grading Scheme: Letter Grade

Survival analysis is about the analysis of time-to-event data. The goal of this course is to help you understand the fundamental concepts of survival analysis and their applications in epidemiology and biomedical sciences. Basic concepts from probability and introductory statistics will be reviewed as needed.

Prerequisite: Prior training in statistics (PHC 6052 or equivalent) and knowledge of multiple regression (PHC 6053 or equivalent). R programming experience will also be helpful.

PHC 6063 Biostatistical Consulting 3 Credits

Grading Scheme: Letter Grade

Providing training for M.S. and Ph.D students in Biostatistics on the statistical aspects of research problems.

Prerequisite: Biostatistical Methods I and II or consent of the instructor. ;

Corequisite: All faculty teaching this course have completed at least 18 graduate semester hours in the teaching discipline and hold at least a master's degree.

PHC 6064 Survey of Advanced Biostatistical Methods for the Health Sciences 3 Credits

Grading Scheme: Letter Grade

Uniquely blends the fundamentals of biostatistical inference with an introduction to advanced statistical techniques critical for the analysis of the growing compendium of health-related data. Topics span the analysis of high-dimensional, categorical, and longitudinal data from the health sciences. Applications utilize the statistical software packages R and SAS.

Prerequisite: PHC 6052 or permission of instructor.

PHC 6075 Biostatistical Literacy 3 Credits

Grading Scheme: Letter Grade

Research in the health sciences requires appropriate study design, statistical analysis and interpretation of results. This course introduces basic concepts and techniques, including types of data, inference, and regression, necessary to read, interpret, and critically evaluate statistical results in health science literature relevant to the interests of the student.

Prerequisite: graduate students in the health sciences and requires a basic knowledge of mathematics, including algebra (for example, MAC 1105 and MAC 1114, or MAC 1140, or equivalent).

PHC 6084 Bayesian Biostatistical Methods 3 Credits

Grading Scheme: Letter Grade

Introduces students to Bayesian statistics with special emphasis on practical implementation in diverse areas such as clinical trials, survival analysis, longitudinal studies, disease mapping, and bioinformatics. Students will be able to fit Bayesian models to analyze real data sets using freely available software such as WinBUGS and R.

Prerequisite: PHC 6092 and PHC 6050C and PHC 6051 or equivalent.

PHC 6088 Statistical Analysis of Genetic Data 3 Credits

Grading Scheme: Letter Grade

An introduction to statistical procedures for genetic studies. This class will emphasize the statistical theory behind methods for analyzing genetic data and its application in useful software tools. This course prepares students for potential research in statistical genetics but is also open to a wider community. \

Prerequisite: PHC 6092 and PHC 6050C or equivalent. Permission at the discretion of the instructor may be granted if the student is familiar with linear algebra, maximum likelihood, simple hypothesis testing, and linear regression.

PHC 6089 Public Health Computing 3 Credits

Grading Scheme: Letter Grade

This course covers using SAS and R to manage and analyze public health data. Students will learn how to import, modify, visualize and perform common analyses of public health data using SAS and R.

Prerequisite: PHC 6052 or or approval of the instructor.

PHC 6092 Introduction to Biostatistical Theory 3 Credits

Grading Scheme: Letter Grade

Concepts and principles of statistical theory, including probability and random variables, parameter estimation, confidence intervals, hypothesis testing, asymptotic analysis, Bayesian inference, statistical decision theory and linear models.

Prerequisite: Multivariable calculus or permission of the instructor.

PHC 6097 Statistical Learning with Applications in Health Sciences 3 Credits**Grading Scheme:** Letter Grade

Covers a broad range of methods that are useful for modern data analysis, specifically in the analysis of high-dimensional data. Many of these methods (e.g., deep learning) go far beyond the classical statistical methods and are developed for addressing various problems (e.g., nonlinearity) we encounter in real situations.

Prerequisite: PHC 6068 and PHC 6050C and PHC 6051, or the permission of the instructor.

PHC 6099 Programing Basics for Biostatistics 3 Credits**Grading Scheme:** Letter Grade

The Introduction to Biostatistical Computing course is intended to develop your programming skills to perform biostatistical computing. The course will include both R programming language using the RStudio interface and Python programming language using the Anaconda interface. Topics include data structure, file input/output, visualization, data manipulation, basic statistical inference, and reproducible reports using markdown languages.

Prerequisite: An introductory course in statistics that covers inference, such as PHC 6052.

PHC 6736 Statistical and Computational Analysis of Genomic Data 3 Credits**Grading Scheme:** Letter Grade

Focuses on statistical and computational methods/tools for next-generation sequencing data analysis. Topics include introduction and analysis of DNA-seq, RNA-seq, ChIP-seq, ATAC-seq, and single-cell genomics. In addition, the course will illustrate how to use R/Bioconductor R packages to handle common types of genomic data.

PHC 6790 Biostatistical Methods Using SAS 3 Credits**Grading Scheme:** Letter Grade

This course is to introduce and prepare students for biostatistical computing using the SAS statistical software. It builds on the knowledge obtained in the Biostatistical Methods I and II courses by reinforcing the material and focusing on application within the SAS framework.

Prerequisite: PHC 6050C and PHC 6051, or Instructor determination of equivalent background.

PHC 6791 Data Visualization in the Health Sciences 3 Credits**Grading Scheme:** Letter Grade

Students will learn the foundations of information visualization and sharpen their skills in communicating using health science data. Throughout the semester, we will primarily use R to explore concepts in graphic design, storytelling, data wrangling and plotting, biostatistics, and artificial intelligence as they apply to data-driven communication.

Prerequisite: A course in statistics such as PHC 6052 or equivalent. Some familiarity with R statistical software is recommended but not required.

PHC 6905 Independent Study 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Independent Study

Prerequisite: consent of instructor.

PHC 6937 Special Topics in Public Health 1-6 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Special Topics in Public Health

PHC 7056 Analysis of Longitudinal Data 3 Credits**Grading Scheme:** Letter Grade

Likelihood-based and semiparametric methods for longitudinal data.

Methods to deal with missing data in both settings.

Prerequisite: STA 6326, STA 6327 (or equivalent), STA 6207, STA 6208 (or equivalent), and STA 6246 (or equivalent).

PHC 7066 Large Sample Theory 3 Credits**Grading Scheme:** Letter Grade

Detailed introduction to large sample theory and its application in univariate and multivariate parametric and nonparametric estimation.

Prerequisite: STA 6326 and STA 6327 (or equivalent).

PHC 7068 Biostatistical Computing 3 Credits**Grading Scheme:** Letter Grade

In this course, students will learn key algorithms for advanced statistical computing and their applications in biomedical sciences. The course will cover fundamental computational techniques for advanced biostatistical data analysis as well statistical methods for random number generation, convex optimization algorithms, Monte Carlo integration, and stochastic optimization.

Prerequisite: PHC 6092, PHC 6050, and PHC 6051, or permission of the instructor.

PHC 7090 Advanced Biostatistical Methods I 3 Credits**Grading Scheme:** Letter Grade

Theory and application for estimation and hypothesis testing for independent data using linear models. Principles of Frequentist and Bayesian estimation and inference. Application using statistical software. Writing data analysis reports.

Prerequisite: PHC 6050, PHC 6051, STA 6326, and STA 6327, or permission of the instructor

PHC 7091 Advanced Biostatistical Methods II 3 Credits**Grading Scheme:** Letter Grade

Theory and application for independent and dependent data using generalized linear models and generalized linear mixed models. Bayesian and Frequentist inference. Application using statistical software. Writing data analysis reports.

Prerequisite: PHC 7090 Advanced Biostatistical Methods I or equivalent

PHC 7095 Advanced Statistical Learning for Biostatistics 3 Credits**Grading Scheme:** Letter Grade

This is an advanced course in statistical learning, which covers a broad range of methods and their applications in high-dimensional data analysis. Many of these methods go far beyond classical statistical methods and are developed for addressing modern problems we encounter in public health and medical science settings.

Prerequisite: PHC 7090 and PHC 7091 or permission of instructor.

PHC 7925 Biostatistics Journal Club 1-3 Credits, Max 8 Credits**Grading Scheme:** S/U

Meeting weekly to present, review, and discuss current articles in biostatistics or statistics journals or discipline-specific (e.g. medicine, public health, epidemiology) articles with substantive biostatistical content.

PHC 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHC 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

STA 6177 Applied Survival Analysis 3 Credits**Grading Scheme:** Letter Grade

Focusing on survival analysis, Kaplan-Meier estimates, proportional hazards model, related tests, phase I, II, and III clinical trials, designs and protocols.

Prerequisite: STA 6327**STA 6707 Analysis of Multivariate Data 3 Credits****Grading Scheme:** Letter Grade

Techniques for analyzing multivariate data. Emphasis on MANOVA and tests on the structure of the dispersion matrix. Topics will include discriminant, factor, profile, and cluster analyses.

Prerequisite: STA 6208 and facility in a computer language.**STA 7179 Survival Analysis 3 Credits****Grading Scheme:** Letter Grade

Theoretical introduction to statistical inferential procedures useful for analyzing randomly right censored failure time data.

Prerequisite: STA 6177.

Botany

BOT 5225C Plant Anatomy 4 Credits**Grading Scheme:** Letter Grade

Origin, structure, and function of principal cells, tissues, and vegetative and reproductive organs of seed plants. Offered fall term.

Prerequisite: BOT 2011C or 3303C; or consent of instructor.**BOT 5305 Paleobotany 3 Credits****Grading Scheme:** Letter Grade

Comparative study of plants through geologic time with attention to morphology and evolution of major groups of land plants, based on the fossil record. Offered spring term in odd-numbered years.

Prerequisite: upper-level course in botany or geology; or consent of instructor.**BOT 5505C Intermediate Plant Physiology 3 Credits****Grading Scheme:** Letter Grade

Fundamental processes underlying water relations, metabolism, growth, and reproduction of plants. Overview of plant physiological and biochemical processes for plant science students. Basic information about plant processes integrated with agronomical and environmental considerations.

Prerequisite: BOT 3503/3503L and CHM 2200/2200L or equivalent.**BOT 5655C Physiological Plant Ecology 3 Credits****Grading Scheme:** Letter Grade

Traits affecting success in different environments (emphasizing energy balance, carbon balance, water relations, and nutrient relations). Introduction to ecophysiological methods and instrumentation. Offered fall term in even-numbered years.

Prerequisite: basic plant physiology or consent of instructor.**BOT 5685C Tropical Botany 5 Credits****Grading Scheme:** Letter Grade

Study of tropical plants using the diverse habitats of South Florida (emphasizing uses, anatomy and morphology, physiology and ecology, and systematics of these plants). Field trips and the Fairchild Tropical Garden supplement laboratory experiences. Offered summer term.

Prerequisite: elementary biology/botany; consent of instructor.**BOT 5695C Ecosystems of Florida 3 Credits****Grading Scheme:** Letter Grade

Major ecosystems of Florida in relation to environmental factors and human effects.

Prerequisite: basic ecology; and consent of instructor.**BOT 5725C Taxonomy of Vascular Plants 4 Credits****Grading Scheme:** Letter Grade

Introduction to systematic principles and techniques used in classification; field and herbarium methods. Survey of vascular plants, their classification, morphology, and evolutionary relationships. Offered spring term in odd-numbered years.

Prerequisite: BOT 2011C and 3303C or equivalent.**BOT 6566 Plant Growth and Development 3 Credits****Grading Scheme:** Letter Grade

Fundamental concepts of plant growth and development with emphasis on the molecular biological approach. Offered fall term in even-numbered years.

Prerequisite: BOT 5505C.**BOT 6716C Advanced Taxonomy 2 Credits****Grading Scheme:** Letter Grade

Survey of vascular plant families of limited distribution and/or of phylogenetic significance not covered in BOT 5725C. Discuss their classification, morphology, and evolutionary relationships. Review published studies to demonstrate principles and methods involved in classification. Offered on demand.

Prerequisite: BOT 5725C or equivalent.**BOT 6726C Principles of Systematic Biology 4 Credits****Grading Scheme:** Letter Grade

Theory of biological classification, taxonomy, nomenclature, and phylogenetics. Discussion of issues in systematic biology including species concepts and reticulate evolution. Laboratory experience in phylogenetic methods, including parsimony, maximum likelihood, Bayesian inference, divergence time estimation, and ancestral state reconstruction.

BOT 6905 Individual Studies in Botany 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

All credits in excess of 3 must be approved by department chair or graduate coordinator. Individual nonthesis, research problem in one of the following areas of botany: ecology, physiology and biochemistry, cryptogamic botany, morphology and anatomy of vascular plants, systematics, cytology, genetics, and ultrastructure. Topics selected to meet the interests and needs of students.

BOT 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

BOT 6927 Advances in Botany 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Supervised study in specific areas.

BOT 6935 Special Topics 1-4 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Special Topics

BOT 6936 Graduate Student Seminar 1-2 Credits, Max 9 Credits**Grading Scheme:** S/U

Readings and oral presentation on general topics in botany.

BOT 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

BOT 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

BOT 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PCB 5046C Advanced Ecology 3 Credits**Grading Scheme:** Letter Grade

Ecological research skills, emphasizing design of field studies and data analysis. Offered fall term in odd-numbered years.

Prerequisite: basic ecology and one course in statistics; physics, chemistry, and physiology desirable.

PCB 5338 Principles of Ecosystem Ecology 3 Credits**Grading Scheme:** Letter Grade

Examines principles that govern the structure and function of terrestrial ecosystems. Ecosystem Ecology is the study of flows of energy and materials between organisms and their environment.

Prerequisite: BSC 2010 or BSC 2011, and PCB 3034C or PCB 4044C.

PCB 5356 Tropical Ecology 3 Credits**Grading Scheme:** Letter Grade

Global overview of tropical environments, natural history, biological communities, and their structure and function. Addresses basic and applied ecological issues in the tropics.

Prerequisite: elementary biology or consent of instructor.

PLP 6656C Fungal Biology 4 Credits**Grading Scheme:** Letter Grade

Introducing groups of fungi and fungi-like organisms. Discussion of the structure, development, physiology, genetics, ecology and systematics of fungi.

Prerequisite: BSC 2010 and BSC 2011 or PLP 3002C/PLP 5005C.

Chemical Engineering

BME 6221 Biomolecular Cell Mechanics 3 Credits**Grading Scheme:** Letter Grade

Biomolecular basis of cell mechanics and cell motility, emphasizing quantitative models and systems-biology approaches.

BME 6322 Dynamics of Cellular Processes 3 Credits**Grading Scheme:** Letter Grade

Develops research skills, including generation of questions, hypotheses testing, reporting, interpretation, and discussion of findings.

Prerequisite: a course on kinetics and/or transport, or consent of instructor.

BME 6644 Pharmacokinetics 3 Credits**Grading Scheme:** Letter Grade

Basic pharmacokinetic and pharmacodynamic concepts and models. Use of these concepts in the drug discovery process.

CHM 5275 The Organic Chemistry of Polymers 2 Credits**Grading Scheme:** Letter Grade

Classification of polymerization types and mechanisms from a mechanistic organic point of view. The structure of synthetic and natural polymers and polyelectrolytes. Reaction of polymers. Practical synthetic methods of polymer preparation.

Prerequisite: CHM 2200, 2210, or equivalent.

CHM 5511 Physical Chemistry of Polymers 2 Credits**Grading Scheme:** Letter Grade

Structure, configuration, conformation, and thermodynamics of polymer solutions, gels, and solids. Thermal, mechanical, optical, and rheological properties of plastics and rubbers.

Prerequisite: CHM 4411 or equivalent.

ECH 5938 Topics in Colloid Science 3 Credits**Grading Scheme:** Letter Grade

Colloids and interfacial phenomena, colloid interaction forces, electrokinetic phenomena, transport phenomena influenced by colloidal forces, and electrokinetic phenomena. Examples and applications.

Prerequisite: PHY 2049 and 2056L, CHM 2046 and 2046L, MAC 2312 or equivalent.

ECH 6052 Research Methods in Chemical Engineering 1 Credit**Grading Scheme:** Letter Grade

Methods, mechanics, and best practices of the research process in the discipline of Chemical Engineering. Through guided modules and open discussion with accomplished researchers, students learn how to evaluate published research papers, plan independent research studies, keep a record of experimental data, and how to disseminate key results through oral presentations and written publications.

ECH 6126 Thermodynamics of Reaction and Phase Equilibria 3 Credits**Grading Scheme:** Letter Grade

Methods of treating chemical and phase equilibria in multi-component systems through application of thermodynamics and molecular theory.

ECH 6225 Electron Transport Phenomena in Semiconductors 3 Credits**Grading Scheme:** Letter Grade

Application of fundamental chemical engineering concepts of transport phenomena (e.g., fluid, heat, and mass) to the principles of electron transport in solid-state semiconductors. Special emphasis will be placed in relating electronic transport to fundamental chemical and material properties.

ECH 6270 Continuum Basis of Chemical Engineering 3 Credits**Grading Scheme:** Letter Grade

Integrated introduction to transport processes in continuous media with emphasis on fluid mechanics and heat and mass transfer.

ECH 6272 Molecular Thermodynamics of Chemical Engineering 3 Credits**Grading Scheme:** Letter Grade

Statistical mechanics and microscopic explanation of macroscopic laws of classical thermodynamics, transport phenomena, and chemical kinetics. Statistical mechanical theories that connect molecular structure to macroscopic properties.

ECH 6275 Nanoscale Transport 3 Credits**Grading Scheme:** Letter Grade

This course focuses on concepts and approaches used to analyze, describe, and quantify mass transport on small length scales when the relevant transport rates can be a function of the displacement length scale. Students learn how to approach such nanoscale transport problems using random walk and other formalisms. Several case studies including diffusion in cell membranes, nanoporous membranes, and catalysts will be considered in detail.

ECH 6285 Transport Phenomena 3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Integrated introduction to transport processes in continuous media with emphasis on fluid mechanics and heat and mass transfer.

Prerequisite: Admission to the ChE graduate program or by consent of instructor, dependent upon prior background in undergraduate fluid mechanics and heat and mass transfer, at a level required to obtain an undergraduate degree in Chemical Engineering.

ECH 6326 Computer Control of Processes 3 Credits**Grading Scheme:** Letter Grade

Introduction to digital computers, sampled data systems and Z-transforms, control of multiple input-multiple output systems, optimal control, state estimation and filtering, and self-tuning regulators.

ECH 6506 Chemical Engineering Kinetics 3 Credits**Grading Scheme:** Letter Grade

Fundamental aspects of chemical reactors, including collision theory, transition rate theory, unimolecular rate theory, homogeneous gas and liquid phase kinetics, and heterogeneous kinetics.

ECH 6526 Reactor Design and Optimization 3 Credits**Grading Scheme:** Letter Grade

Fundamentals of heterogeneous reactor design including the characterization of catalytic reactions and support, the development of global rate of the intrinsic reaction affected by chemical and physical deactivation of catalyst, intraphase and interphase mass and heat transfer, and the design and optimization of various types of heterogeneous reactors.

ECH 6537 Molecular Understanding of Catalysis 3 Credits**Grading Scheme:** Letter Grade

Catalysts are key to the development of renewable energy, fuel, and chemicals, as well as in cleaning pollutants from waste streams. This course teaches topics relevant to modern catalysis, with an emphasis on heterogeneous catalysis, including techniques of catalyst synthesis, characterization, and kinetic testing. Students are introduced to computational tools that assist in understanding catalysis at the molecular level. Case studies of catalyzed reactions are presented.

ECH 6538 Surface Science 3 Credits**Grading Scheme:** Letter Grade

The principles of adsorption and reactions on the surfaces of metals, semiconductors and insulators are covered. Surface structure, the nature of molecule binding on surfaces, surface electronic structure, adsorption isotherms, adsorbate phase behavior, and the kinetics and mechanisms of adsorption and surface reactions will be discussed. The course provides particular emphasis on developing quantitative descriptions of adsorption and surface reaction rates.

ECH 6709 Electrochemical Engineering Fundamentals and Design 3 Credits**Grading Scheme:** Letter Grade

Fundamentals of electrostatics and ionics applied to systems of interest in electrochemical engineering.

ECH 6716 Managing Safety in the Chemical Industry 3 Credits**Grading Scheme:** Letter Grade

Safety is an important aspect of chemical engineering. The present course covers the importance of chemical properties, including transport properties, fluid dynamics, turbulence, thermodynamics, and kinetics, in safety analysis. Applied mathematics and computational methods are employed for the assessment of safety in separation processes, reactor design, particulate systems, biochemical and electrochemical systems.

ECH 6726 Interfacial Phenomena I 3 Credits**Grading Scheme:** Letter Grade

Introduction to the forces responsible for unique physical properties at interfaces, including wetting phenomena, the adsorption of polymers and surface-active molecules at interfaces, and the structure of these solutions.

ECH 6727 Interfacial Phenomena II 3 Credits**Grading Scheme:** Letter Grade

Discussion on the forces responsible for unique physical properties at solid-liquid interfaces and their application in various engineering problems. Topics include the role and application of colloids, spreading of liquids on surfaces, lubrication, flotation, and nanomaterial synthesis.

ECH 6728 Material Self-Assembly Over All Length Scales 3 Credits**Grading Scheme:** Letter Grade

Students are introduced to interdisciplinary nanoscience and nanotechnology. This course shows how nano- and micrometer-scale building blocks with a variety of shapes, compositions and surface functionalities can be assembled spontaneously into unprecedented and functional nanostructures. Examples of self-assembly systems discussed in this course include self-assembled monolayers, layer-by-layer self-assembly, microsphere self-assembly, and block copolymer self-assembly.

ECH 6828 Polymer Science & Engineering for Chemical Engineers 3 Credits**Grading Scheme:** Letter Grade

An overview of polymer science and engineering for chemical engineers. Special emphasis will be placed on polymer research in chemical engineering derives its engineering relevance from answering fundamental questions underlying polymerization, polymer phase separation, and processing technology.

ECH 6829 Polymer Processing 3 Credits**Grading Scheme:** Letter Grade

Polymer Processing

ECH 6836 Semiconductor Device Fabrication Principles for Chemical Engineers 3 Credits**Grading Scheme:** Letter Grade

Provides students with knowledge in semiconductor material characterization, device fabrication techniques, and the role that chemical engineers have in these processes. The semiconductor industry relies on several processing steps that are reliant on transport phenomena, kinetics, and the handling of dangerous chemicals. As chemical engineers have a great grasp on these concepts, many chemical engineers are employed at both semiconductor fabrication facilities and equipment manufacturers.

ECH 6837 Complex Fluids 3 Credits**Grading Scheme:** Letter Grade

Chemical engineers frequently design, process, and test specialty fluids having a wide range of non-Newtonian properties. This course is an elective that prepares students to address these from a fundamental physics-based perspective while focusing on microhydrodynamics.

ECH 6843 Design and Analysis of Chemical Engineering Experiments 3 Credits**Grading Scheme:** Letter Grade

Statistical design of experiments and treatment of data, including regression analysis, interpolation, and integration.

ECH 6845 Chemical Process Data Science 3 Credits**Grading Scheme:** Letter Grade

Applications of fundamental data science visualization methods and algorithms, with a strong emphasis on examples from integrated chemical processes and computational materials design and discovery.

ECH 6847 Advanced Mathematics for Chemical Engineering 3 Credits**Grading Scheme:** Letter Grade

Methods of linear systems, chemical engineering applications in finite and infinite dimensional spaces, concepts of stability, application to transport phenomena.

ECH 6851 Impedance Spectroscopy 3 Credits**Grading Scheme:** Letter Grade

Intended for chemists, physicists, materials scientists, and engineers with an interest in applying electrochemical impedance techniques to study a broad variety of electrochemical processes.

Prerequisite: familiarity with applications of differential equations.

ECH 6905 Individual Work 1-6 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Independent study to gain knowledge of a topic not offered in other coursework that is guided by an instructor. Not intended for students actively participating in efforts contributing to work of a specific research group.

ECH 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ECH 6926 Graduate Seminar 1 Credit, Max 10 Credits**Grading Scheme:** Letter Grade

Graduate Seminar

ECH 6937 Topics in Chemical Engineering I 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Covers advanced and contemporary topics in chemical engineering.

ECH 6939 Topics in Chemical Engineering III 1-4 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Topics in Chemical Engineering III

ECH 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

ECH 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

ECH 7938 Advanced Special Chemical Engineering Topics for Doctoral Candidates 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Advanced Special Chemical Engineering Topics for Doctoral Candidates

ECH 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ECH 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6**Credits, Max 6 Credits****Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits**Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

Chemistry

CHM 5224 Basic Principles for Organic Chemistry 3 Credits**Grading Scheme:** Letter Grade

A review for those students intending to enroll in the Advanced Organic Sequence CHM 6225, CHM 6226.

Prerequisite: one year of undergraduate organic chemistry.

CHM 5235 Organic Spectroscopy 3 Credits**Grading Scheme:** Letter Grade

Advanced study of characterization and structure proof of organic compounds by special methods, including IR, UV, NMR, and mass spectrometry.

Prerequisite: CHM 2211.

CHM 5275 The Organic Chemistry of Polymers 2 Credits**Grading Scheme:** Letter Grade

Classification of polymerization types and mechanisms from a mechanistic organic point of view. The structure of synthetic and natural polymers and polyelectrolytes. Reaction of polymers. Practical synthetic methods of polymer preparation.

Prerequisite: CHM 2200, 2210, or equivalent.

CHM 5305 Chemistry of Biological Molecules 3 Credits**Grading Scheme:** Letter Grade

Mechanistic organic biochemistry. Emphasis on model systems, enzyme active sites, and physical and organic chemistry of biomacromolecules.

Prerequisite: CHM 2211 and 4412.

CHM 5416L Advanced Physical Chemistry Laboratory 2 Credits**Grading Scheme:** Letter Grade

Techniques used in experimental research; techniques of design and fabrication of scientific apparatus. Advanced experiments involving optical, electronic, and high vacuum equipment.

Prerequisite: CHM 4411L.

CHM 5511 Physical Chemistry of Polymers 2 Credits**Grading Scheme:** Letter Grade

Structure, configuration, conformation, and thermodynamics of polymer solutions, gels, and solids. Thermal, mechanical, optical, and rheological properties of plastics and rubbers.

Prerequisite: CHM 4411 or equivalent.

CHM 6036 Chemical Biology 3 Credits**Grading Scheme:** Letter Grade

In depth examination of current research directions in the field of chemical biology. Topics covered include aptamers, chemical synthesis of proteins, in vitro incorporation of unnatural amino acids into proteins, directed evolution of enzymes, natural product discovery and their biosynthesis mechanisms, chemically synthesized small-molecule libraries, chemical genetics, chemical screening, and target identification.

Prerequisite: Admission to the graduate program and CHM 5305 (Bioorganic Chemistry), or permission of the professor.

CHM 6037 Chemical Biology and Biochemistry Seminar 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Weekly seminar series from graduate students and outside speakers in chemical biology/biochemistry areas. Attendance and participation of graduate students required.

Prerequisite: Admission into the graduate program

CHM 6153 Electrochemical Processes 3 Credits**Grading Scheme:** Letter Grade

Principles of electrochemical methods, ionic solutions, and electrochemical kinetics.

CHM 6154 Chemical Separations 3 Credits**Grading Scheme:** Letter Grade

Theory and practice of modern separation methods with emphasis on gas and liquid chromatographic techniques.

CHM 6155 Spectrochemical Methods 3 Credits**Grading Scheme:** Letter Grade

Principles of atomic and molecular spectrometric methods; discussion of instrumentation, methodology, applications.

CHM 6158C Electronics and Instrumentation 1-4 Credits**Grading Scheme:** Letter Grade

Principles of operation of instruments, optimization of instrumental conditions, and interpretation of instrumental data for qualitative and quantitative analysis.

CHM 6159 Mass Spectrometric Methods 3 Credits**Grading Scheme:** Letter Grade

Modern spectrometry including fundamentals, instrumentation, and analytical applications.

CHM 6165 Chemometrics 3 Credits**Grading Scheme:** Letter Grade

Analytical method, information theory, and chemometrics, including statistical data analysis, heuristic and non-heuristic data analysis (pattern recognition and artificial intelligence), and experimental design and optimization.

Prerequisite: graduate standing.

CHM 6180 Special Topics in Analytical Chemistry 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Lectures or conferences covering selected topics of current interest in analytical chemistry.

Prerequisite: two courses of graduate level analytical chemistry.

CHM 6190 Analytical Chemistry Seminar 1 Credit, Max 20 Credits**Grading Scheme:** Letter Grade

Attendance required of graduate majors in the analytical area. graduate course in analytical chemistry. Presentation of one seminar.

CHM 6225 Advanced Principles of Organic Chemistry 4 Credits**Grading Scheme:** Letter Grade

Principles of organic chemistry and their application to reaction mechanisms.

Prerequisite: CHM 2211.

CHM 6226 Advanced Synthetic Organic Chemistry 3 Credits**Grading Scheme:** Letter Grade

Discussion and application of synthetic methodology.

Prerequisite: CHM 6225.

CHM 6227 Topics in Synthetic Organic Chemistry 2 Credits**Grading Scheme:** Letter Grade

Synthesis of complex organic molecules, with emphasis on recent developments in approaches and methods.

Prerequisite: CHM 6226.

CHM 6251 Organometallic Compounds 3 Credits**Grading Scheme:** Letter Grade

Properties of organometallic compounds, the nature of the carbon-metal bond, compounds of metals in groups 1, 2, 3, and 4, and transition metals.

CHM 6271 The Chemistry of High Polymers 2 Credits**Grading Scheme:** Letter Grade

Fundamental polymer chemistry, with emphasis on the mechanisms of polymerization reactions and the relationship of physical properties to chemical constitution.

CHM 6301 Enzyme Mechanisms 3 Credits**Grading Scheme:** Letter Grade

Principles of enzyme structure; isolation and purification; physical chemistry of enzyme/substrate interactions; general overview of classes; transition state theory and catalysis; types of chemical catalysis; survey of cofactors; example mechanisms; catalytic antibodies; ribozyme structure and catalysis.

CHM 6302 Chemistry and Biology of Nucleic Acids 3 Credits**Grading Scheme:** Letter Grade

Principles of nucleic acid structure and function; protein/nucleic acid interactions with particular emphasis on transcriptional regulators and DNA and RNA polymerases; chemistry of phosphate hydrolysis and its application to enzyme mechanisms; evolution of novel RNA molecules capable of specific binding and catalysis.

CHM 6303 Methods in Computational Biochemistry and Structural Biology 3 Credits**Grading Scheme:** Letter Grade

Modeling and protein structures enzyme reaction mechanisms using empirical as well as quantum-mechanical methods.

CHM 6306 Special Topics in Biological Chemistry Mechanisms 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Molecular evolution, bioinformatics and protein structure prediction, principles of molecular recognition, rational protein design, biotechnology, reengineered organisms, advanced biophysical techniques, and computational biology.

CHM 6381 Special Topics in Organic Chemistry 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Chemistry of selected types of organic compounds, such as alkaloids, carbohydrates, natural products, steroids.

Prerequisite: CHM 6225, CHM 6226.

CHM 6390 Organic Chemistry Seminar Presentation 1 Credit, Max 20 Credits**Grading Scheme:** Letter Grade

Attendance required of graduate majors in the organic area. Presentation of one seminar.

CHM 6391 Organic Chemistry Seminar Discussion 1 Credit**Grading Scheme:** S/U

Attendance at weekly seminars reporting current advances in organic chemistry.

Prerequisite: graduate standing.**CHM 6430 Chemical Thermodynamics 3 Credits****Grading Scheme:** Letter Grade

Energetics, properties of ideal and nonideal systems primarily from the standpoint of classical thermodynamics.

CHM 6461 Statistical Thermodynamics 3 Credits**Grading Scheme:** Letter Grade

Fundamental principles with applications to systems of chemical interest.

Prerequisite: CHM 6430 or its equivalent, permission of instructor.**CHM 6470 Chemical Bonding and Spectra I 3 Credits****Grading Scheme:** Letter Grade

Basic methods and applications of quantum chemistry; atomic structure; chemical bonding in diatomic and polyatomic molecules. Brief introduction to molecular spectroscopy.

CHM 6471 Chemical Bonding and Spectra II 3 Credits**Grading Scheme:** Letter Grade

Theory of symmetry and its chemical applications; semi-empirical molecular orbital treatment of simple inorganic and organic molecules; further applications to inorganic and organic chemistry.

Prerequisite: CHM 6470.**CHM 6480 Elements of Quantum Chemistry 3 Credits****Grading Scheme:** Letter Grade

Brief treatment of the Schrodinger equation, followed by a survey of applications to chemical problems.

Prerequisite: CHM 6471.**CHM 6490 Theory of Molecular Spectroscopy 3 Credits****Grading Scheme:** Letter Grade

Molecular energy levels, spectroscopic selection rules; rotational, vibrational, electronic, and magnetic resonance spectra of diatomic and polyatomic molecules.

CHM 6580 Special Topics in Physical Chemistry 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Lecture or conferences covering selected topics of current interest in physical chemistry.

CHM 6586 Computational Chemistry 3 Credits**Grading Scheme:** Letter Grade

Software for computational chemistry; model building and molecular mechanics; molecular orbitals and electronic structure; optical, infrared, and magnetic resonance spectra; solvation effects and molecular dynamics; building large systems.

Prerequisite: undergraduate physical chemistry.**CHM 6590 Physical Chemistry Seminar 1 Credit, Max 20 Credits****Grading Scheme:** S/U

Attendance required of graduate majors in physical chemistry. graduate course in physical chemistry. Presentation of one seminar.

CHM 6620 Advanced Inorganic Chemistry I 3 Credits**Grading Scheme:** Letter Grade

Crystalline state; covalent bonding; acids, bases, and solvents, nonmetallic compounds of Groups II through VII with emphasis on structure and reactivity.

CHM 6621 Advanced Inorganic Chemistry II 3 Credits**Grading Scheme:** Letter Grade

Electronic structure of metals and transition metal complexes; solution chemistry and reaction mechanisms at metal centers; redox reactions; introduction to organometallic and bioinorganic chemistry.

Prerequisite: CHM 6620.**CHM 6626 Applications of Physical Methods in Inorganic Chemistry 3 Credits****Grading Scheme:** Letter Grade

Principles and applications of spectroscopic methods to the solution of inorganic problems. Those techniques used most extensively in current inorganic research are treated.

Prerequisite: graduate standing or consent of instructor.**CHM 6628 Chemistry of Solid Materials 3 Credits****Grading Scheme:** Letter Grade

Structure and properties of solids; semiconductors and superconductors.

CHM 6670 Inorganic Biochemistry 3 Credits**Grading Scheme:** Letter Grade

Role of elements in biology. Modern spectroscopic and physical methods for study of Group I and II metals, metalloenzymes, metal ion transport and storage, functions of nonmetals in biochemical systems, and biomedical/biotechnical applications of metals.

Prerequisite: graduate standing or consent of instructor.**CHM 6680 Special Topics in Inorganic Chemistry 1-3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Lectures or conferences on selected topics of current research interest in inorganic chemistry.

CHM 6690 Inorganic Chemistry Seminar 1 Credit, Max 20 Credits**Grading Scheme:** Letter Grade

Attendance required of graduate majors in inorganic chemistry. graduate course in inorganic chemistry. Presentation of one seminar.

CHM 6720 Chemical Dynamics 3 Credits**Grading Scheme:** Letter Grade

Basic concepts of rate laws, collision theory, and transition state theory; an introduction to reaction dynamics, structural dynamics, and quantitative structure-reactivity correlations.

CHM 6905 Individual Problems, Advanced 1-5 Credits, Max 10 Credits**Grading Scheme:** S/U

Double registration permitted. Assigned reading program or development of assigned experimental problem.

Prerequisite: consent of faculty member supervising the work.**CHM 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

CHM 6934 Advanced Topics in Chemistry 1 Credit, Max 8 Credits**Grading Scheme:** S/U

Discussion and evaluation of chemical research advances reported in current chemical literature. S/U

Prerequisite: consent of instructor.

CHM 6935 Chemistry Colloquium 1 Credit, Max 7 Credits**Grading Scheme:** S/U

Topics presented by visiting scientists and local staff members.

CHM 6943 Internship in College Teaching 2 Credits, Max 36 Credits**Grading Scheme:** Letter Grade

Required for Master of Science in Teaching students but available for students needing additional practice and direction in college-level teaching.

Prerequisite: graduate standing.**CHM 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

CHM 7485 Special Topics in Theory of Atomic and Molecular Structure 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Mathematical techniques used in atomic, molecular, and solid-state theory. The one-electron approximation and the general quantum-mechanical manybody problems. Selected advanced topics.

Prerequisite: PHZ 6426 or equivalent.**CHM 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CHM 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

CHS 5110 Radiochemistry 2 Credits**Grading Scheme:** Letter Grade

Radioactivity detection, radiochemical separations and analyses, radiochemistry laboratory techniques, the practice of radiological safety, and tracer applications of radioisotopes in chemistry and other fields.

PHA 6435 Biosynthetic Logic of Medicinal Natural Products 3 Credits**Grading Scheme:** Letter Grade

Covers topics of biosynthesis of the major families of medical natural products, structural and biochemical understanding of their biosynthetic logic, gene cluster identification, genome mining, and production of bioactive "unnatural products" for drug discovery and development.

Prerequisite: Students are expected to have the background of Biochemistry, Enzymology, and Bioorganic Chemistry. Or permission of instructors.

Civil and Coastal Engineering

CCE 5035 Construction Planning and Scheduling 3 Credits**Grading Scheme:** Letter Grade

Planning, scheduling, organizing, and control of civil engineering projects with CPM and PERT. Application of optimization techniques.

Prerequisite: Knowledge or experience with theory and practice of construction operations, equipment utilization and construction methods, and analysis of costs.**CCE 6016 Advanced Engineering Cost Estimating 3 Credits****Grading Scheme:** Letter Grade

The application of scientific principles and techniques to the problem of cost estimation, cost control and profitability of infrastructure renewal projects, in support of engineering planning, design and construction practice.

Prerequisite: Graduate Standing.**CCE 6037 Civil Engineering Operations I 3 Credits****Grading Scheme:** Letter Grade

Advanced construction engineering and management procedures at the project level to support quantitative decision making.

Prerequisite: graduate status.**CCE 6515C Engineering and Construction Analytics using BIM 3 Credits****Grading Scheme:** Letter Grade

Provides an exploration of model-based engineering and construction analytics using Building Information Modeling (BIM) to understand structural properties, constructability, and maintainability of structures. Topics include model-based designs; finite element analysis based on BIM; mechanical, electrical and plumbing (MEP) models; constructability and maintainability assessment; model-informed construction time and cost analysis, and reality capture for infrastructure assessment.

Prerequisite: Instructor approval.**CEG 5105 Geotechnical Engineer 3 Credits****Grading Scheme:** Letter Grade

Shallow foundations, bearing capacity, settlements, deep foundations, pile testing, earth pressures, excavations, retaining structures, dewatering.

CEG 5114 Advanced Geotechnical Aspects of Landfill Design 3 Credits**Grading Scheme:** Letter Grade

Settlement analysis, slope stability, liner design, and LCRS design.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.**CEG 5115 Foundation Design 3 Credits****Grading Scheme:** Letter Grade

Investigations, bearing capacity, and the analysis and design of shallow footings, walls, and deep pile foundations.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.**CEG 5205C Insitu Measurement of Soil Properties 3 Credits****Grading Scheme:** Letter Grade

Methods of soil exploration; techniques of soil sampling and insitu testing; field performance of insitu testing.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.**CEG 5805 Ground Modification Design 2 Credits****Grading Scheme:** Letter Grade

Introduction to design of ground modification techniques for improvement of marginal construction sites.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6015 Advanced Soil Mechanics 3 Credits**Grading Scheme:** Letter Grade

Nature and origin of soil. Stresses within a soil body. Stress-strain behavior and shear strength of dry, saturated no flow, saturated transient flow soils.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6116 Advanced Shallow Foundation Design 3 Credits**Grading Scheme:** Letter Grade

Application of soil mechanics to design and analysis of shallow foundations.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation; fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CEG 6117 Advanced Deep Foundation Design 3 Credits**Grading Scheme:** Letter Grade

Application of soil mechanics to design and analysis of deep foundations.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6206 Nondestructive Testing and Geophysical Methods 3 Credits**Grading Scheme:** Letter Grade

Covers nondestructive and geophysical methods, and their engineering related applications. It includes (i) the principles of elastic waves and associated computational methods; (ii) the fundamentals on inverse theory and signal processing; (iii) inversion methods (e.g., global and deterministic); and (iv) real-world applications. The applications include geotechnical site characterization (soil/rock and sinkhole) and evaluation of concrete structural components (bridge deck/slab).

Prerequisite: CEG 4011 with a minimum grade of C.

CEG 6210 Computational Inelasticity 3 Credits**Grading Scheme:** Letter Grade

Implementation of plastic and viscoplastic models including essential components of nonlinear finite element codes as applied to both metal and granular/porous materials. Basic theory of material instability and nonlocal numerical techniques. Return mapping algorithms in strain space; advanced plasticity models (critical state and bounding surface). Final class project to apply an inelastic finite-element material model to a practical problem.

Prerequisite: Solid mechanics and linear finite element method (FEM), or equivalent, or consent of instructor.

CEG 6405 Seepage in Soils 3 Credits**Grading Scheme:** Letter Grade

Focusing on Darcy's law, coefficient of permeability, flownets, seepage forces; engineering applications: use of computer software for seepage and slope stability analyses in dewatering systems, embankment design, filter design, earth dams, and drainage problems.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CEG 6515 Earth Retaining Systems and Slope Stability 3 Credits**Grading Scheme:** Letter Grade

Applications of soil mechanics to design and analysis of earth retaining systems and slope stability.

Prerequisite: Fundamentals of Geotechnical Engineering including soil classification, soil strength assessment, consolidation, slope stability, retaining walls and seepage.

CES 5010 Probabilistic and Stochastic Methods in Civil Engineering 3 Credits**Grading Scheme:** Letter Grade

Fundamental aspects of uncertainty and their roles in determining system reliability. Probability and statistics, stochastic processes, random data analysis, and reliability methods.

Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 5116 Finite Elements in Civil Engineering 3 Credits**Grading Scheme:** Letter Grade

Introduction to finite elements, use of finite element concepts for structural analysis. Application of 1-, 2-, and 3-D elements of structural problems.

Prerequisite: Theory and application of the direct stiffness method.

CES 5325 Design of Highway Bridges 3 Credits**Grading Scheme:** Letter Grade

Analysis by influence lines, slab and girder bridges, composite design, prestressed concrete, continuity, arch bridges, design details, highway specifications.

Prerequisite: Behavior and design of reinforced concrete members subjected to flexure, shear, and compression. Behavior and design of steel members and connections subjected to tension, compression, flexure, and torsion.

CES 5607 Behavior of Steel Structures 3 Credits**Grading Scheme:** Letter Grade

Plastic analysis and designs of beams and frames. Buckling and stability problems. Shear and torsion.

Prerequisite: Behavior and design of steel members and connections subjected to tension, compression, flexure, and torsion.

CES 5715 Prestressed Concrete 3 Credits**Grading Scheme:** Letter Grade

Analysis and design of prestressed concrete flexural members; pre- and post-tensioned construction, allowable stress, strength evaluation; design for bending moments and shear; evaluation of serviceability requirements; design of simple bridges.

Prerequisite: Behavior and design of reinforced concrete members subjected to flexure, shear, and compression.

CES 5801 Design and Construction in Timber 3 Credits**Grading Scheme:** Letter Grade

Analysis and design of beams, columns, connections, and diaphragm/shearwall structures using sawn timber, laminated timber, and plywood and including a comprehensive design project.

Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 6106 Advanced Structural Analysis 3 Credits**Grading Scheme:** Letter Grade

Traditional methods of analyses for forces and deformations; modern matrix methods including the direct stiffness method.

Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 6108 Structural Dynamics 3 Credits**Grading Scheme:** Letter Grade

Evaluating structural response to the effect of dynamic loads for single-degree and multidegree of freedom systems. Considers seismic and wind effects, modal analysis, numerical methods, structural idealization, response spectra, and design codes.

Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 6117 Advanced Finite Element Analysis in Civil Engineering 3 Credits**Grading Scheme:** Letter Grade

This course focuses on the application of advanced finite element techniques to the analysis of civil engineering systems. Topics covered include constraints, material nonlinearity, strain-rate effects, geometric nonlinearity, incrementation and iteration procedures, critical load analysis, dynamic analysis, contact analysis, nonlinear analysis of concrete structures with non-prestressed and prestressed reinforcement, analysis of staged construction.

Prerequisite: CES 5116.

Corequisite: CES 6018.

CES 6164C Structural Health Monitoring 3 Credits**Grading Scheme:** Letter Grade

Through the application of sensors, IoT systems, and data informatics students will gain skills to meaningfully evaluate structural condition. This course covers theoretical background and practical application of structural monitoring and assessment for a variety of infrastructure types. Includes end-to-end design of monitoring systems based on decision support needs and appropriate selection of sensors and components, sensor placement, data acquisition and processing, and result generation.

Prerequisite: Dynamics, structural analysis, basic programming, statistics.

CES 6165 Concrete Structural Rehabilitation 3 Credits**Grading Scheme:** Letter Grade

This course will cover the basic mechanisms that cause degradation of concrete pavements and structures, methods for diagnosing concrete degradation mechanisms, and structural repair and strengthening methods.

Prerequisite: Understanding of behavior of civil engineering materials (concrete, timber, steel, asphalt) with laboratory experience; analysis and design in reinforced concrete.

CES 6585 Wind Engineering 3 Credits**Grading Scheme:** Letter Grade

The nature of wind related to wind-structure interaction and design loads for extreme winds, tornadoes and hurricanes.

Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements.

CES 6588 Protective Structures 3 Credits**Grading Scheme:** Letter Grade

Addressing a range of tissues to mitigate blast, shock, and impact effects. It will include extensive course notes, references, manuals, handouts, and special computer codes. Also, it is expected that guest lectures on several topics will be given by invited experts.

Prerequisite: BS in Civil Eng; CES 6108

CES 6590 Impact Engineering 3 Credits**Grading Scheme:** Letter Grade

Addressing a broad range of technical issues on mitigating the severe loading effects associated with impact loading incidents. The course will address static and dynamic structural behavior of elastic and elastic-perfectly-plastic systems that include: contact between bodies, classical impact problems for ideal systems, beams under concentrated or distributed loads, transverse shear and rotary inertia, strain rate effects, and instability.

Prerequisite: B.S. in Civil Engineering; CES 6108

CES 6591 Applied Protective Structures 3 Credits**Grading Scheme:** Letter Grade

Expanding knowledge gained from the course on protective structures for expedient applications that can be deployed under emergency situations associated with abnormal loading incidents (e.g., blast, shock, impact, etc.).

Prerequisite: B.S. in Civil Engineering; CES 6588

CES 6592 Retrofit Protective Structures 3 Credits**Grading Scheme:** Letter Grade

Focusing on engineering approaches, innovative materials, and structural systems for enhancing the performance of protective structures against blast, shock, impact.

Prerequisite: B.S. in Civil Engineering; CES 6588: Protective Structures

CES 6593 Advanced Protective Structures 3 Credits**Grading Scheme:** Letter Grade

Expanding the basic knowledge gained by the students in the previous course on Protective Structures by deeper treatments of the various key topics handled there.

Prerequisite: B.S. in Civil Engineering; CES 6588

CES 6706 Advanced Reinforced Concrete 3 Credits**Grading Scheme:** Letter Grade

Torsion in structural members. Ultimate load theories and application to design. Columns and beam columns. Shear walls, combined shear walls and frames. Research topics.

Prerequisite: Fundamentals of structural analysis including loads, shear and moment diagrams, and classical methods for determining displacements. Behavior and design of reinforced concrete members subjected to flexure, shear, and compression.

CGN 5605 Public Works Planning 3 Credits**Grading Scheme:** Letter Grade

Functional approach to planning and implementing public works needs with emphasis on role of engineer.

CGN 5606 Public Works Management 3 Credits**Grading Scheme:** Letter Grade

Nature of profession, duties, and administrative responsibilities. Organization and management of operating divisions with emphasis on role of engineer.

CGN 6425 Applied Data Science in Civil and Environmental Engineering 3 Credits**Grading Scheme:** Letter Grade

Introduces the workflows of data science applications, covering the state-of-art techniques in data acquisition, data processing and management, analytics and modeling, and visualization. Critical application of data science concepts and techniques in complex socioeconomic and environmental contexts. Basics of problem formulation and major ethical considerations of applying data science in practice

Prerequisite: Computer programming and numerical methods for engineering.

CGN 6504 Concrete Durability 3 Credits**Grading Scheme:** Letter Grade

Mechanisms, test methods, and mitigation methods for concrete deterioration. Mechanisms covered include cracking, freeze-thaw, reinforcing steel corrosion, alkali silica reaction, sulfate attack, chemical attack, and abrasion.

Prerequisite: Instructor permission or understanding of behavior of civil engineering materials (concrete, timber, steel, asphalt) with laboratory experience, analysis and design in reinforced concrete.

CGN 6505 Properties, Design and Control of Concrete 3 Credits**Grading Scheme:** Letter Grade

Portland cement and aggregate properties relating to design, control, and performance of concrete. Concrete forming and construction methods. Laboratory testing and analysis.

Prerequisite: Course in introduction to civil engineering materials.

CGN 6506 Bituminous Materials 3 Credits**Grading Scheme:** Letter Grade

Analysis of strength and deformation mechanism for asphalt concrete, properties, and their effect on flexible pavement performance. Pavement construction and quality assurance methods, testing and evaluation of asphalts and mixture.

Prerequisite: Course in introduction to pavement design.

CGN 6525 Sustainable Materials 3 Credits**Grading Scheme:** Letter Grade

Providing a contemporary perspective to the sustainability problems associated with our dependence on materials and the consequences of their use. It introduces a method of decision making regarding materials selection, and design with materials, that considers the environmental and social impacts, in addition to the traditional assessment of the economic impact.

Prerequisite: Graduate standing.

CGN 6877C Nondestructive Evaluation of Civil Infrastructure 3 Credits**Grading Scheme:** Letter Grade

This course provides students' knowledge and experience to evaluate existing civil infrastructure. The course covers nondestructive and geophysical methods and their engineering related applications, including (i) the principles of elastic waves and associated computational method; (ii) the fundamentals on inverse theory and signal processing; (iii) inversion methods; and (iv) real-world applications. Applications include geotechnical site characterization and evaluation of concrete components.

Prerequisite: Permission of Instructor.

CGN 6905 Special Problems in Civil Engineering 1-6 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Studies in areas not covered by other graduate courses.

CGN 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Credits do not apply to any graduate degree.

CGN 6936 Civil Engineering Graduate Seminar 1 Credit, Max 6 Credits**Grading Scheme:** S/U

Lectures by graduate students, faculty members, and invited speakers.

CGN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

CGN 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

CGN 6974 Master of Engineering or Engineer Degree Report 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Individual work culminating in a professional practice-oriented report suitable for the requirements of the Master of Engineering or Engineer degree. Three credits only are applicable toward the requirements of each degree.

CGN 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

Prerequisite: CVE_PhD & Academic Level 7 or Academic Level 8.

CGN 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Prerequisite: CVE_PhD & Academic Level 9.

CWR 5125 Groundwater Flow I 3 Credits**Grading Scheme:** Letter Grade

Porous media flow. Darcy's law. Conservation of mass. Laplace equation. Flownets. Well hydraulics.

Prerequisite: Undergraduate coursework including Differential Equations, Dynamics, Hydrodynamics (Fluid Mechanics), and Hydraulics.

CWR 5127 Evaluation of Groundwater Quality 3 Credits**Grading Scheme:** Letter Grade

Characteristics of flow in saturated and unsaturated zones; solute convection and dispersion; effects of chemical reactions and adsorption; management of groundwater quality.

Prerequisite: CWR 5125.

CWR 5235 Open Channel Hydraulics 3 Credits**Grading Scheme:** Letter Grade

Classification of flow, Normal depth. Specific energy and critical depth. Gradually varied flow. Transitions.

Prerequisite: Undergraduate coursework including Differential Equations, Dynamics, Hydrodynamics (Fluid Mechanics), and Hydraulics.

CWR 6116 Advanced Surface Hydrology 3 Credits**Grading Scheme:** Letter Grade

Physical and quantitative concepts and principles of hydrologic processes and their engineering applications. Reynolds Transport Theorem, the Continuity and Momentum Equations applied to phenomena and processes. Hydrologic analyses, including unit hydrograph theory, lumped flow routing, and distributed flow routing. Engineering concepts of hydrologic design, design storms and hydrologic chemistry.

Prerequisite: ENV3040C or equivalent numerical methods, STA 3032 or equivalent statistics, CWR3201 or equivalent hydrodynamics

CWR 6240 Mixing and Transport in Turbulent Flow 3 Credits**Grading Scheme:** Letter Grade

Applying fluid mechanics to problems of turbulent mixing and transport of substances in the natural environment.

Prerequisite: Undergraduate coursework including Differential Equations, Dynamics, Hydrodynamics (Fluid Mechanics), and Hydraulics.

CWR 6308 Advanced Urban Stormwater Systems Design 3 Credits**Grading Scheme:** Letter Grade

Stormwater system design including: time of concentration, peak runoff rate, open-channel flow, gravity storm sewer, culvert, stormwater pumping, filtration systems, hydrograph generation, flood routing, site layout, site grading and permitting.

Prerequisite: Understanding of undergraduate-level fluid mechanics and applied hydraulics.

CWR 6537 Contaminant Subsurface Hydrology 3 Credits**Grading Scheme:** Letter Grade

Physical-chemical-biological concepts and modeling of retention and transport of water and solutes in unsaturated and saturated media. Applications of environmental aspects of soil and groundwater contamination.

Prerequisite: None.

EGM 5816 Intermediate Fluid Dynamics 3 Credits**Grading Scheme:** Letter Grade

Basic laws of fluid dynamics. Introduction to potential flow, viscous flow, boundary layer theory, and turbulence.

Prerequisite: A proficiency in Fluid Mechanics and Differential equations is needed.

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits**Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

EOC 5860 Port and Harbor Engineering 3 Credits**Grading Scheme:** Letter Grade

Principles of port design; wave penetration; harbor oscillations; sediment movement and pollutant mixing; port structures, port operations; case studies.

Prerequisite: A proficiency in Fluid Mechanics and Differential equations is needed.

EOC 6085 Field Methods for Coastal Engineers 3 Credits**Grading Scheme:** Letter Grade

Introduces basic coastal engineering and physical oceanographic tools used to obtain and analyze field data. Data processing and analysis techniques will be introduced for spatially and temporally varying data sets collected via commonly employed instruments such as conductivity-temperature-depth profilers and recorders, current profilers, tide gauges, wave gauges, and meteorological instruments.

Prerequisite: Permission of instructor.

EOC 6086C Python Programming for Coastal Oceanography 3 Credits**Grading Scheme:** Letter Grade

Fundamental and advanced Python programming techniques to analyze and visualize coastal and oceanographic data. Practical exercises and projects will emphasize real-world applications, including data collection, processing, analysis, and modeling of coastal phenomena.

Prerequisite: Prior knowledge of Python programming and fundamental concepts in oceanography is recommended.

EOC 6116 Nearshore Coastal Processes 3 Credits**Grading Scheme:** Letter Grade

Introduction to coastal engineering and coastal processes highlighting practical coastal engineering projects. Coastal geology, wave generation and propagation, coastal nearshore hydrodynamics, coastal sediment processes, coastal inlet behavior, and coastal protection measures. Recent innovations in coastal engineering practice will be discussed.

Prerequisite: Permission of instructor.

EOC 6196 Littoral Processes 3 Credits**Grading Scheme:** Letter Grade

Shoreline developments; nearshore hydrodynamics; sediment transport phenomena by waves and wind; methods of determining littoral transport quantities; effects of groins, jetties, and other coastal structures on littoral processes.

Prerequisite: OCP 6165.

EOC 6430 Coastal Structures 3 Credits**Grading Scheme:** Letter Grade

Planning and design for beach nourishment, breakwaters, jetties, seawalls and coastal protection structures.

Prerequisite: OCP 6165.

EOC 6850 Numerical Simulation Techniques in Coastal and Ocean Engineering 3 Credits**Grading Scheme:** Letter Grade

Numerical treatment of problems in ordinary and partial differential equations with application to incompressible geophysical fluid flows.

EOC 6855 Coastal Storms: Processes and Impacts 3 Credits**Grading Scheme:** Letter Grade

Extreme water levels and waves caused by coastal storms rank among the most significant hazards threatening coastal communities. This hands-on course explores storm independent water level components, such as astronomical tides and mean water levels, and storm induced components, including storm surge, rainfall-driven water levels, and wave runup. Students select a historical tropical cyclone that impacted the Florida coast and analyze the different contributions to total water levels.

Prerequisite: Understanding of basic wave mechanics and data analysis techniques. Programming experience in Python and/or MATLAB. EOC 6855

EOC 6905 Individual Study in Coastal and Oceanographic Engineering 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Individual Study in Coastal and Oceanographic Engineering

EOC 6934 Advanced Topics in Coastal and Oceanographic Engineering 1-6 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Waves; wave-structure interaction; coastal structures; ocean structures; sediment transport; instrumentation; advanced data analysis techniques; turbulent flow and its applications.

EOC 6939 Graduate Seminar 1 Credit, Max 6 Credits**Grading Scheme:** S/U

Guest lecturers; lectures by COE faculty and students.

EOC 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

EOC 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

Prerequisite: COA_PhD & Academic Level 7 or Academic Level 8.

EOC 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Prerequisite: COA_PhD & Academic Level 9.

OCP 6050 Physical Oceanography 3 Credits**Grading Scheme:** Letter Grade

Structure of ocean basins; physical and chemical properties of sea water; basic physical laws used in oceanography; ocean current; thermohaline effects; numerical models; heat budget.

Prerequisite: A proficiency in Fluid Mechanics and Differential equations is needed.

OCP 6165 Ocean Waves I: Linear Theory 3 Credits**Grading Scheme:** Letter Grade

Ocean wave classification, solution of the linearized boundary value problem; simple harmonic waves; shoaling effects; internal waves.

Prerequisite: This is an obligatory course and should be taken the first semester. A proficiency in Fluid Mechanics and Differential equations is needed.

OCP 6167 Ocean Waves II: Nonlinear Theory 3 Credits**Grading Scheme:** Letter Grade

Perturbation development of nonlinear water wave theories; regions of validity of various theories; dynamics and kinematics of nonlinear wave trains composed of single and multiple fundamental components.

Prerequisite: OCP 6165: Ocean Waves I: Linear Theory.

OCP 6168 Data Analysis Techniques for Coastal and Ocean Engineers 3 Credits**Grading Scheme:** Letter Grade

Data editing, fundamentals of spectral analysis, subsurface and surface signal analysis, directional spectral analysis.

OCP 6298 Coastal Sediment Transport Processes 3 Credits**Grading Scheme:** Letter Grade

Physical sedimentation processes, including boundary layer hydrodynamics, suspended sediment dynamics, and bedload mechanics under wave and current conditions.

Prerequisite: CWR 6236, OCP 6165.

OCP 6605 Estuarine Circulation 3 Credits**Grading Scheme:** Letter Grade

Physical and environmental aspects of estuaries with a special emphasis on engineering challenges within complex ecosystems at the interface between coastal and terrestrial environments. Estuarine classification, tidal processes and dynamics, transport of sediment and salinity, estuarine modeling, natural and anthropogenic change and impacts, and estuarine ecology. A field trip to a local estuary will allow students to experience estuarine environments.

Prerequisite: Permission of instructor.

TTE 5006 Advanced Urban Transportation Planning 3 Credits**Grading Scheme:** Letter Grade

Analytical techniques for estimating future travel demands; and for planning transportation facilities and locations. Review of transportation technology and future systems.

Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5256 Traffic Engineering 3 Credits**Grading Scheme:** Letter Grade

Traffic characteristics, studies and analyses, street operations, level of service analysis, congestion and access management, signs and markings, pedestrians, bicycles, parking, roadway lighting.

Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5305 Advanced Transportation Systems Analysis 3 Credits**Grading Scheme:** Letter Grade

Systems analysis in transportation planning and engineering, including supply, demand, equilibrium, evaluation, and decision analysis.

Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5805 Geometric Design of Transportation Facilities 3 Credits**Grading Scheme:** Letter Grade

Geometric design criteria and controls of highways and intersections.

Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.

TTE 5835 Pavement Design 2 Credits**Grading Scheme:** Letter Grade

Design of flexible and concrete pavements.

Prerequisite: Understanding of the principal materials used for engineering purposes with special attention to mechanical properties and their importance to the engineer. Hands-on experience in testing of civil engineering materials.**TTE 5837 Pavement Management Systems 3 Credits****Grading Scheme:** Letter Grade

Evaluation, analysis, design, performance prediction, planning, and maintenance of pavements.

Prerequisite: Background in fundamentals of Civil Engineering Materials and Pavement Design.**TTE 6008 Fundamentals of the Transportation Profession 3 Credits****Grading Scheme:** Letter Grade

Provides a holistic view of the professional practice of transportation including history, organizational structures, legal aspects, finances, human resources, asset management, leadership, marketing and communications, innovation, and technical overview of select topics to prepare students for a career in the field of transportation rapidly undergoing transformation.

Prerequisite: Students are expected to have a background in a transportation-related field.**TTE 6205 Freeway Operations and Simulation 3 Credits****Grading Scheme:** Letter Grade

Uninterrupted traffic flow theory. Highway capacity analysis. Microscopic simulation. Freeway management and control methods.

TTE 6207 Advanced Highway Capacity Analysis 3 Credits**Grading Scheme:** Letter Grade

Procedures defined within the current Highway Capacity Manual (HCM), including analytical chapters for uninterrupted and interrupted flow.

Prerequisite: Students are expected to be familiar with elementary statistics and have the ability for analytical/quantitative problem solving.**TTE 6259 Urban Streets Simulation and Control 3 Credits****Grading Scheme:** Letter Grade

Principles of simulation modeling and applications. Simulating urban street operations using commercially available packages; traffic signal control and optimization for urban streets; signal control hardware.

Prerequisite: TTE 5256.**TTE 6267 Traffic Flow Theory 3 Credits****Grading Scheme:** Letter Grade

Vehicle-roadway-infrastructure interactions, equations of motion, and car-following; microscopic and macroscopic traffic characteristics and traffic stream models; simulation, queueing theory, and shockwave analysis.

Prerequisite: TTE 5256.**TTE 6275 Connected & Automated Vehicles 3 Credits****Grading Scheme:** Letter Grade

Prepares students to understand Connected and Automated Vehicles (CAVs) and address the myriad of issues related to the safe and efficient deployment of CAVs in the transportation system. Technology, policy/legal aspects, human factors, traffic operations/safety, and ethics/equity will be addressed in the context of passenger vehicles, public transit vehicles, and freight vehicles.

Prerequisite: Permission of Instructor.**TTE 6306 Computational Methods in Transportation Engineering 3 Credits****Grading Scheme:** Letter Grade

Applying numeric methods to traffic engineering/analysis. Key issues in implementing a computational methodology into a software format. Fundamentals of developing simulation software.

Corequisite: TTE 5256.**TTE 6315 Highway Safety Analysis 3 Credits****Grading Scheme:** Letter Grade

Statistics and characteristics of accidents, accident reconstruction, accident causation and reduction.

TTE 6505 Discrete Choice Analysis 3 Credits**Grading Scheme:** Letter Grade

Theory and models of individual choice behavior, unordered and ordered multinomial choice models, empirical specifications, maximum likelihood estimation, state-of-the-art methods, travel modeling applications.

TTE 6605 Smart Multimodal Transportation Systems 3 Credits**Grading Scheme:** Letter Grade

Prepares students to operate multimodal transportation systems (intersections, urban streets, freeways, and transit systems) efficiently and safely in the light of all the transformation happening in the field of transportation engineering such as intelligent infrastructure and data for real-time decision making. Real world data will be used for quantitative analyses using emerging visualization techniques and optimization/modeling methods.

Prerequisite: Permission of Instructor.**TTE 6606 Urban Transportation Models 3 Credits****Grading Scheme:** Letter Grade

Mathematical models for decision making in planning and operations of urban highway and transit systems.

Prerequisite: TTE 5305.**TTE 6615 Electric, Shared, and Micro Mobility 3 Credits****Grading Scheme:** Letter Grade

Prepares students to understand three critical trends in transportation namely electrification, shared mobility (Uber/Lyft etc.), and micro mobility (e-scooters, micro transit, etc.). Technology, policy/legal aspects, human factors, traffic operations/safety, and equity are addressed. Analyses will be undertaken using emerging visualization techniques and optimization/modeling methods

Prerequisite: Permission of Instructor.

Classics

CLA 6125 Augustan Age 3 Credits**Grading Scheme:** Letter Grade

In-depth investigation of history, political organization, literature, and society of Augustan Rome.

Prerequisite: B.A. in classics.**CLA 6795 Greek and Roman Archeology 3 Credits****Grading Scheme:** Letter Grade

Grounding in monuments of ancient Greece and Roman, and history and methodology of classical archeology.

Prerequisite: B.A. in classics or related field.**CLA 6805 The Classical Research Tradition 3 Credits****Grading Scheme:** Letter Grade

Research methods in the classics.

CLA 6895 Athenian Law and Society 3 Credits**Grading Scheme:** Letter Grade

Comprehensive assessment of structures of classical Athens, offering detailed study of Athenian law, constitution, society, gender relations, and culture. Ancient life linked with modern debate on similar issues.

Prerequisite: B.A. in classics or related field.**CLA 6905 Individual Work 2-4 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Readings and reports in Classical civilization.

CLA 6930 Greece and the Near East 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Rotating topics concerning political, economic, diplomatic, and cultural interaction between Greek world and its neighbors in the East.

CLA 6932 Topics in Classical Civilization 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Intensive study of a particular topic in ancient classical civilization which is not offered every academic year and is not covered by existing course numbers/titles. Past topics have included Ancient Sculpture Methods, Slavery in Antiquity, Women in Ancient Greece and Rome, Roman Religion, etc. The reading material for this course will generally consist of secondary literature and ancient literature in translation. Students will produce a final research paper or project in the topic.

Prerequisite: Graduate standing.

Computer and Information Science and Engineering

CAI 5731 Biostatistics for AI 2 Credits**Grading Scheme:** Letter Grade

Biostatistics for AI highlights the crucial role of biostatistics in AI-driven medical applications. Students will master foundational biostatistical methods, design effective medical experiments, and navigate the intricacies of large biomedical datasets. Emphasizing the union of traditional biostatistics with contemporary AI techniques, the course ensures proficiency in data analysis, AI model validation, and addressing ethical challenges in medical data use.

Prerequisite: Prior coding experience is helpful but not mandatory.**Corequisite:** Recommended but not mandatory: CAI 5720 and CAI 5724 both with a minimum grade of C.**CAI 5732 AI for Clinical Decision Support 3 Credits****Grading Scheme:** Letter Grade

Explores the current landscape of clinical artificial intelligence (AI) for augmenting patient care, including real-world deployments, promising cutting-edge research, and ethical and societal implications of current clinical AI progress. A hybrid flipped classroom/journal club structure which emphasizes peer engagement will empower students to join the ongoing conversation and become versed in the contemporary clinical AI topics that are currently shaping the field.

CAI 6108 Machine Learning Engineering 3 Credits**Grading Scheme:** Letter Grade

Covers foundational machine learning concepts with an emphasis on applying these concepts on real-world data through programming exercises and assignments using the relevant industry-standard Python tools, libraries, and frameworks.

Prerequisite: Knowledge of programming fundamentals. Experience with Python is a plus but not required.**CAI 6307 Natural Language Processing 3 Credits****Grading Scheme:** Letter Grade

Covers concepts in natural language processing ranging from shallow bag-of words to richer representations and formalisms, for applications such as translation, generation, extraction, summarization, and dialogue. Classic and state-of-the-art techniques and remaining challenges are discussed, as well as recent proposals for meeting those challenges (both symbolic and machine learning approaches). Intended for graduate students doing research related to natural language processing.

Prerequisite: Proficiency in programming (Python recommended) & familiarity with introductory machine learning or artificial intelligence is a plus.**CAI 6726 Clinical AI Design Studio I 3 Credits****Grading Scheme:** Letter Grade

Offers an immersive learning experience for students interested in the intersection of artificial intelligence (AI) and clinical practice. Throughout the semester, students will participate in rotations, spending time working in various faculty members' labs or clinical domains. These rotations provide a unique opportunity to delve into various research domains and acquire valuable insights into ongoing clinical AI initiatives.

Prerequisite: (CAI 5720 and CAI 5721 and CAI 5724 and CAI 6725) all with a minimum grade of C.**CAI 6727 Clinical AI Design Studio II 3 Credits****Grading Scheme:** Letter Grade

Clinical AI Design Studio II offers a unique, extended engagement with a faculty advisor, building upon the foundational experiences from Clinical AI Design Studio I. Students will delve into the specialized clinical domain of their advisor, gaining firsthand insights into the intricacies of patient care and medical decision-making processes.

Prerequisite: (CAI 5720 and CAI 5721 and CAI 5724 and CAI 5723 and CAI 6725 and CAI 6726) all with a minimum grade of C.**CAI 6826 Project in Artificial Intelligence Systems 3 Credits****Grading Scheme:** Letter Grade

Using concepts learned in prerequisite courses, including AI ethics, machine learning, and the Artificial Intelligence Systems course, students will individually or as a team identify AI systems problems, formulate solutions, and apply AI Systems knowledge in the context of a real-world project. Project requirements include preparing a plan, technical final report, delivering an oral presentation, and creating a software repository.

Prerequisite: (LAW 6930 & EGN 5216) AND (CAP 6615 or EGN 6615) AND (CAP 5416 or EEE 6512 or EEL 5406) AND (CAP 6XXX or EEE 6561 or EEL 5793).**CAI 6910 Supervised Research in AI for Health 1-5 Credits, Max 5 Credits****Grading Scheme:** Letter Grade

Students will work with their technical and clinical advisors to design, develop, and complete an agreed-upon project, the substantiveness of the project to be determined by number of credit hours the student enrolls in. Students may take this course to advance their research interests by working in an advisor's lab or clinic, completing a reading course, or completing a capstone project or a Master's Thesis.

Prerequisite: CAI 6726 and CAI 6727 both with a minimum grade of C.**CAP 5100 Human-Computer Interaction 3 Credits****Grading Scheme:** Letter Grade

Topics related to interaction with technology, including interface design, software tools, 3-D interaction, virtual environments, interaction devices, collaboration, and visualization.

Prerequisite: COP 3530, and any one programming course (COP 2800, COP 3275, or COP 3229).

CAP 5108 Research Methods for Human-Centered Computing 3 Credits**Grading Scheme:** Letter Grade

Introduces the fundamental methods and techniques to evaluate technologies and collect data from humans, including experimental design, types of variables, types of errors, hypothesis testing, survey design, behavioral and psychophysical methods.

Prerequisite: STA 3032, COT 3100, COP 3530, or equivalent.**CAP 5404 Deep Learning for Computer Graphics 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Covers fundamental theory and application of popular artificial intelligence (AI) algorithms in computer graphics. Introduces several neural network architectures and the mathematical principles behind them. A semester-long project motivated by research publications teaches technical writing and graphics processing unit (GPU) programming on a GPU cluster. Convolutional neural networks for denoising movies and generative adversarial networks for animation are project examples.

Prerequisite: Proficiency in a programming Language (Python and/or C ++ recommended), Data Structures and Algorithms, Linear Algebra, and Calculus.CAP5404**CAP 5416 Computer Vision 3 Credits****Grading Scheme:** Letter Grade

Introduction to image formation and analysis. Monocular imaging system projections, camera model calibration, and binocular imaging. Low-level vision techniques, segmentation and representation techniques, and high-level vision.

Prerequisite: PrerequisitesMAC 2312 or equivalent, COT 4501 or equivalent and Proficiency in MATLAB or C++ or Java. Course instructor will determine equivalency.**CAP 5510 Bioinformatics 3 Credits****Grading Scheme:** Letter Grade

Basic concepts of molecular biology and computer science. Sequence comparison and assembly, physical mapping of DNA, phylogenetic trees, genome rearrangements, gene identification, biomolecular cryptology, and molecular structure prediction.

Prerequisite: CIS 3020 or equivalent.**CAP 5705 Computer Graphics 3 Credits****Grading Scheme:** Letter Grade

Display device characteristics; system considerations, display algorithms. Curve and surface generation. Lighting models and image rendering.

Prerequisite: COP 3530.**CAP 5771 Introduction to Data Science 3 Credits****Grading Scheme:** Letter Grade

Introducing the basics of data science including programming for data analytics, file management, relational databases, classification, clustering and regression. The foundation is laid for big data applications ranging from social networks to medical and business informatics.

Prerequisite: COP 3530 Data Structures and Algorithms or equivalent.**CAP 5841 Modeling and Computing with Geometry 3 Credits****Grading Scheme:** Letter Grade

Introduction to modeling and shaping curved smooth geometry and computing on the geometry. Topics include curves, surfaces and volumetric representations. The course leverages numerical computing techniques and 3D computer graphics programming. The course combines lecture and seminar elements: towards the end of the course, students give presentations of classic (or by mutual consent recent) literature on Modeling and Computing with Geometry.

Prerequisite: Calculus in several variables, Programming in Matlab or OpenGL.**CAP 6137 Malware Reverse Engineering 3 Credits****Grading Scheme:** Letter Grade

Introducing the theory and practice of software reverse engineering applied to analysis of malicious software (malware). Students learn techniques of static and dynamic analysis to help identify the behavior of programs presented without documentation or source code and to identify possible remediation and avoidance techniques.

Prerequisite: Computer Organization or Computer Architecture or Assembly Language Programming.**Corequisite:** Operating Systems Principles.**CAP 6516 Medical Image Analysis 3 Credits****Grading Scheme:** Letter Grade

Image formation, reconstruction mathematics (Fourier slice theorem, Abel, Hankel and Radon transforms), PDE-based denoising and segmentation, multidimensional clustering algorithms, iso-surface extraction, basic differential geometry of curves and surfaces, multidimensional splines, active 2D/3D models, image matching/registration with application to multimodal co-registration.

Prerequisite: expertise in image proc./comp. vision, proficiency in C language or MATLAB.**CAP 6610 Machine Learning 3 Credits****Grading Scheme:** Letter Grade

Concepts in developing computer programs that learn and improve with experience. Emphasis on methods based on probability, statistics, and optimization.

Prerequisite: Mathematics for Intelligent Systems.**CAP 6615 Neural Networks for Computing 3 Credits****Grading Scheme:** Letter Grade

Neural network models and algorithms. Adaptive behavior, associative learning, competitive dynamics and biological mechanisms. Applications include computer vision, cognitive information processing, control, and signal analysis.

Prerequisite: CAP 5635.**CAP 6617 Advanced Machine Learning 3 Credits****Grading Scheme:** Letter Grade

Advanced concepts in developing computer programs that learn and improve with experience. Emphasis on methods based on probability, statistics, and optimization.

Prerequisite: CAP 6610.**CAP 6701 Advanced Computer Graphics 3 Credits****Grading Scheme:** Letter Grade

Curved surface representations, representation and visualization of higher-dimensional fields, advanced rendering, collision detection and collision response, and scene navigation in context of high-level graphics environments.

Prerequisite: CAP 4730 or CAP 5705 or consent of instructor.

CAP 6769 Advanced Topics in Data Science 3 Credits**Grading Scheme:** Letter Grade

Advanced topics in data science such as relational databases and parallel and distributed processing in the cloud, tree-based classifiers and support vector machines, dimensionality reduction and theories of visualization.

Prerequisite: Graduate standing, CAP 5771**CAP 6779 Projects in Data Science 3 Credits****Grading Scheme:** Letter Grade

Advanced topics in data science, individual projects in application areas such as vision, natural language processing, computational fluid dynamics, social networks, bioinformatics, etc.

Prerequisite: Graduate standing and CAP 5571.**CDA 5155 Computer Architecture Principles 3 Credits****Grading Scheme:** Letter Grade

Fundamental design issues of processor and computer architecture, a variety of design approaches for CPU, memory, and system structure.

Prerequisite: CDA 3101, COP 3530, and COP 4600.**CDA 5636 Embedded Systems 3 Credits****Grading Scheme:** Letter Grade

Design of efficient and trustworthy embedded and cyber-physical systems consisting of hardware, software, firmware, sensors and actuators. It covers fundamental issues related to modeling and specification, design space exploration, hardware-software partitioning, synthesis and compilation, real-time operating systems, and application-specific optimizations targeting area, power, performance, temperature, energy, and security.

Prerequisite: Computer Organization.**CDA 6325C Cyber-physical System Security 3 Credits****Grading Scheme:** Letter Grade

Covers foundational concepts of cyber-physical system security. In particular, hardware and software threats and mitigation strategies of integrating sensing and actuation, AI computation, infrastructure control, and networking. Students will analyze research papers, write technical essays, present security research problems, conduct hands-on testing, and learn the challenges of building secure systems.

Prerequisite: Basic proficiency with programming is required (e.g., Python, C++).**CEN 5035 Software Engineering 3 Credits****Grading Scheme:** Letter Grade

Topics in projects organization, specification techniques, reliability measurement, documentation.

Prerequisite: COP 3504 and COT 3100.**CEN 5726 Natural User Interaction 3 Credits****Grading Scheme:** Letter Grade

Introducing design, development, and evaluation of Natural User Interaction (NUI) technologies (e.g., non-keyboard and mouse technologies, such as touchscreen interaction, gesture interaction, speech interaction, etc.). Key concepts include hardware-to-software NUI pipeline and considerations in NUI software development (including existing platforms, toolkits, and APIs used to create NUI software).

Prerequisite: COP 3530(C)**CEN 5728 User Experience Design 3 Credits****Grading Scheme:** Letter Grade

Introduces methods and tools used in User Experience Design (UXD): the early stages of software design focused on meeting user needs. Key concepts include user research, contextual design, design thinking, ideation, iterative design, prototyping, and design documentation. Software tools used in industry are used in class projects.

Prerequisite: COP 3530 or equivalent.**CEN 5735 Human-Centered Input Recognition Algorithms 3 Credits****Grading Scheme:** Letter Grade

Human-centered methods for the design and evaluation of intelligent algorithms for recognizing user input in advanced modalities such as gesture, handwriting, speech, and more. Algorithms and modalities vary; students will implement and extend an existing algorithm, evaluating it on user input data students will collect from real people.

CEN 6070 Software Testing and Verification 3 Credits**Grading Scheme:** Letter Grade

Concepts, principles, and methods for software testing and verification. Topics include human and machine-based testing strategies, formal proofs of correctness, and software reliability.

Prerequisite: CEN 5035.**CEN 6075 Software Specification 3 Credits****Grading Scheme:** Letter Grade

Concepts, principles, and methods for practical specification. System modeling, requirements exploration, validation and prototyping, and documentation techniques.

Prerequisite: CEN 5035.**CIS 5209 Penetration Testing -- Ethical Hacking 3 Credits****Grading Scheme:** Letter Grade

Introduction to the principles and techniques associated with the cybersecurity practice known as penetration testing or ethical hacking. The course covers planning, reconnaissance, scanning, exploitation, post-exploitation, and result reporting. The student discovers how system vulnerabilities can be exploited and learns to avoid such problems.

Prerequisite: COP 3530.**CIS 5370 Computer and Information Security 3 Credits****Grading Scheme:** Letter Grade

Covers systematic threat and risk assessment; programmed threats and controls in hardware, software, and human procedures; security policies, models, and mechanisms; theoretical limitations and practical implementations; certification and accreditation standards; and case study reviews. Coursework includes a significant term project.

Prerequisite: COP 4600 Operating Systems or equivalent**CIS 5371 Introduction to Cryptology 3 Credits****Grading Scheme:** Letter Grade

Introducing classical and modern cryptography and cryptanalysis, including symmetric and asymmetric (public key) ciphers. It covers cryptographic hash functions, block and stream ciphers, as well as differential and linear cryptanalysis. It reviews BAN logic, applications of cryptography, cryptographic standards and protocols, and analyzes case studies of failed implementations.

Prerequisite: COT 3100 Applications of Discrete Structures or equivalent ;**Corequisite:** COT 5405 Analysis of Algorithms or equivalent

CIS 6261 Trustworthy Machine Learning 3 Credits**Grading Scheme:** Letter Grade

Explores research at the intersection of machine learning and security and privacy. Topics include: adversarial machine learning; differential privacy; membership inference; fairness transparency; explainable/interpretable machine learning; deepfakes and disinformation.

Prerequisite: Knowledge of programming fundamentals, familiarity with machine learning and Python is a plus.

CIS 6307 Internet Data Streaming 3 Credits**Grading Scheme:** Letter Grade

Fundamental concepts, data structures and algorithms about extracting information from packet streams on the Internet in real time, with applications in network security, traffic engineering, e-commerce, and big data analytics

Prerequisite: Data Structures and Algorithms.

CIS 6905 Individual Study 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Individual Study

Prerequisite: consent of faculty member supervising the study.

CIS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

Prerequisite: graduate status in CIS.

CIS 6930 Special Topics in CIS 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Special Topics in CIS

Prerequisite: vary depending on topics.

CIS 6935 Graduate Seminar 1-12 Credits, Max 12 Credits**Grading Scheme:** S/U

Presentations by visiting researchers, faculty members, and graduate students.

CIS 6940 Supervised Teaching 3 Credits, Max 5 Credits**Grading Scheme:** S/U

A supervised teaching experience.

CIS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

CIS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CIS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

CNT 5106C Computer Networks 3 Credits**Grading Scheme:** Letter Grade

Design, implementation, and internals of networks. Routing, congestion control, internetworking, TCP/IP, optimization, and proxy services.

CNT 5410 Computer and Network Security 3 Credits**Grading Scheme:** Letter Grade

Issues, analysis, and solutions. Viruses, worms, logic bombs, network attacks, covert channels, steganography, cryptology, authentication, digital signatures, electronic commerce.

Prerequisite: COP 3530, COT 5405. ;

Corequisite: COP 4600.

CNT 5517 Mobile Computing 3 Credits**Grading Scheme:** Letter Grade

Emerging topics of wireless and mobile computing and networking including mobile computing models, mobile-IP, adhoc networks, Bluetooth, and 802.11b. Mobile database access and mobile transactions in context of emerging field of M-commerce.

Prerequisite: CNT 4007C.

CNT 6107 Advanced Computer Networks 3 Credits**Grading Scheme:** Letter Grade

Computer network architecture, including topologies, media, switching, routing, congestion control, protocols, and case studies.

Prerequisite: COP 5615 , COP 5536 , and CNT 5106C

CNT 6530 Mobile Networking 3 Credits**Grading Scheme:** Letter Grade

Concepts of emerging mobile networks architecture, systematic analysis of effects of mobility on network performance, synthetic and data-driven mobility modeling and simulation, behavior analysis in mobile networks, mobile service and application structure, development, implementation, and evaluation. Topics include architecture, geographic routing and query resolution in ad hoc networks, sensor networks, Internet of Things, and vehicular networks.

Prerequisite: COP 3502c or COP 3503c.

CNT 6885 Distributed Multimedia Systems 3 Credits**Grading Scheme:** Letter Grade

Design issues; survey of recent advances, including compression, networking, and operating system issues.

COP 5536 Advanced Data Structures 3 Credits**Grading Scheme:** Letter Grade

Development of efficient data structures used to obtain more efficient solutions to classical problems, such as those based on graph theoretical models, as well as problems that arise in application areas of contemporary interest.

Prerequisite: Undergraduate data structures.

COP 5556 Programming Language Principles 3 Credits**Grading Scheme:** Letter Grade

History of programming languages, formal models for specifying languages, design goals, run-time structures, and implementation techniques, along with survey of principal programming language paradigms.

COP 5615 Distributed Operating System Principles 3 Credits**Grading Scheme:** Letter Grade

Concepts and techniques for efficient management of computer system resources.

Prerequisite: COP 4600.

COP 5618 Concurrent Programming 3 Credits**Grading Scheme:** Letter Grade

Overview of principles and programming techniques. Reasoning about concurrency, synchronization, program structuring, multi-threaded server applications.

Prerequisite: COP 3100, 3530.

COP 5725 Database Management Systems 3 Credits**Grading Scheme:** Letter Grade

Introduction to systems and procedures for managing large computerized databases.

Prerequisite: COP 3530, 4600, or equivalent.

COP 6726 Database System Implementation 3 Credits**Grading Scheme:** Letter Grade

DBMS architecture, query processing and optimization, transaction processing, index structures, parallel query processing, object-oriented and object-relational databases, and related topics.

Prerequisite: COP 4600 and 4720 or COP 5725.**COT 5405 Analysis of Algorithms 3 Credits****Grading Scheme:** Letter Grade

Introduction and illustration of basic techniques for designing efficient algorithms and analyzing algorithm complexity.

Prerequisite: COP 3530.**COT 5442 Approximation Algorithms 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of algorithmic paradigms, analysis, techniques, and software. Topics include greedy methods, randomized algorithms, IP-rounding, approximability, covering, packing, clustering, and network problems.

Prerequisite: COP 3530 or COT 5405**COT 5520 Computational Geometry 3 Credits****Grading Scheme:** Letter Grade

Design, analysis, and implementation of algorithms and data structures to solve geometric problems. Applications in graphics, robotics, computational biology, data mining, and scientific computing. Convex hulls, Voronoi diagrams, triangulations, arrangements, and range searching.

Prerequisite: COP 3530.**COT 5615 Mathematics for Intelligent Systems 3 Credits****Grading Scheme:** Letter Grade

Mathematical methods commonly used to develop algorithms for computer systems that exhibit intelligent behavior.

Prerequisite: MAC 2313, Multivariate Calculus; MAS 3114 or MAS 4105, Linear Algebra; STA 4321, Mathematical Statistics.**COT 6315 Formal Languages and Computation Theory 3 Credits****Grading Scheme:** Letter Grade

Introduction to theoretical computer science including formal languages, automata theory, Turing machines, and computability.

Prerequisite: COP 3530 and familiarity with discrete mathematics and data structures.**EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits****Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.**EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits****Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

IDC 5715 Virtual Reality for the Social Good 3 Credits**Grading Scheme:** Letter Grade

A multidisciplinary approach to solving pressing social problems by blending social science practices with innovative technology. Students will explore effective messaging perspectives, virtual social spaces, and virtual reality technologies to create a compelling story for a social good issue. This class is for all students, regardless of major/prior experience.

Construction Management

BCN 5470 Construction Methods Improvements 3 Credits**Grading Scheme:** Letter Grade

Methods of analyzing and evaluating construction techniques to improve project time and cost control. Work sampling, productivity ratings, crew balance studies, time lapse photography, and time management.

Prerequisite: graduate standing.**BCN 5618C Comprehensive Estimating 3 Credits****Grading Scheme:** Letter Grade

Classification of work and quantity survey techniques. Analysis and determination of costs of construction operations including direct and overhead costs, cost analysis, and preparation of bid proposals.

Prerequisite: graduate standing.**BCN 5625 Construction Cost Analysis 3 Credits****Grading Scheme:** Letter Grade

Study of cost engineering and cost distribution and comparative analysis of actual and estimated cost as used for project control.

Prerequisite: BCN 4612C/BCN 5618C, 4720/BCN 5722 graduate standing.**BCN 5705C Project Management for Construction 3 Credits****Grading Scheme:** Letter Grade

Project organization, site planning, and implementation.

Prerequisite: BCN 5618C, BCN 6748, non-BCN graduate.**BCN 5722 Advanced Construction Planning and Control 3 Credits****Grading Scheme:** Letter Grade

Time-cost relationships for various construction operations.

Prerequisite: BCN 4720, graduate standing.**BCN 5729 Design-Build Delivery Methods 3 Credits****Grading Scheme:** Letter Grade

This course will be focusing on an in depth examination of the advantages and disadvantages of design-build, the methodology of the design-build delivery process and implementation of this process. The class will be featuring inter-disciplinary instructors, industry speakers, and a design-build team competition with industry and faculty judges.

BCN 5737 Advanced Issues in Construction Safety and Health 3 Credits**Grading Scheme:** Letter Grade

Current construction safety and health issues. Development of specific methodology to provide hazard reduction on job sites.

Prerequisite: BCN 4735, graduate standing.**BCN 5776 International Construction Business Management 3 Credits****Grading Scheme:** Letter Grade

Construction contracting, emphasis on international economics, marketing, contracts, design, and specifications.

Prerequisite: BCN 6748, graduate standing.**BCN 5778 Facilities Operation and Maintenance 3 Credits****Grading Scheme:** Letter Grade

Facilities management as a specialized professional career; study of how a facility, its people, equipment, and operations are served and maintained.

Prerequisite: graduate standing.**BCN 5789C Construction Project Delivery 3 Credits****Grading Scheme:** Letter Grade

Designing, developing, estimating, scheduling, contracting, and administering small construction project, including extensive site and feasibility analysis.

Prerequisite: BCN 5618C, 4720, BCN 6748, non-BCN graduate.

BCN 5874 Equipment and Methods for Heavy Construction 3 Credits**Grading Scheme:** Letter Grade

Teaching non-engineering students the theory and practice of heavy equipment utilization and construction methods through analysis of costs through production rates, optimizing crew, and equipment. Also including an introduction to planning and executing a construction project.

BCN 5885 Methods and Management for Heavy Construction 3 Credits**Grading Scheme:** Letter Grade

Project control from conception through the construction phase: procurement of design professional, prime contractor, subcontractor construction manager, project/program manager, etc., and the definition of and delineation between each entity; construction contract types; delivery systems; heavy/highway plans reading; quality assurance / quality control; nuances of planning and bidding a unit price project.

BCN 5905 Special Studies in Construction 1-5 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

For students requiring supplemental work in the building construction area.

Prerequisite: graduate standing.**BCN 5949 Graduate Construction Management Internship 1-3 Credits, Max 6 Credits****Grading Scheme:** S/U

Two-term employment in construction management position.

Prerequisite: approval of graduate coordinator.**BCN 5957 Advanced International Studies in Construction 1-4 Credits, Max 6 Credits****Grading Scheme:** S/U

Issues of local construction techniques, construction marketing, international construction, sustainability, global economics, and influence on construction of local culture, traditions, architecture, history, and political climate.

Prerequisite: graduate standing or supervising instructor's approval; admission to approved study abroad program.**BCN 6036 Research Methods in Construction 3 Credits****Grading Scheme:** Letter Grade

Research proposal development process and statistical, computational, visualization, and presentation tools available to researcher.

Prerequisite: graduate standing.**BCN 6558C Building Integrated Renewable Energy Systems 3 Credits****Grading Scheme:** Letter Grade

Addressing the emergence of economically and technically viable renewable energy systems and US and European Union policies calling for a net zero built environment. Provides the renewable energy piece for the Sustainable Construction (SCN) track in the BCN Masters program. It also provides additional capabilities and opportunities for students interested in employment in the renewable energy sector.

Prerequisite: Graduate standing in Construction Management, Engineering or Architecture**BCN 6580 High-Performance Green Building Delivery Systems 3 Credits****Grading Scheme:** Letter Grade

High-performance green buildings; emerging delivery systems, evaluating their sustainability, and details on LEED criteria.

Prerequisite: graduate standing, BCN 6585/ICM 6680, or consent of instructor.**BCN 6583 Sustainable Housing 3 Credits****Grading Scheme:** Letter Grade

Familiarizes students with various approaches to developing and constructing sustainable residential environments, incorporating environmental, social and financial sustainability practices. Students examine a range of metrics and approaches for benchmarking and performance. Projects involve case studies of sustainable housing and developments in Florida and throughout the US and world.

BCN 6584C Building Energy Modeling 3 Credits**Grading Scheme:** Letter Grade

As energy is becoming more precious, it is crucial for building sector to proactively design and operate high performance buildings. To achieve higher standards in building design and operation, a solid foundation of energy engineering and sustainability principles is essential.

Prerequisite: Graduate Standing in Building Construction, Engineering, or Architecture.**BCN 6585 Sustainable Construction 3 Credits****Grading Scheme:** Letter Grade

Sustainability principles applied to planning, design, operation, renovation, and deconstruction of built environment. Emphasis on resource efficiency, environmental protection, and waste minimization.

Prerequisite: graduate standing.**BCN 6586 Construction Ecology and Metabolism 3 Credits****Grading Scheme:** Letter Grade

Sustainability principles and concepts related to reducing environmental impacts of creating, operating, and deconstruction built environment.

Prerequisite: graduate standing.**BCN 6641 Construction Value Engineering 3 Credits****Grading Scheme:** Letter Grade

Principles and applications of value engineering in construction industry.

Prerequisite: BCN 4612C/BCN 5618C, graduate standing.**BCN 6748 Construction Law 3 Credits****Grading Scheme:** Letter Grade

Formation of a company, licensing, bid process, contracts, plans and specifications, mechanics liens, insurance bonds, and remedies as they relate to the building constructor and construction manager. Case studies.

Prerequisite: graduate standing.**BCN 6785 Construction Information Systems 3 Credits****Grading Scheme:** Letter Grade

Potential applications of computer and information systems in construction industry.

Prerequisite: CGS 2531 or equivalent, graduate standing.**BCN 6905 Directed Independent Study in Construction 1-3 Credits, Max 3 Credits****Grading Scheme:** Letter Grade

Directed Independent Study in Construction

Prerequisite: graduate standing.**BCN 6933 Advanced Construction Management 1-5 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Financial and technological changes affecting construction and the management of construction projects.

Prerequisite: graduate standing.**BCN 6940 Supervised Teaching 1-3 Credits, Max 3 Credits****Grading Scheme:** S/U

Supervised Teaching

Prerequisite: graduate standing.

BCN 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: graduate standing.**FES 6705 Communications in Emergency Management 3 Credits****Grading Scheme:** Letter Grade

Discussing several aspects of communication: communication coordination among emergency responders and agencies; effective communication with the public, including education programs; and guidelines for media relations and the use of new and traditional media to communicate during a crisis

FES 6724 Fire and Emergency Services Response Planning 3 Credits**Grading Scheme:** Letter Grade

Comprehensive response planning including theory and value of response planning are examined. Steps to develop a strategic response plan are examined and discussed.

FES 6726 Hazard Mitigation and Preparedness 3 Credits**Grading Scheme:** Letter Grade

Introducing major principles involved in preparing for and mitigating the impact of hazards in the context of ES/DM including key features and characteristics of both natural and man-made hazards, the risk assessment process that is used to determine community vulnerability, and in-depth discussion of hazard mitigation planning.

FES 6735 International Emergency/Disaster Management 3 Credits**Grading Scheme:** Letter Grade

Applying science and technology, planning, risk analysis, and management in dealing with events that have the potential to kill and injure large numbers of people, do extensive property damage, and destroy our economic and physical infrastructure.

FES 6736 Homeland Security and Emergency Management 3 Credits**Grading Scheme:** Letter Grade

Understanding of issues related to domestic and international terrorism, understanding of key terms and incidents, and development of practical plans for providing emergency services before, during, and after a terroristic incident.

FES 6786 Research Methods in FES 3 Credits**Grading Scheme:** Letter Grade

Covering the research proposal development process and the statistical, computational, visualization, and presentation tools available to the researcher.

Prerequisite: Completion of 18 graduate credit hours in FES**FES 6806 Disaster Response and Recovery 3 Credits****Grading Scheme:** Letter Grade

Exploring response and recovery operations in the emergency / disaster management profession. Typical challenges to be expected during response efforts along with tools and techniques to enhance the ability to protect lives, reduce property damage and minimize disruption through multi-organizational preparedness, coordination and improvisation will be examined.

FES 6826 Emergency Services - Disaster Planning 3 Credits**Grading Scheme:** Letter Grade

Introducing the process and practice of emergency/disaster planning. The relationship between emergency planning and disaster management and the principles of social psychology, communication theory and approaches to public education are explored.

FES 6827 Business Continuity and Disaster Planning 3 Credits**Grading Scheme:** Letter Grade

Addressing risks from cyber attacks, rioting, protests, product tampering, bombs, explosions, and terrorism. Extensive disaster planning and readiness checklists and developing alternate work and computing sites and emergency facilities.

FES 6836 Impacts of Natural and Man-made Disasters on Buildings 3 Credits**Grading Scheme:** Letter Grade

Impacts of natural and man-made disasters, including terrorist attacks, on buildings.

FES 6916 Research for Master's Report 3 Credits**Grading Scheme:** S/U

Research for Masters Report

Prerequisite: FES 6786: Research Methods in FES**FES 6940 Practicum in FES 1-3 Credits, Max 3 Credits****Grading Scheme:** S/U

Practicum in FES

Prerequisite: Completion of 18 graduate credit hours in FES**FES 6971 Research for Master's Thesis 1-6 Credits, Max 6 Credits****Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: FES 6786C**ICM 5905 Special Studies 1-3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Special Studies

Prerequisite: Graduate Standing**ICM 6420 Commercial Management and Cost Control 3 Credits****Grading Scheme:** Letter Grade

Budgeting and estimating, and principles of cost analysis for international projects.

Prerequisite: graduate standing.**ICM 6440 Construction Value Management 3 Credits****Grading Scheme:** Letter Grade

Classical value management/value engineering principles; practical applications for designers, contractors, suppliers, and other construction functions. Students conduct full-scale VM/VE studies of recent international projects.

Prerequisite: graduate standing.**ICM 6680 Principles of International Sustainable Construction 3 Credits****Grading Scheme:** Letter Grade

Techniques for creating good indoor and outdoor environments, renewable resources, conservation, low environmental impact methods, life cycle assessments.

Prerequisite: graduate standing.**ICM 6682 Construction Ecology and Metabolism 3 Credits****Grading Scheme:** Letter Grade

Application of ecological theory and developments in industrial ecology to ecological design in built environment.

Prerequisite: graduate standing.**ICM 6684 High-Performance Green Building Delivery Systems 3 Credits****Grading Scheme:** Letter Grade

Overview of emerging delivery systems for high-performance green buildings and the basis on which their sustainability can be evaluated. LEED criteria are discussed in detail.

Prerequisite: graduate standing, BCN 6585 or ICM 6680, or consent of instructor.

ICM 6710 Construction Human Resource Management 3 Credits**Grading Scheme:** Letter Grade

Theories of human behavior and influence and leadership, organization, environment, motivation, and culture.

Prerequisite: graduate standing.**ICM 6716 Construction Productivity and Methods Improvement 3 Credits****Grading Scheme:** Letter Grade

Examines the factors that impact construction productivity, the use of management tools to develop construction productivity improvement programs, methods for performing construction loss calculations, and strategies for developing productivity improvement programs for the construction environment.

ICM 6750 Managing Construction Information Technology 3 Credits**Grading Scheme:** Letter Grade

Applications of computer and information systems in international construction industry. How information technology develops and how it dramatically affects structure, process, and performance of projects.

Prerequisite: graduate standing.**ICM 6761 Advanced Planning, Scheduling, and Logistics 3 Credits****Grading Scheme:** Letter Grade

Overall schedule, including overall durations and phasing and review points, principles of logistics planning, and practicalities of detailed network scheduling.

Prerequisite: graduate standing.**ICM 6762 Construction Risk Management 3 Credits****Grading Scheme:** Letter Grade

Overview of what is meant by risk and uncertainty and influences in international construction industry.

Prerequisite: graduate standing.**ICM 6770 Advanced Project Safety Management 3 Credits****Grading Scheme:** Letter Grade

International, governmental, and construction industry requirements of safety and loss control regulations. Project responsibilities.

Prerequisite: graduate standing.**ICM 6775 Manufactured Construction Processes 3 Credits****Grading Scheme:** Letter Grade

Addresses the differences between construction using conventional site built techniques versus construction of buildings and components in factory settings and how this affects construction processes. Compares manufactured construction techniques internationally including Japan, Europe, and Australia.

ICM 6905 Directed Independent Study in International Construction 1-3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Directed Independent Study in International Construction

ICM 6910 Supervised Research 1-3 Credits, Max 3 Credits**Grading Scheme:** S/U

Supervised Research

ICM 6930 Construction Communication and Research 3 Credits**Grading Scheme:** Letter Grade

Research proposal development process and statistical, computational, visual, and presentational tools available to researcher.

Prerequisite: graduate standing.**ICM 6934 International Construction Research 1-6 Credits, Max 12 Credits****Grading Scheme:** S/U

International Construction Research

Criminology

CCJ 5934 Contemporary Issues in Criminology and Law 3 Credits, Max 36 Credits**Grading Scheme:** Letter Grade

Policy, theory, and research issues in crime, criminal justice, and law.

CCJ 6285 Criminal Justice Process 3 Credits**Grading Scheme:** Letter Grade

Police, courts, and the correction system.

CCJ 6619 Crime and the Life Course 3 Credits**Grading Scheme:** Letter Grade

Intensive examination of crime and the life course. How criminal activity is patterned over time.

CCJ 6705 Research Methods in Crime, Law, and Justice 3 Credits**Grading Scheme:** Letter Grade

Research issues (qualitative, quantitative, and historical) associated with crime, law, and justice, including skills to become consumers and producers of research.

CCJ 6712 Study Design and Evaluation Research 3 Credits**Grading Scheme:** Letter Grade

Provides skills for evaluating criminology and criminal justice programs.

CCJ 6905 Independent Study 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Reading or research areas in criminology, law, and society. Topics not available in current courses.

CCJ 6910 Supervised Research 1-3 Credits, Max 3 Credits**Grading Scheme:** S/U

Supervised Research

CCJ 6916 Applied CJ Research Project 1-12 Credits, Max 15 Credits**Grading Scheme:** S/U

Supervised individual or team applied research project.

CCJ 6920 Seminar in Criminological Theory 3 Credits**Grading Scheme:** Letter Grade

Classic and contemporary explanations of criminal activity.

CCJ 6936 Proseminar in Crime, Law, and Justice 3 Credits**Grading Scheme:** Letter Grade

Interdisciplinary examination of the relationship between legal and social orders. Focuses on various functions of law, different forms of legal thought, development of law, and the impact of law/sanctions on society.

CCJ 6971 Research for Master's Thesis 1-9 Credits**Grading Scheme:** S/U

Research for Master's Thesis

CCJ 7742 Research Methods in Crime, Law, and Justice II 3 Credits**Grading Scheme:** Letter Grade

Quantitative and qualitative methods.

Prerequisite: CCJ 6705.**CCJ 7921 Professional Development in Criminology, Law, and Society 3 Credits****Grading Scheme:** S/U

Professional aspects of research, teaching, and service activities in the areas of crime, justice, law, and society.

CCJ 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CCJ 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

CJJ 6020 Juvenile Justice 3 Credits**Grading Scheme:** Letter Grade

Introduces students to important topics related to the juvenile crime and juvenile justice. Discusses factors related to juvenile crime and societal responses to them. Discusses both classical and current research as well as policy and practice.

CJL 6039 Law and Society 3 Credits**Grading Scheme:** Letter Grade

Interdisciplinary examination of relationship between legal and social orders. Focuses on various functions of law, different forms of legal thought, development of law, and the impact of law/sanctions on society.

CJL 6090 Law and Social Science 3 Credits**Grading Scheme:** Letter Grade

The interface between law and knowledge from various social scientific disciplines, including psychology, sociology, history, and anthropology.

Digital Worlds Institute

DIG 5541 Managing Emerging Technology Projects 2 Credits**Grading Scheme:** Letter Grade

Develops competencies needed to effectively manage team-based projects built with emerging technologies. Multiple project methodologies are presented in the context of human-computer interaction and the development of virtual, augmented, and mixed realities. Presents strategies for managing project scope, the development team, deliverables, client relations, and the role of project manager.

Prerequisite: MA DAS program or permission of instructor**DIG 5555C Digital Media Projection Design I 3 Credits****Grading Scheme:** Letter Grade

Students will be learning theoretical, technical and historical production-oriented perspectives of using projections for a variety of events. Students collaboratively design, construct and present a digital projection media project. Students work as "projection designer" on two main projects and write a research paper on an approved topic in projection design.

Prerequisite: Enrollment in the MA in DAS program or DAR program, or consent of Instructor.**DIG 5930 Special Topics 3 Credits****Grading Scheme:** Letter Grade

Special Topics

DIG 5931C Special Topics 1-4 Credits**Grading Scheme:** Letter Grade

Complements theory-based digital arts offerings with an up-to-the-minute examination of emergent cultural and technological events and developments.

Prerequisite: Admission in MA DAS program or consent of instructor.**DIG 6027 Digital Storytelling 1-4 Credits, Max 4 Credits****Grading Scheme:** Letter Grade

Investigates participation and storytelling as foundations of interactivity. Explores how storytelling is incorporated into contemporary digital delivery platforms including games, social networks, and both linear and interactive media. Online and open-source tools are used to create content, taking advantage of mobile hardware already in students' possession.

Prerequisite: admission in MA DAS program or consent of instructor.**DIG 6028 Roots of Digital Culture 1-3 Credits****Grading Scheme:** Letter Grade

Interdisciplinary approach to technological and cultural underpinnings shaping current digital media (video games, the Internet, computer-animated movies, virtual reality and online social networking), exploring and presenting individuated perspectives in both written and digital media assignments.

Prerequisite: admission in MA DAS program or consent of instructor.**DIG 6050C Entertainment Technology 1-4 Credits****Grading Scheme:** Letter Grade

Evolving digital entertainment technologies and techniques, providing a forum to discuss current and future multimedia and hybrid media technologies, including the completion of an original design, script or treatment for a digital entertainment artifact.

Prerequisite: admission in MA DAS program or consent of instructor.**DIG 6125C Digital Design & Visualization 1-3 Credits****Grading Scheme:** Letter Grade

Creation of 2D and 3D content for large-scale visualization systems employed in the creative services and industrial design fields. Providing participatory experience in controlling multi-screen sound and visualization environments in both intermediate and large-scale display environments.

Prerequisite: admission in MA DAS program or consent of instructor.**DIG 6126C Interaction Design 1-3 Credits****Grading Scheme:** Letter Grade

Extend theoretical and practical perspectives into several focused projects using interaction principles prevalent in the entertainment and simulation industries, by creating and evaluating solutions across iterative design and testing cycles researching usability and affective influence. Emphasizes principles of cognitive psychology, including mental models, targeting and interface metaphors.

Prerequisite: admission in MA DAS program or consent of instructor.**DIG 6256C Audio Design For Digital Production 1-3 Credits****Grading Scheme:** Letter Grade

Capturing, storing, processing, and retrieving audio in analog and digital domains for visual media and information systems. Recording, editing, processing, and mixing sound for 2-d and 3-d artifacts.

Prerequisite: Admission into the M.A. in DAS program or consent of instructor.**DIG 6358C Applied 3D Modeling and Animation 2 Credits****Grading Scheme:** Letter Grade

3D asset production skills are essential for modelers and animators working in Digital Arts, Communications, Film, Interaction Design, Game, Industrial Design, and Architecture Industries. This course instructs students in the best industry standard practices and pipelines for creating 3D assets, with a special concentration in producing content for interactive media.

Prerequisite: (MAJOR DAS OR DAR) & CLASS GE7

DIG 6719 Videogame Theory and Analysis 2-4 Credits**Grading Scheme:** Letter Grade

Surveying the emerging interdisciplinary study of videogames. Examine contemporary and historical scholarship on the medium. Focus on video games as socially-situated semiotic spaces that exist in dialogue with society at large.

Prerequisite: Admission into the MA in DAS program for either the 12-hour certificate or as a full-time Major or written consent of Instructor.

DIG 6744C Movement, Media and Machines 1-4 Credits**Grading Scheme:** Letter Grade

Exploring existing and emergent relationships between human movement, interactive post-produced media and various electro-mechanical and digital machines. Texts, techniques and presentations from the spectrum of movement-based inquiry provide an interdisciplinary forum for transdisciplinary investigation.

Prerequisite: Admission into the MA in DAS program as a full-time Major or written consent of Instructor.

DIG 6751C Protocols for Multimedia Interfaces 2-4 Credits**Grading Scheme:** Letter Grade

Covering protocols that control the interface components of a wide range of human-computer interaction devices including computers, mobile phones, multimedia players etc. Principles of interactive event handling and skills in coding touch screen interaction using contemporary platforms and mobile device environments, virtual world interaction, web-based interaction, as well as standard interaction methods for computer applications.

Prerequisite: Admission into the MA in DAS program as a full-time Major or written consent of Instructor.

DIG 6788C Digital Production & Game Design 1-4 Credits**Grading Scheme:** Letter Grade

Students form small production teams and collaborate on a semester-long project with appointed production milestones, exploring intermediate and advanced 2-D and 3-D game design and visualization paradigms.

Prerequisite: Admission in MA DAS program or consent of instructor.

DIG 6837C Digital Tools for Arts and Humanities 3 Credits**Grading Scheme:** Letter Grade

The study of digital applications, games, tools, and social networks to enhance research in the arts humanities. The course examines and expands on current theoretical discussions, applications, and methodologies. An interdisciplinary group project will further engage students in collaborative research and offer hands-on experience with digital tools.

Prerequisite: Class GE7.

DIG 6840 Interdisciplinary Research Seminar in Digital Arts & Sciences 1-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

An interdisciplinary exploration of current topics and trajectories with a goal of enabling the rapid-prototyping of ideas, inventions, and interactions utilizing the digital arts sciences. Single or multiple areas will be chosen and investigated with the intention of a resultant prototype publication, media artifact or research presentation.

Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6850 Digital Arts & Sciences Convergence 1-4 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Explores implications, ramifications, and transformations resulting from the convergence of traditional and digital technologies with cultural phenomena. Interdisciplinary teams study and undertake projects integrating aspects of global cultures, film, video games, animation, communications, and the recording arts.

Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6906 Independent Study - Graduate Level 1-4 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Independent study of individual Digital Arts Sciences projects and issues, under faculty supervision.

Prerequisite: Consent of faculty member supervising the study.

DIG 6931C Special Topics 1-3 Credits**Grading Scheme:** Letter Grade

Special Topics

DIG 6950C Digital Performance Production 1-4 Credits**Grading Scheme:** Letter Grade

Provides instruction on the configuration, assembly and execution of events in venues using streaming technologies for a variety of entertainment, business and research applications. Students demonstrate individuated achievement in performance technologies and integrated techniques via a final event of their own design.

Prerequisite: admission in MA DAS program or consent of instructor.

DIG 6971 Research for Master's Thesis 1-3 Credits, Max 6 Credits**Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: CLASS GE7 & MAJOR DAR

DIG 6972C Capstone Project 2-4 Credits**Grading Scheme:** S/U

Completion of an original project that addresses an identified issue or need within the field of Digital Arts and Sciences.

Prerequisite: Advanced standing in the MA in DAS graduate program; Permission of the Instructor.

DIG 6973 Capstone Project in Lieu of Thesis 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Submission of an original project based upon extended study of a topic within the field of Digital Arts Sciences (DAS). DIG 6973 is the course for students interested in completing a capstone project in lieu of a Thesis for a Master's of Arts degree.

Prerequisite: CLASS GE7 & MAJOR DAR

Economics

ECO 5114 Microeconomic Analysis 4 Credits**Grading Scheme:** Letter Grade

Develops the foundational theoretical models employed in understanding market interactions. Examines consumer choice, profit maximization by suppliers, market equilibrium in settings that vary with respect to their competitiveness, economic efficiency, and policy interventions in markets.

ECO 5207 Macroeconomic Analysis 4 Credits**Grading Scheme:** Letter Grade

Develops foundational tools of modern macroeconomic analysis. Examines consumption-labor decisions and consumption-savings decisions by households, profit maximization by firms, and the impacts of fiscal and monetary policy on the aggregate economy. Identifies optimal fiscal and monetary policies. Presents prominent theories of long-run economic growth.

ECO 5216 Monetary Economics 4 Credits**Grading Scheme:** Letter Grade

Develops foundational theoretical models employed by modern monetary economics. Examines individual and aggregate money demands and analyzes their effect on interest rate determination. Examines liquidity effect of monetary injections on interest rates and currency exchange rates.

ECO 5426 Econometric Analysis 1 4 Credits**Grading Scheme:** Letter Grade

Introduces concepts and methods employed in empirical economic analysis. Examines ordinary least squares, instrumental variables, maximum likelihood estimation, and model specification. Covers topics needed to plan and implement empirical projects, and understand potential problems with the empirical analyses of others.

ECO 5427 Econometric Analysis 2 4 Credits**Grading Scheme:** Letter Grade

Introduces to advanced concepts and methods employed in empirical economic analysis. Examines logit, probit, tobit, and categorical dependent variable models. Examines estimation of economic panel data. Covers topics needed to plan and implement empirical projects in the presence of limited dependent variables.

Prerequisite: ECO 5426**ECO 5435 Economic Data Analysis 4 Credits****Grading Scheme:** Letter Grade

Introduces coding for data manipulations and statistical analysis in Stata. Investigates construction and calculation of economic indicators. Identifies imperfections inherent to common indicators. Examines microdata and aggregate-level economic data using panel data and fixed-effects regression models.

ECO 5464 Game Theory and Industrial Organization 4 Credits**Grading Scheme:** Letter Grade

Introduces strategic behavior—what to do when your preferred action depends on others' choices of their own preferred actions—to the analysis of imperfectly competitive markets. Develops and examines Nash Equilibrium and numerous equilibrium refinements. Applies these solution refinements to important issues of imperfect competition.

ECO 5715 Open Economy Macroeconomics 2 Credits**Grading Scheme:** Letter Grade

International linkages arising from capital flows and exchange rates as well as comparison on macroeconomic policies and performance across countries. Effect of macroeconomic events on international business environment.

Prerequisite: ECP 5702. Designed primarily for M.B.A. students.**ECO 5745 Global Trade and Policy 3 Credits****Grading Scheme:** Letter Grade

Provides overview of theory, policy, and institutions that govern international flow of goods and services. Analyzes evolution of global trade, causes and effects of globalization, foreign outsourcing, effects of globalization on income distribution, international factor movements, strategic trade policy, multilateral and regional trade agreements, and global environmental issues.

ECO 6409 Game Theory Applied to Business Decisions 2 Credits**Grading Scheme:** Letter Grade

Business settings analyzed wherein a few decision makers profoundly affect one another's well being. Oligopoly competition and coordination, nonprice choices, entry deterrence, reputation formation, contract design, and management of work teams.

Prerequisite: ECP 5702 or equivalent. Designed primarily for MBA students.**ECO 6716 International Macroeconomics 3 Credits****Grading Scheme:** Letter Grade

Macroeconomic policies and their effects on the international business environment.

Prerequisite: ECP 5705. Designed primarily for M.B.A. students. Not designed for doctoral students in economics.**ECO 6906 Individual Work in Economics 1-4 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Individual Work in Economics

ECO 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ECO 6936 Special Topics 1-4 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Special Topics

ECO 6957 International Studies in Economics 1-4 Credits, Max 12 Credits**Grading Scheme:** S/U

International Studies in Economics

Prerequisite: admission to approved study abroad program and permission of department.**ECO 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ECO 6977 Financial Economics Capstone 3 Credits**Grading Scheme:** Letter Grade

Introduces fundamentals of financial project management. Examines project financing for private and public projects. Covers numerous application-based topics including funds sourcing, legal frameworks and regulation, and credit risk. Includes capstone project in financial economics.

Prerequisite: Admission into the Master of Arts in Economics program.**ECO 7113 Information Economics 1-2 Credits, Max 2 Credits****Grading Scheme:** Letter Grade

Analysis of information problems, remedies through contracting or adoption of different procedures and organization when complete contracting is infeasible.

Prerequisite: ECO 7115 and ECO 7408. ;**Corequisite:** ECO 7404.**ECO 7115 Microeconomic Theory 1 3 Credits****Grading Scheme:** Letter Grade

Analysis of optimization applied to consumer and product theory including comparative statistics and duality.

ECO 7116 Microeconomic Theory 2 3 Credits**Grading Scheme:** Letter Grade

Introduces game theory, public goods and externalities, and adverse selection and moral hazard. Applies pure-strategy and mixed-strategy Nash Equilibria solution concepts to solve simultaneous-play games. Develops Bayesian Nash Equilibria solution concepts for dynamic games. Solves monopolists' profit-maximization problem. Examines other inefficiencies stemming from public goods, externalities, and information asymmetries.

Prerequisite: ECO 7115. ECO 7115 is taught once per year.

ECO 7120 General Equilibrium and Welfare Economics 1-2 Credits, Max 2 Credits**Grading Scheme:** Letter Grade

Introduction to general equilibrium analysis, including existence of equilibrium, core convergence, and fundamental theorems of welfare economics.

Prerequisite: ECO 7115. ;**Corequisite:** ECO 7406.**ECO 7206 Macroeconomic Theory I 3 Credits****Grading Scheme:** Letter Grade

Coreq: ECO 7115, ECO 7408. Classical, Keynesian, and new classical aggregate income and employment analysis. Demand for money. Inflation and unemployment. Monetary policy and stabilization. Time series and rational expectations models.

ECO 7207 Macroeconomic Theory II 3 Credits**Grading Scheme:** Letter Grade

Introduces foundational models of economic growth and macroeconomic fluctuations. Presents the Solow Growth Model, the Ramsey-Cass-Koopmans Growth Model, and the Diamond Growth Model. Develops the New Growth Theory by incorporating research and development activity and human capital investment. Examines short-run macroeconomic fluctuations using the traditional and new Keynesian models.

Prerequisite: ECO 7206.**ECO 7297 Applied Macroeconomics I 3 Credits****Grading Scheme:** Letter Grade

Prepares doctoral students to be researchers in Modern Macroeconomics. Constructs and solves Dynamic Stochastic General Equilibrium (DSGE) models. Uses real-world economic data to estimate and calibrate DSGE models using Bayesian methods. Identifies and measures the size of macroeconomic shocks on output, employment, prices, and other relevant macroeconomic variables.

Prerequisite: ECO 7206. (ECO 7206 is completed by all PhD students in Year 1 of the program. This course will be taken in the fall semester of the second year of the PhD program.)

ECO 7298 Applied Macroeconomics II 3 Credits**Grading Scheme:** Letter Grade

Expands the set of analytical tools that students may use to answer important questions in macroeconomics. Focuses on models that capture interactions between heterogeneous agents, such as households or firms, and their implications for economic performance. Examines the role of market imperfections and financial frictions.

Prerequisite: ECO 7297.**ECO 7404 Game Theory for Economists 1-2 Credits, Max 2 Credits****Grading Scheme:** Letter Grade

Introduction to modern game theory as used in economics. Emphasis on use of techniques in simple applications.

Prerequisite: ECO 7115 and ECO 7408.**ECO 7408 Mathematical Methods and Applications to Economics 1-2 Credits, Max 2 Credits****Grading Scheme:** Letter Grade

Mathematical techniques used in graduate work in economics and finance. Linear algebra and differential equations, with emphasis on results used in economic theory and econometrics.

ECO 7415 Statistical Methods in Economics 3 Credits**Grading Scheme:** Letter Grade

Coreq: ECO 7408. Introduction to fundamental statistical concepts: estimation, hypothesis testing, linear regression, and analysis of variance.

ECO 7423 Econometric Methods I 3 Credits**Grading Scheme:** Letter Grade

Stochastic models. The general linear model and problems associated with its use in econometric research. Theory of the simultaneous equation approach, model construction, and estimation techniques.

Prerequisite: ECO 7424 or departmental approval.**ECO 7424 Econometric Models and Methods 3 Credits****Grading Scheme:** Letter Grade

Introduction to classical econometric theory, linear models, and estimation methods.

Prerequisite: ECO 7415.**ECO 7452 Best Empirical Practices in Economics 1-2 Credits****Grading Scheme:** Letter Grade

Analysis of empirical papers to develop skills for evaluating and conducting empirical testing of economic theory.

ECO 7458 Econometric Methods II 3 Credits**Grading Scheme:** Letter Grade

Advanced econometric theory with applications to topics such as nonlinear estimation, limited dependent variable models, time-series analysis, and specification testing.

Prerequisite: ECO 7424 or AEB 7571.**ECO 7525 Welfare Economics and The Second Best 1-2 Credits****Grading Scheme:** Letter Grade

Introduction and overview of public sector economics. Basic welfare economics, optimal commodity and income taxation, and public goods and welfare.

Prerequisite: ECO 7115**ECO 7534 Empirical Public Economics I 1-2 Credits, Max 2 Credits****Grading Scheme:** Letter Grade

Taxation, expenditures, marketplace of local governments, federalism and sources of inefficiency in government, voter turnout.

Prerequisite: ECO 7424 and 7525.**ECO 7535 Empirical Public Economics II 1-2 Credits****Grading Scheme:** Letter Grade

Education, welfare policy, health policy, and environmental policy.

ECO 7536 Theoretical Public Economics 1-2 Credits**Grading Scheme:** Letter Grade

The course is concerned primarily with public goods and their provision.

Prerequisite: ECO 7115.**ECO 7706 Theory of International Trade 3 Credits****Grading Scheme:** Letter Grade

Historical and economic background of foreign trade; theory of international trade; fundamentals of international exchange; international commercial policies and international trade; exchange fluctuations and their control; international monetary institutions.

ECO 7707 International Economic Relations 3 Credits**Grading Scheme:** Letter Grade

International trade and income distribution, international technology diffusion, foreign direct investment and multinational enterprise, formation and reform of trade and investment policy.

ECO 7925 Research Skills Workshop 3 Credits**Grading Scheme:** S/U

Transition from learning about work of others to doing research. Selecting area of research, surveying literature, narrowing to specific topic, formulating model, collecting data if appropriate, working through theoretical or empirical analysis, and writing first draft.

Prerequisite: passed written qualifying exams.

ECO 7938 Advanced Economics Seminar 1-4 Credits, Max 20 Credits**Grading Scheme:** Letter Grade

For advanced graduate students in economics. Student must have completed graduate core program and have preliminary dissertation topic.

ECO 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ECO 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ECP 5702 Managerial Economics 2 Credits**Grading Scheme:** Letter Grade

Microeconomic forces that influence decisions made by firms. Cost concepts, pricing strategies, capital investment, human resource management, innovation, and the influence of the competitive environment of firms.

Prerequisite: Designed primarily for M.B.A. students.

ECP 5705 Economics of Business Decisions 3 Credits**Grading Scheme:** Letter Grade

Synthesis and application of microeconomic theory and related business administration principles to managerial decision making through a problem-solving orientation.

Prerequisite: Designed primarily for M.B.A. students.

ECP 6035 Cost-Benefit Analysis 4 Credits**Grading Scheme:** Letter Grade

Introduces leading economic methodologies for conducting cost-benefit analyses. Differentiates and describes importance of opportunity costs and accounting costs. Discusses and applies individual and social discount rates. Presents several practical applications of cost-benefit analysis.

Prerequisite: ECO 5114 (Microeconomic Analysis).

ECP 6455 Antitrust Economics 4 Credits**Grading Scheme:** Letter Grade

Introduces United States' law governing American competition policy and enforcement. Identifies and describes several potentially anticompetitive practices. Applies microeconomic theory to analyze potentially anticompetitive conduct and calculates welfare effects. Examines abuse of monopoly and monopsony power, cartels and collusion, vertical integration and restraints, and horizontal and vertical mergers.

Prerequisite: ECO 5114 (Microeconomic Analysis) and ECO 5464 (Game Theory and Industrial Organization).

ECP 6708 Cases in Competitive Strategy 2 Credits**Grading Scheme:** Letter Grade

Current and recent cases to illustrate practical principles using strategic analysis. Class discussions of cases comprise first part; student presentations comprise second part. Practical business lessons from applying strategic methodology.

Prerequisite: ECO 6409. Designed for MBA students.

ECP 7408 Empirical Industrial Organization 3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Reviews numerical methods for optimization in MatLab. Presents current methods for demand estimation. Describes conventional approaches to characterizing demand for homogenous and differential products. Describes methods for appropriately treating static and dynamic settings. Examines methodological strengths and weaknesses of various demand estimation techniques.

Prerequisite: ECO 7424 required; ECO 7426 recommended or consent of instructor.

ECP 7409 Empirical Industrial Organization II 3 Credits**Grading Scheme:** Letter Grade

Reviews various econometric approaches to estimating firms' production functions. Identifies and describes strengths and weaknesses of those approaches. Examines incentives for market entry, exit, and deterrence. Characterizes relationships between price, welfare, and market structure. Examines methods for treating price discrimination.

Prerequisite: ECP 7408.

HSA 6436 Health Economics 3 Credits**Grading Scheme:** Letter Grade

Fundamental economic relations governing production, consumption, reimbursement, and financing of health services. Characteristics of markets for acute and long-term care services, insurance, and health care labor. Economic evaluation of technology.

Prerequisite: consent of instructor.

Education, School of Human Development and Organizational Studies in Education

EDA 6061 Educational Organization and Administration 3 Credits**Grading Scheme:** Letter Grade

Explores educational organizations through systems theory and organizational behavior, examining how leadership, change, and innovation operate across dynamic schooling contexts. Emphasizes cross-sector insights, digital transformation, and the evolving role of educational leaders within complex social systems.

EDA 6067 Education Policy in a Democratic Society 3 Credits**Grading Scheme:** Letter Grade

Examines the development, implementation, and analysis of educational policy in democratic contexts. Explores varying definitions of democracy, their application to policy, and methods for evaluating policies against democratic principles. Key topics include the aims of public education and the tensions among equality, efficiency, security, and liberty in shaping and analyzing policy.

EDA 6069 Educational Policy Analysis 3 Credits**Grading Scheme:** Letter Grade

This course is designed to deepen students understanding of the ways in which educational policy analysis can be used to better understand the causes and consequences of education policies. This course is designed as an upper-level graduate course, with readings coming from top journals educational policy and administration.

EDA 6107 Leading Change in Educational Organizations 3 Credits**Grading Scheme:** Letter Grade

Organizational dynamics, and leadership theory and practice, and their roles in promoting successful change.

EDA 6192 Educational Leadership: The Individual 3 Credits**Grading Scheme:** Letter Grade

The individual as a leader and the role of educational leaders in group development.

EDA 6193 Educational Leadership: Instruction 3 Credits**Grading Scheme:** Letter Grade

Examination and analysis of role in curriculum change and school improvement.

EDA 6195 Educational Policy Development 3 Credits**Grading Scheme:** Letter Grade

Contemporary research on political power in policy decision making and role of educational leaders in policy development.

EDA 6197 Contemporary Issues in Educational Leadership 3 Credits**Grading Scheme:** Letter Grade

Explore contemporary issues in educational leadership and their complexities in professional practice. Students will critically analyze interdisciplinary aspects of these challenges, shaping their research interests. Using theoretical frameworks, empirical studies, and policy updates, students will build an argument for a study with broad educational implications. The course culminates in developing a conceptual framework for a specific research interest.

EDA 6198 Communicating through Scholarly Writing in Educational Leadership 3 Credits**Grading Scheme:** Letter Grade

Communicating Through Scholarly Writing in Educational Leadership provides students the necessary scaffolding of skills of professional academic writing, in preparation for writing a dissertation. These skills include writing exercises focused on APA correct style, note-taking on journal articles, creating a literature map, synthesizing of notes leading to writing a mini-literature review, and analyzing model dissertations for writing style and structure.

Prerequisite: EDL_EDD or EDL_PHD.**EDA 6215 Communications in Educational Leadership 3 Credits****Grading Scheme:** Letter Grade

School/community relations and communication implications for educational leaders.

EDA 6222 Administration of School Personnel 3 Credits**Grading Scheme:** Letter Grade

Problems of the professional school staff and administration of staff personnel in public schools.

EDA 6232 Public School Law 3 Credits**Grading Scheme:** Letter Grade

The law as it affects public school operation in America. Religion; desegregation; compulsory attendance; torts; curriculum; student control and discipline; and teacher freedoms, employment, and dismissal.

EDA 6242 Public School Finance 3 Credits**Grading Scheme:** Letter Grade

State, local, and federal financing of education.

EDA 6271 Technology Leadership for Educational Administrators 3 Credits**Grading Scheme:** Letter Grade

Prepares educational leaders to navigate the evolving technology landscape in schooling environments, integrating digital tools, platforms, and infrastructure to support innovation, data privacy, strategic procurement, and future-ready school environments. Emphasizes ethical leadership, instructional technology, and systems-level decision-making in digitally connected educational ecosystems.

EDA 6326 Turnaround Schools 3 Credits**Grading Scheme:** Letter Grade

This course examines the themes in the contemporary use of school turnaround as a strategy for improving chronically underperforming schools. This course examines (1) the need for turnaround, (2) best practices in turnaround, (3) turnaround leadership, (4) the human costs of turnaround, and (5) the effectiveness of school turnaround.

EDA 6370 Mentoring for Career Development 3 Credits**Grading Scheme:** Letter Grade

Assists graduate students in their careers in any field through the discovery of how mentoring, a commonly accepted support structure in business, industry, medicine, and academia, can enhance their professional development. In addition, students will gain knowledge to become mentors or lead mentoring programs.

EDA 6423 Data-Driven Decision Making in Educational Organizations 3 Credits**Grading Scheme:** Letter Grade

Analytical and leadership issues related to conducting data-driven decision making in a professional, legal, ethical, and methodologically sound manner.

EDA 6427 Applied Education Policy Research 3 Credits**Grading Scheme:** Letter Grade

Prepare students to design and carryout empirical research in the field of education policy that is sufficiently credible to influence public decisions and for publication in scholarly journals, enable participants to fairly and rigorously evaluate the contributions and limitations of empirical studies that address significant questions for education policymaking and, emphasize the theoretical constructs that underlie causal inference.

EDA 6428 Legal Methods and Research in Education 3 Credits**Grading Scheme:** Letter Grade

Covers legal theory, the development of education law in American society, and contemporary methods of legal research related to education. Students will learn to apply legal research methods to laws, policies, and practices within education to inform educational research and influence policy and practice.

EDA 6429 Literature Review in Educational Leadership and Policy 3 Credits**Grading Scheme:** Letter Grade

Equips students with the essential tools and strategies for conducting rigorous and methodical literature reviews in educational leadership and policy. Students will gain a comprehensive understanding of research design and systematic literature review (SLR) methods.

EDA 6503 The Principalship 3 Credits**Grading Scheme:** Letter Grade

Organization and administration of the school; emphasis on competencies necessary for leadership and management of the school center, both elementary and secondary.

EDA 6509 The Superintendent 3 Credits**Grading Scheme:** Letter Grade

The course will focus on the superintendent's leadership responsibilities and specific job functions. Attention will be centered on acquiring the knowledge and skills to address contemporary challenges facing superintendents.

EDA 6905 Individual Work 1-6 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

For advanced students who wish to study individual problems under faculty guidance.

Prerequisite: students must have approval of proposed project before registering.**EDA 6931 Special Topics 1-3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Special Topics

EDA 6948 Supervised Practice in School Administration 1-15 Credits, Max 15 Credits**Grading Scheme:** S/U

Opportunity to perform administrative duties under supervision.

Prerequisite: open only to advanced students.**EDA 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

EDA 6981 Research Proposal Development in Educational Leadership and Policy 3 Credits**Grading Scheme:** Letter Grade

Assists students in the preparation of their dissertation research proposal. Students in this course will learn to identify, organize, and assess research around an education leadership or policy issue and write a comprehensive literature review and introduction chapter of their dissertation proposal by the end of this course.

EDA 7206 Organizational Leadership in Education 3 Credits**Grading Scheme:** Letter Grade

Developing concepts and refining skills associated with planning and organizing in educational institutions.

Prerequisite: EDA 6192.**EDA 7236 Advanced School Law for Educational Leaders 3 Credits****Grading Scheme:** Letter Grade

Provides an advanced exploration of the law influencing K-12 public education. Develops educators' understanding of the law, their ability to anticipate and proactively address current and emerging legal issues, and their ability to influence the development of the law. Explores how education law grapples with fundamental questions regarding the role of education in a democratic society and the relationship between parents, students, and the state.

EDA 7945 Practicum in Supervision and Administration 1-15 Credits, Max 15 Credits**Grading Scheme:** S/U

A seminar and an internship in administration and supervision.

EDA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EDA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EDA 7985 Research Design in Educational Administration 3 Credits**Grading Scheme:** Letter Grade

Conceptualizing problems in administration and determining appropriate research procedures.

Prerequisite: EDL_EDD or EDL_PHD.**EDF 5441 Assessment in General and Exceptional Student Education 3 Credits****Grading Scheme:** Letter Grade

Basic measurement concepts, designing classroom assessments, and interpreting results from traditional or alternative assessments; using these to plan instruction and evaluate student performance.

Prerequisite: STA 3122.**EDF 6113 Educational Psychology: Human Development 3 Credits****Grading Scheme:** Letter Grade

Current research and theories in the area of human development.

EDF 6211 Educational Psychology: General 3 Credits**Grading Scheme:** Letter Grade

Basic principles, techniques, and research; designed for graduate students preparing to teach who have a minimal background in psychology.

EDF 6215 Educational Psychology: Learning Theory 3 Credits**Grading Scheme:** Letter Grade

Logic and methodologies of theories of learning.

Prerequisite: consent of instructor.**EDF 6400 Quantitative Foundations of Education Research Overview 3 Credits****Grading Scheme:** Letter Grade

Overview of quantitative methods: validity, reliability, research design, and inferential statistics.

Prerequisite: STA 2023 or equivalent.**EDF 6401 Educational Statistics 3 Credits****Grading Scheme:** Letter Grade

Application to educational data and problems.

Prerequisite: STA 2023. Primarily for Ed.D. candidates.**EDF 6402 Quantitative Foundations in Educational Research: Inferential Statistics 3 Credits****Grading Scheme:** Letter Grade

Analysis of variance: One-way ANOVA, two-way ANOVA, ANOVA, repeated measures, and split plot.

Prerequisite: EDF 6400.**EDF 6403 Quantitative Foundations of Educational Research 6 Credits****Grading Scheme:** Letter Grade

Integrated coverage of fundamentals in the general field of education research. Includes statistics, experimental design, and data processing.

Prerequisite: STA 2023 or equivalent.**EDF 6416 Quantitative Methods for Evaluation in Educational Environments 3 Credits****Grading Scheme:** Letter Grade

Integrated coverage of advanced quantitative methods for evaluation research in education. A conceptual approach with an emphasis on reading and writing research results sections. Topics include data management and specific applications of univariate and multivariate statistical procedures to educational data.

EDF 6436 Theory of Measurement 3 Credits**Grading Scheme:** Letter Grade

Introductory study of true score models, reliability, validity, norms, scaling, item analysis, and basic elements of instrument construction.

Prerequisite: STA 2023; EDF 4430.

EDF 6463 Culturally Responsive Evaluation in Educational Environments 3 Credits**Grading Scheme:** Letter Grade

Theory, models, and methods applicable to the planning and implementation of culturally responsive evaluations with the recognition that evaluation takes place within cultural, social, economic, and political contexts.

Prerequisite: EDF 6401.**EDF 6464 Reading and Designing Qualitative Research 3 Credits****Grading Scheme:** Letter Grade

Introduces students to basic concepts and theories in qualitative research to enable them to design and conduct qualitative studies. Examples of different types of qualitative research designs and approaches are analyzed in relation to specific evaluative criteria.

EDF 6468 Evaluation Management for Grants in Educational Environments 3 Credits**Grading Scheme:** Letter Grade

Coverage of the theory and tools applicable to the planning, implementing, and completing a grant-funded evaluation.

EDF 6471 Survey Design and Analysis in Educational Research 3 Credits**Grading Scheme:** Letter Grade

Development and analysis techniques for surveys and questionnaires. Techniques of protocol development, data collection, analysis, and reporting.

Prerequisite: EDF 6403 or (EDF 6400 and EDF 6402)**EDF 6475 Qualitative Foundations of Educational Research 3 Credits****Grading Scheme:** Letter Grade

Introduction to philosophical, historical, sociological, and other methodologies as aspects of qualitative educational research.

EDF 6481 Quantitative Research Methods in Education 4 Credits**Grading Scheme:** Letter Grade

Design and data analysis for educational research.

Prerequisite: STA 2023, 2122 or equivalent.**EDF 6492 Evaluation Communication and Ethics in the Educational Environment 3 Credits****Grading Scheme:** Letter Grade

Provides a twofold emphasis: one on strategies for communicating and reporting evaluation processes and findings, and another on the understandings and applications of ethics to evaluation research.

EDF 6905 Individual Study 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

For advanced students who wish to study individual problems in psychological, social, or philosophical foundations of education, or research and measurement under faculty guidance.

Prerequisite: Students must have approval of proposed project before registering.**EDF 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

Prerequisite: consent of department chair.**EDF 6938 Special Topics 1-3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Special Topics

Prerequisite: consent of department chair.**EDF 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

EDF 6941 Practicum in Educational Research 2-9 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Experience in conducting various phases of quantitative or qualitative educational research under individual supervision.

Prerequisite: EDF 6403 or (EDF 6400 and EDF 6402). Arrangements must be made with instructor before registration.**EDF 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

EDF 6973 Project in Lieu of Thesis 1-6 Credits**Grading Scheme:** S/U

Develop a comprehensive evaluation plan for a program in an educational environment. Provide strong theoretical and practical rationale for the plan and approach. Implement and conduct the evaluation and provide a final report.

Prerequisite: Permission of the department.**EDF 7405 Advanced Quantitative Foundations of Educational Research 3 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Integrated coverage of important approaches to educational research. Includes application of experimental design, regression analysis, and computer processing to selected educational research problems.

EDF 7412 Structural Equation Models 3 Credits**Grading Scheme:** Letter Grade

Confirmatory factor analysis and causal models.

Prerequisite: EDF 6436, EDF 7405.**EDF 7413 Advanced Topics in Structural Equation Modeling 3 Credits****Grading Scheme:** Letter Grade

Methods for conducting methodological research about structural equation modeling (SEM) and advanced techniques in SEM: multilevel SEM, mixture models, latent variable interactions, advanced latent growth models and SEM with complex survey data.

Prerequisite: EDF 7412**EDF 7435 Rating Scale Design and Analysis in Educational Research 3 Credits****Grading Scheme:** Letter Grade

Development and analysis techniques for questionnaires and rating scales. Applications of psychometric models to item, scale, and rater evaluation; bias detection; factor analysis; and measurement of change.

Prerequisite: EDF 6403 and EDF 6434 or EDF 6436.**EDF 7439 Item Response Theory 3 Credits****Grading Scheme:** Letter Grade

Psychometric models for test scores; estimation of ability and item parameters; applications of and current issues in IRT.

Prerequisite: EDF 6436.**EDF 7453 Natural Language Processing in Education Research 3 Credits****Grading Scheme:** Letter Grade

A comprehensive overview of Natural Language Processing (NLP) techniques and applications in educational research, with an emphasis on Python-based text analysis and machine learning integration.

Prerequisite: EDF 7405.

EDF 7469 AI for Evaluation in Educational Environments 3 Credits**Grading Scheme:** Letter Grade

This course provides knowledge and skills to implement AI methods to evaluate the effectiveness of educational programs and policies, investigate variability in program effects across groups and contexts, and optimize the matching of educational experiences to students.

Prerequisite: EDF 7405 – Advanced Quantitative Foundations of Educational Research

EDF 7474 Multilevel Models 3 Credits**Grading Scheme:** Letter Grade

Models and methods for analysis of multilevel data.

Prerequisite: EDF 7405.

EDF 7479 Qualitative Data Analysis: Approaches and Techniques 3 Credits**Grading Scheme:** Letter Grade

Theories, approaches, and techniques of qualitative data analysis.

Prerequisite: EDF 7483.

EDF 7482 Quasi-experimental Design and Analysis in Educational Research 3 Credits**Grading Scheme:** Letter Grade

Examining quasi-experimental educational research designs and methods for data analysis for treatment comparisons that do not use random assignment of participants to conditions. Topics include matched designs, regression discontinuity designs, and control of selection bias using propensity scores, instrumental variables, and fixed effects.

Prerequisite: EDF 7405 : Advanced Quantitative Foundations of Educational Research

EDF 7483 Qualitative Data Collection: Approaches and Techniques 3 Credits**Grading Scheme:** Letter Grade

Qualitative Data Collection: Approaches and Techniques

Prerequisite: EDF 6475.

EDF 7486 Methods of Educational Research 3 Credits**Grading Scheme:** Letter Grade

Examination of research methodologies. Problem identification as well as organization and presentation of data.

Prerequisite: STA 2023. Primarily for Ed.D. candidates.

EDF 7491 Evaluation of Educational Products and Systems 3 Credits**Grading Scheme:** Letter Grade

Models and methods for formative and summative evaluation of educational products and programs.

EDF 7911 Qualitative Research Writing and Representation in Education 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Provides an overview of various types of representation in qualitative inquiry. Practice skills needed to align relevant representation with theoretical frameworks, research purpose, literature review, and data analysis. Explores strategies and techniques for writing vibrant and adequate findings and making implications more discerning.

Prerequisite: EDF7479 or equivalent.

EDF 7931 Seminar in Educational Research 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

In-depth examination of specific methodological approaches to educational research.

Prerequisite: EDF 6403 or (EDF 6400 and EDF 6402).

EDF 7932 Multivariate Analysis in Educational Research 3 Credits**Grading Scheme:** Letter Grade

Review of selected studies, focusing on methods of data analysis. Emphasis on using multivariate techniques.

Prerequisite: EDF 7405.

EDF 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EDF 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EDG 6285 Evaluation in the School Program 3 Credits**Grading Scheme:** Letter Grade

Procedures and techniques of evaluation in school programs.

Emphasizes needs assessment, school self-study, and course evaluation.

EDH 6006 The College Student 3 Credits**Grading Scheme:** Letter Grade

Examines the trends and nature of the changing demographic of college student subpopulations, including race, gender, and socioeconomic status. Additionally, the course examines the various educational and societal outcomes associated with college attendance, including intellectual development, psychosocial change, moral development, and career and economic impacts after college.

EDH 6040 Theory of College Student Development 3 Credits**Grading Scheme:** Letter Grade

Examines theoretical perspectives that describe college students' holistic growth in the areas of learning, psychosocial, cognitive-structural, typological, motivational, and moral development. Explores how person-environment interactions affect student learning and development. Explores how to create opportunities for learning and development by applying and critiquing appropriate theory to understand, support, and advocate for students.

EDH 6046 Diversity Issues in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Models, theories, and skills for understanding multicultural students at the postsecondary level.

EDH 6051 Educational Outcomes of American Colleges and Universities 3 Credits**Grading Scheme:** Letter Grade

Exploration of impact of postsecondary educational institutions and barriers to student development.

EDH 6052 Inquiry in College and University Teaching 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Applies the principles of Scholarship of Teaching and Learning (SOTL) to investigate, reflect on, and improve one's own teaching within the context of higher education.

EDH 6053 The Community Junior College in America 3 Credits**Grading Scheme:** Letter Grade

Programs, issues, and problems.

EDH 6065 History of American Higher Education 3 Credits**Grading Scheme:** Letter Grade

focuses on the development of American colleges and universities. Emphasis is placed on the historical natures of institutional types, the history of inclusion and exclusion of people with a variety of identities, and the relevance of historical context to current and emergent professional practice.

EDH 6066 American Higher Education 3 Credits**Grading Scheme:** Letter Grade

History, philosophy, and policies, with emphasis on current practices and problems.

EDH 6305 College and University Teaching 3 Credits**Grading Scheme:** Letter Grade

Contemporary issues, problems, and research related to the role of the college faculty member and the teaching-learning process.

EDH 6306 Coaching Models for Student Success in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Introduces techniques and methods for coaching, mentoring, and supporting student success in higher education, including but not limited to, academic coaching, life/career coaching, and wellness coaching. Explores skills to assess, design, implement, and evaluate effective coaching models and interventions.

EDH 6360 Foundations and Functions of Higher Education and Student Affairs 3 Credits**Grading Scheme:** Letter Grade

Reviews the historical, philosophical, ethical, cultural, and research foundations of higher education and student affairs practice. Examines historical and contemporary documents that state the philosophical foundations and the values of the profession. Explores the understanding of higher education systems through the study of various student affairs functional areas.

EDH 6364 Higher Education Environments 3 Credits**Grading Scheme:** Letter Grade

Examines the effects of the college experience and institutional characteristics on student learning and development. Focuses on how student learning and learning opportunities are influenced by student characteristics and by collegiate environments so that practitioners can design and evaluate learning experiences for students.

EDH 6365 Academic and Student Affairs Collaborations 3 Credits**Grading Scheme:** Letter Grade

Explores high impact partnerships between academic and student affairs that contribute to student learning and retention. Examines student characteristics and institutional contexts that correlate with student persistence to design and evaluate learning experiences for students.

EDH 6503 Resource Development in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Exploration of financial resource development in higher education institutions and organizations.

EDH 6632 Current Issues in Community College Leadership 3 Credits**Grading Scheme:** Letter Grade

Case-based approach to examining current issues on community college campuses.

EDH 6637 Crisis Management in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Introduction to real crisis situations. Students form emergency plans based on different crisis response models.

EDH 6644 Assessment in Higher Education 3 Credits**Grading Scheme:** Letter Grade

The course focuses on the practical application of assessment within higher education and student affairs while maintaining ethical standards. This includes the creation and implementation of assessment efforts; analysis, interpretation, and presentation of results; utilization of existing instruments; and consumption of assessment efforts from colleagues, benchmark institutions, and literature.

EDH 6662 Contemporary Issues in Higher Education Leadership 3 Credits**Grading Scheme:** Letter Grade

Explores contemporary leadership issues facing higher education administrators, including the academic, financial, operational, and governance factors that shape contemporary American higher education.

EDH 6664 Public Policy in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Explores the conceptual and theoretical frameworks used to situate the public policy process in the higher education context. Students will evaluate the effectiveness of policies and will examine the historical and contemporary practices, procedures, and protocols used to address the changing political landscape of American postsecondary education.

EDH 6665 Leadership and Supervision in Higher Education 3 Credits**Grading Scheme:** Letter Grade

This course will explore various aspects of leadership and supervision within the context of the various staffing practices of higher education. Students will be exposed to current theory and research about each topic and will learn how to translate that information to professional practice.

EDH 6668 Change Leadership in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Explores contemporary leadership issues facing higher education administrators, including the academic, financial, operational, and governance factors that shape contemporary American higher education.

EDH 6669 The College Experience: Higher Education in Media and Pop Culture 3 Credits**Grading Scheme:** Letter Grade

Explores how pop culture and various forms of contemporary media influence perceptions and policy decisions that shape American higher education.

EDH 6905 Individual Work 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

For advanced students who wish to study individual problems in higher education administration under faculty guidance.

Prerequisite: Students must have approval of proposed project before registering.

EDH 6931 Special Topics in Higher Education 1-3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Topics in Higher Education

EDH 6935 Capstone Seminar in Student Personnel in Higher Education 3 Credits**Grading Scheme:** S/U

Culminating seminar integrating core curriculum and practitioner experience.

Prerequisite: consent of instructor.

EDH 6947 Practicum in Student Personnel 3 Credits, Max 6 Credits**Grading Scheme:** S/U

Practicum in Student Personnel

Prerequisite: adviser's consent, and written application to practicum coordinator.

EDH 6973 Project in Lieu of Thesis 3 Credits, Max 6 Credits**Grading Scheme:** S/U

Completion of an original project based upon extended study of a topic within the field of higher education. This is the capstone course for students pursuing a non-thesis for the Master's of Arts in Education degree.

Prerequisite: Approval of Program Coordinator/Instructor.**EDH 6981 Introduction to Problems of Practice Inquiry 3 Credits****Grading Scheme:** Letter Grade

Explores approaches to research in real-world higher education settings. This course is designed to help advanced doctoral students connect qualitative, quantitative, and mixed methods approaches with practice-based inquiry to prepare for success with their future dissertation in practice projects.

EDH 7050 Exploration of Research Literature in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Facilitates the selection of significant research topics and preparation of a literature review. This course will familiarize students with the characteristics of the research proposal and help students develop the skills to write an integrative literature review.

EDH 7225 Seminar: Curriculum in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Issues and problems in college and university curricula. Curriculum planning, implementation, and evaluation.

EDH 7405 The Law and Higher Education 3 Credits**Grading Scheme:** Letter Grade

The legal structure of higher education, religion, academic freedom of faculty, employment, due process, students' rights of speech and expression, search and seizure, desegregation, and tort liability.

EDH 7505 The Financing of Higher Education 3 Credits**Grading Scheme:** Letter Grade

Junior college through university. Theoretical basis for use of tax funds for education, student fees and tuition, state methods for financing, planning, cost benefit, budgeting, federal role, and capital outlay.

EDH 7631 Administration of Instruction in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Skills and knowledge for current and future college leaders.

EDH 7634 Student Affairs Administration in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Explores divisional models and administrative functions in the context of diverse institutional types. Analyzes leadership, organizational, and management practices that assist institutions in accomplishing their missions, including content regarding organizational culture and campus politics; budgeting, finance, and resource management; strategic planning; and technology.

EDH 7635 Higher Education Administration 3 Credits**Grading Scheme:** Letter Grade

Educational policies, functions, and practices.

EDH 7636 Organizational Theory in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Evaluates the major theories and practices used to examine higher education institutions and their governing forces from multiple perspectives.

EDH 7645 Data Management and Quantitative Workflow in Education Research 3 Credits**Grading Scheme:** Letter Grade

Students will learn the fundamentals of data management and quantitative research workflow in education research using common open-source tools. Topics include project organization, version control, data cleaning, data visualization, and performing exploratory data analyses. Students will also learn some special coding and/or data gathering techniques and, throughout the course, employ coding best-practices so that their workflow may be shared and easily reproduced.
Prerequisite: Currently enrolled in a doctoral-level degree program or with permission of the instructor.

EDH 7910 Higher Education Research Fieldwork 3 Credits**Grading Scheme:** Letter Grade

Supports students with fieldwork and implementation of research projects, including data access, participant recruitment, data collection, data storage, and appropriate data analysis procedures.

Prerequisite: EDH 7979.**EDH 7916 Contemporary Research on Higher Education 3 Credits****Grading Scheme:** Letter Grade

Examination and analysis of research related to higher education. Implications for application of findings for improvement of colleges and universities.

EDH 7934 Advanced Scholarly Writing for Publication 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Assists Higher Education Administration doctoral students with preparing their dissertations and scholarly publications. Explores how to transform doctoral research into publishable papers and conference presentations by drafting and revising their work with instructor and peer feedback.

Prerequisite: Candidacy**EDH 7942 Supervised Practice in Student Personnel in Higher Education 1 Credit, Max 5 Credits****Grading Scheme:** S/U

Supervised Practice in Student Personnel in Higher Education

Prerequisite: written application to internship coordinator before registration.**EDH 7948 Internship in Higher Education 3 Credits, Max 6 Credits****Grading Scheme:** S/U

Internship in Student Personnel

Prerequisite: adviser's consent; and written application to internship coordinator before registration.**EDH 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EDH 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for doctoral candidates

Prerequisite: Candidacy**EDH 7982 Research Proposal Development in Higher Education 3 Credits****Grading Scheme:** Letter Grade

Provides students with research strategies and writing skills to complete a research proposal in higher education administration.

Prerequisite: EDH 7050.

MHS 5005 Introduction to Counseling 3 Credits**Grading Scheme:** Letter Grade

Focuses on verbal and nonverbal counseling skill development, human relations, identification of client issues, and counseling strategies.

MHS 6020 Counseling in Community Settings 3 Credits**Grading Scheme:** Letter Grade

Counseling in Community Settings

MHS 6061 Spiritual Issues in Multicultural Counseling 3 Credits**Grading Scheme:** Letter Grade

Spiritual/religious/transpersonal issues expressed in counseling from both client and counselor perspective.

MHS 6071 Diagnosis and Treatment of Mental Disorders 3 Credits**Grading Scheme:** Letter Grade

Diagnosis and Treatment of Mental Disorders

Prerequisite: MHS 6401.**MHS 6200 Assessment in Counseling 3 Credits****Grading Scheme:** Letter Grade

Assessment in Counseling

Prerequisite: course in basic statistics.**MHS 6340 Career Development 3 Credits****Grading Scheme:** Letter Grade

Career Development

MHS 6401 Counseling Theories and Applications 3 Credits**Grading Scheme:** Letter Grade

A study of the major counseling theories and exploration of theoretical interventions to facilitate change.

MHS 6421 Play Counseling and Play Process with Children 3 Credits**Grading Scheme:** Letter Grade

Play Counseling and Play Process with Children

Prerequisite: MHS 6401.**MHS 6428 Multicultural Counseling 3 Credits****Grading Scheme:** Letter Grade

Multicultural Counseling

Prerequisite: MHS 6401.**MHS 6430 Introduction to Family Counseling 3 Credits****Grading Scheme:** Letter Grade

Introduction to Family Counseling

MHS 6440 Marriage and Couples Counseling 3 Credits**Grading Scheme:** Letter Grade

Marriage and Couples Counseling

MHS 6450 Substance Abuse Counseling 3 Credits**Grading Scheme:** Letter Grade

Substance Abuse Counseling

MHS 6466 Trauma and Crisis Intervention: Theory and Practice 3 Credits**Grading Scheme:** Letter Grade

Theories and practice models related to trauma and crisis intervention.

MHS 6471 Sexuality and Mental Health 3 Credits**Grading Scheme:** Letter Grade

Sexuality and Mental Health

Prerequisite: MHS 6401.**MHS 6480 Developmental Counseling Over the Life Span 3 Credits****Grading Scheme:** Letter Grade

Overview of human nature/behavior through knowledge of life-span developmental theory, personality development, and learning theory.

MHS 6495 Counseling Lesbian, Gay, Bisexual, and Transgender Clients 3 Credits**Grading Scheme:** Letter Grade

Explores lesbian, gay, bisexual, and transgender (LGBT) identity formation and theory, vocabulary, resources, and developmental life stages.

Prerequisite: (MHS 5005 and MHS 6401) or (EDH 6046 and EDH 6040)**MHS 6500 Group Counseling: Theories and Procedures 3 Credits****Grading Scheme:** Letter Grade

Entry-level knowledge and skills to lead different types of counseling groups.

Prerequisite: MHS 6401.**MHS 6705 Professional, Ethical, and Legal Issues in Marriage and Family Counseling 3 Credits****Grading Scheme:** Letter Grade

Professional, Ethical, and Legal Issues in Marriage and Family Counseling

MHS 6720 Professional Identity and Ethics in Counseling 3 Credits**Grading Scheme:** Letter Grade

Examines the foundations of the counseling profession and the ethical codes that serve as a guide for professional practice.

MHS 6735 Applied Research in Counseling 3 Credits**Grading Scheme:** Letter Grade

Focuses on developing and initiating a counselor education research project that includes constructing a research question, developing a research proposal, and initiating data collection.

MHS 6765 Mindful Living: Spirituality For Everyday Life 3 Credits**Grading Scheme:** Letter Grade

Examines approaches to living a more mindful life. Focuses on the various mental, emotional, physical, and spiritual conditions that arise when confronted with stressful or traumatic situations. Explores various perspectives regarding personal responsibility toward stress management and mindful self-care practices and mindfulness-based techniques to reduce the negative effects of psychological concerns through the application of these methods.

MHS 6831 Supervised Split Internship 3-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Required first enrollment for students participating in internship over two semesters.

Prerequisite: Advisor consent, completion of practicum sequence, and written application to internship coordinator at least 6 weeks before registering.**Corequisite:** MHS 7804 or MHS 7807 or SDS 7820**MHS 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

MHS 6940 Supervised Teaching 0-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

MHS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: MFC_MAE or MHC_MAE or SCG_MAE.**MHS 7407 Advanced Counseling Theories 3 Credits****Grading Scheme:** Letter Grade

Advanced preparation in individual, group, career, multicultural, and ecosystemic (marriage and family) theories of counseling.

Prerequisite: CCE_PHD.

MHS 7431 Advanced Family Counseling 4 Credits**Grading Scheme:** Letter Grade

Advanced Family Counseling

Prerequisite: MHS 6430.**MHS 7600 Consultation Procedures 3 Credits****Grading Scheme:** Letter Grade

Examines consultation models appropriate to education, human services, and the counseling field. Provides a framework to understand the counselor's role as consultant and staffing team member.

Corequisite: registration in practicum or internship.**MHS 7610 Counseling Supervision Theories and Practice 3 Credits****Grading Scheme:** Letter Grade

Focuses on the understanding of supervision theories and the practice of clinical supervision to prepare doctoral students to become Reflective Practitioners of Clinical Supervision.

MHS 7730 Advanced Counseling Research 3 Credits**Grading Scheme:** Letter Grade

Issues in designing and implementing counseling and psychotherapy dissertation research.

Prerequisite: EDF6403 or (EDF6400 & EDF6402).**MHS 7740 Research in Counseling 3 Credits****Grading Scheme:** Letter Grade

Research in Counseling

Prerequisite: MHS 6200.**MHS 7803 Advanced Counseling Practicum 3 Credits****Grading Scheme:** S/U

This course focuses on the development and demonstration of advanced counseling skills, including complex case conceptualization.

Prerequisite: Master's level counseling internship course.**MHS 7804 Group Supervision in Mental Health Counseling 3 Credits, Max 15 Credits****Grading Scheme:** S/U

Provides master's and specialist students in internship or practicum courses with the opportunity to group supervision on a regular schedule that averages 1.5 hours per week by a faculty member or supervised doctoral student per CACREP standards. Students will prepare a case conceptualization using a secure audio or video recording of a client interaction in compliance with applicable institutional, state, federal, and international privacy requirements.

Prerequisite: written application to practicum/internship coordinator at least 6 weeks before registration. ;**Corequisite:** MHS 6831.**MHS 7805 Practicum in Mental Health Counseling 3 Credits****Grading Scheme:** S/U

Provides graduate students the opportunity to demonstrate increased competence in mental health counseling while integrating theory and practice. Students will apply, refine, and synthesize knowledge, technique, and skills learned in the classroom.

Prerequisite: MHS 5005, MHS 6200, MHS 6401, MHS 6500, MHS 6720.**Corequisite:** MHS 6071 and MHS 6430.**MHS 7806 Practicum in Marriage and Family Counseling 3 Credits****Grading Scheme:** S/U

Practicum in Marriage and Family Counseling

Prerequisite: MHS 5005, MHS 6200, MHS 6401, MHS 6500, MHS 6720. ;**Corequisite:** MHS 6071 and MHS 6430.**MHS 7807 Group Supervision in Marriage and Family Counseling 3 Credits, Max 15 Credits****Grading Scheme:** S/U

Group Supervision in Marriage and Family Counseling

Prerequisite: written application to practicum/internship coordinator at least 6 weeks before registration. ;**Corequisite:** MHS 7806; SDS 7830 or MHS 6831.**MHS 7809 Counseling Supervision Practicum 3 Credits****Grading Scheme:** S/U

Builds upon the supervision theories course by focusing on the integration and application of supervision knowledge and skills within an applied counseling supervisory setting to prepare doctoral students to become clinical supervisors.

Prerequisite: MHS 7610.**MHS 7830 Internship in Counseling and Development-600 Hours 6 Credits, Max 18 Credits****Grading Scheme:** S/U

Internship in Counseling and Development-600 Hours

Prerequisite: adviser's consent, completion of all practica required for M.Ed. or Ed.S. degree, and written application to internship coordinator at least 6 weeks before registering.**MHS 7840 Internship 1 in Counselor Education 3 Credits****Grading Scheme:** Letter Grade

The purpose of this course is to understand and obtain experience in the five core domains: (a) counseling and consultation, (b) leadership and advocacy, (c) research and scholarship, (d) supervision, and (e) teaching.

MHS 7941 Internship 2 in Counselor Education 3 Credits**Grading Scheme:** Letter Grade

This course focuses on career development, specifically related to articulating one's specialization area and understanding and preparing for the roles of entering careers in academia and counseling management.

Prerequisite: MHS 7840.**MHS 7946 Internship in Agency Program Management 6 Credits****Grading Scheme:** S/U

Internship in Agency Program Management

Prerequisite: written application to internship coordinator at least 6 weeks before registration. Open only to advanced doctoral students.**MHS 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Designed for students with a master's degree in the field of study or for students who have been admitted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

Prerequisite: research for doctoral students before admission to candidacy.**MHS 7980 Research for Doctoral Dissertation 1-15 Credits****Grading Scheme:** S/U

Research for Doctoral Dissertation

PCO 6939 Seminar: Current Topics in Counseling Psychology 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Emphasis on theoretical background and implications for applied work.

Prerequisite: MHS 6401 or consent of instructor.

PCO 7217 Professional Ethics and Skills in Counseling Psychology 3 Credits**Grading Scheme:** Letter Grade

Professional issues, ethics, relationships, and skills pertaining to practice of counseling psychology.

Prerequisite: graduate student status in counseling psychology or consent of instructor.**PCO 7949 Internship in Counseling Psychology 1 Credit, Max 12 Credits****Grading Scheme:** Letter Grade

Full-time or equivalent work in a university or community agency where counseling functions are carried out under supervision. Open only to students in the counseling psychology program.

Prerequisite: written application to the Counseling Psychology Internship Coordinator.**SDS 6401 Counseling Skills for Non-Counselors 3 Credits****Grading Scheme:** Letter Grade

Counseling skills in dyadic communication and in small groups.

SDS 6411 Counseling with Children 3 Credits**Grading Scheme:** Letter Grade

Focuses on the knowledge base, skills, theories, research, models, and critical issues of counseling children and adolescents.

SDS 6436 Family-School Intervention 3 Credits**Grading Scheme:** Letter Grade

Examines common patterns of family-school interaction and the major types of family-school interventions used to support children's learning and development including school-wide interventions to engage families, parent and teacher case consultation, and family referral for community services.

Prerequisite: MHS 5005, MHS 6401. ;**Corequisite:** SDS 6411.**SDS 6620 Organization and Administration of School Counseling Programs 3 Credits****Grading Scheme:** Letter Grade

Organization and Administration of School Counseling Programs

Prerequisite: SDS 6411.**SDS 6831 Supervision for a Split Internship 3 Credits, Max 6 Credits****Grading Scheme:** S/U

Required first enrollment for students participating in internship over 2 semesters.

Prerequisite: adviser's consent, completion of practicum sequence, and written application to internship coordinator at least 6 weeks before registering. ;**Corequisite:** MHS 7804, MHS 7807, SDS 7820, or 7802.**SDS 6905 Individual Work 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual Work

Prerequisite: approval of proposed project.**SDS 6936 Seminar in Counselor Education 3 Credits****Grading Scheme:** Letter Grade

Seminar in Counselor Education

Prerequisite: CCE_PHD.**SDS 6938 Special Topics 1-4 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Special Topics

Prerequisite: consent of department chair.**SDS 7800 Practicum in School Counseling 3 Credits****Grading Scheme:** S/U

Practicum in School Counseling

Prerequisite: SDS 6411; adviser's consent; and written application to practicum coordinator at least 6 weeks before registration. ;**Corequisite:** MHS 5005, MHS 6401, MHS 6421, MHS 6720.**SDS 7820 Group Supervision in School Counseling 3 Credits, Max 5 Credits****Grading Scheme:** S/U

Practice, critically apply, refine, and synthesize knowledge, technique, and skills learned in the counselor preparation.

Prerequisite: written application to practicum/internship coordinator at least 6 weeks before registration.;**Corequisite:** SDS 7800 or SDS 7830 or MHS 6831.**SDS 7830 Internship in Counseling and Development-600 Hours 6 Credits, Max 18 Credits****Grading Scheme:** S/U

Internship in Counseling and Development-600 Hours

Corequisite: MHS 7804 or MHS 7807 or SDS 7820.

Education, School of Special Education, School Psychology and Early Childhood Studies

EEC 6205 Early Childhood Curriculum 3 Credits**Grading Scheme:** Letter Grade

Students develop and/or implement instructional strategies consistent with their personal philosophies of early childhood education.

EEC 6304 Creativity in the Early Childhood Curriculum 3 Credits**Grading Scheme:** Letter Grade

Techniques for teaching all areas of the early childhood curriculum to support the development of children's creativity with an emphasis on art and music.

EEC 6326 Social and pre-academic instructional methods for young children 3 Credits**Grading Scheme:** Letter Grade

Social and Pre-Academic Instructional Methods for Young Children is designed to expose students to evidence-informed intervention methods to address the needs of young children who are at risk for or have disabilities and their families.

EEC 6405 Families as a Context in Early Childhood Studies 3 Credits**Grading Scheme:** Letter Grade

Explores the knowledge and skills necessary to form partnerships with families and how the family unit functions within the context of early childhood development and learning. Connections between theory and application of family capacity building will be identified through a developmental equity lens.

Prerequisite: Graduate level student in good academic standing.**EEC 6419 Families, Disabilities, and Diversity 3 Credits****Grading Scheme:** Letter Grade

Provides for the study of familial and ecological factors affecting families of young children who are receiving early childhood intervention services. The course focuses on the development and implementation of evidence-based services for families and children. Cultural and linguistic diversity is also a focus.

EEC 6525 Issues in Child Care Administration 3 Credits**Grading Scheme:** Letter Grade

Child care background, curriculum, organization, staffing, training of staff, parent education and involvement, funding, and research.

EEC 6615 Early Childhood Education: Background and Concepts 3 Credits**Grading Scheme:** Letter Grade

Trends in the teaching of nursery and kindergarten children as shown in past and current educational theory.

EEC 6636 Examining Practices, Policies, and Key Issues in Early Childhood Policy 3 Credits**Grading Scheme:** Letter Grade

Provides a thorough overview of the pedagogy, practices, policies, and issues framing the design and delivery of contemporary ECEC. Central to such formulations, the role of parents and families is addressed as a critical contouring variable. Designed in three units, the course addresses: (i) understanding early childhood education and care practice and policy in the US; (ii) identifying critical policy challenges; and (iii) addressing critical policy challenges.

EEC 6665 History, Child Development, and Equity in Early Childhood Policy 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of the developmental science that informs policy and program development; social, political and economic forces that shape the study of young children and contribute to developmental trajectories with an emphasis on equity; changing roles of families; and implications of these issues for policies affecting young children.

EEC 6667 Theory and Analysis in Early Childhood Policy 3 Credits**Grading Scheme:** Letter Grade

Provides an interdisciplinary perspective on early childhood education and care (ECEC) policy, focusing on the systematic study, analysis, and interpretation of policy. Designed to help students understand the role of policy analysis in the policy process, and to explore theoretical frames used in ECEC policy discourse.

EEC 6818 Assessment and Evaluation in Early Childhood Settings 3 Credits**Grading Scheme:** Letter Grade

Students will explore topics related to assessment, measurement, and evaluation as they apply to early childhood development and learning for infants, toddlers, preschoolers, and children in the early grades. Principles and recommended practices related to assessment and how to evaluate assessment instruments in early childhood care and education settings will be addressed through a developmental equity lens.

Prerequisite: Graduate level student in good academic standing.**EEC 6905 Individual Work 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual study conducted under the supervision of a faculty member.

Prerequisite: Consent of department chair, approval of proposed project, and completion of at least 9 hours of graduate work.**EEC 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

EEC 6933 Special Topics 1-12 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Selected topics in the theory and practice of early childhood education not included in the established curriculum.

Prerequisite: Consent of instructor.**EEC 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

Prerequisite: consent of instructor.**EEC 7056 Early Childhood Policy and Advocacy 3 Credits****Grading Scheme:** Letter Grade

Focuses on understanding, analyzing, and evaluating early childhood policies at federal, state, and local levels and internationally. Analyzes relationships among early childhood policies, research, and practices.

Prerequisite: Intended for doctoral students only**EEC 7617 Early Childhood Assessment & Evaluation 3 Credits****Grading Scheme:** Letter Grade

Doctoral students will explore in depth the role of assessment and evaluation in research, practice, and policy as it relates to the field of early childhood studies.

Prerequisite: EDF 6400 and EDF 6402; or EDF 6403; or consent of instructor**EEC 7666 Theory and Research in Early Childhood Studies 3 Credits****Grading Scheme:** Letter Grade

Reading, evaluating, synthesizing, and discussing early childhood theory and applied early childhood research. Discussions of commonly encountered issues related to the ethical conduct of research in applied contexts.

Prerequisite: Intended for doctoral students; permission of instructor.**EEC 7979 Advanced Research 1-12 Credits, Max 12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy.

Prerequisite: Designed for students with a masters' degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.**EEC 7980 Research for Doctoral Dissertation 1-15 Credits****Grading Scheme:** S/U

Research for Doctoral Dissertation

EEX 6053 Foundations of Special Education 3 Credits**Grading Scheme:** Letter Grade

Providing an overview of special education, students with disabilities, and students at risk of being identified with disabilities including those who are culturally or linguistically diverse or otherwise disadvantaged. It is appropriate for students preparing to work in high need schools, inclusive settings, and school programs serving K-12 students. Advanced issues in identification of students with disabilities and delivery of services to meet their academic, developmental, and functional needs.

EEX 6056 Foundations of Special Education 2 3 Credits**Grading Scheme:** Letter Grade

Examines foundations of special education practices as it relates to identification, assessment, instruction, and intervention practices for students with disabilities. Covers implementation of multi-tiered systems of support (MTSS), Individualized Education Program (IEPs), high leverage practices (HLPs), evidence-based practices (EBPs), and culturally responsive teaching (CRT) in supporting diverse students. Content will focus on using principles of UDL as the foundation for inclusive practices.

Prerequisite: EEX 6053.

EEX 6058 Family and Teacher Perspectives on Disability 3 Credits**Grading Scheme:** Letter Grade

Addresses issues related to culturally reciprocal collaboration between families and teachers of students with disabilities. We will explore the ways human disability and parental/family advocacy have been constructed in the US, as well as issues and practices related to building collaboration based in culturally informed paradigms. Students will investigate important literature related to the motivations and goals that drive disability advocacy within schools and adjacent systems.

Prerequisite: EEX 7304.**EEX 6072 Accessing Academic and Social Communities for Students with Disabilities 3 Credits****Grading Scheme:** Letter Grade

Information and expertise related to meeting effectively academic and social needs of full range of students in inclusive settings.

EEX 6099 Social Perspectives on Disability 3 Credits**Grading Scheme:** Letter Grade

Provides a framework for understanding disabilities and disability-related issues within societal contexts. It examines (1) historical and contemporary views of people with disabilities, (2) disability-related issues with respect to education, inclusion, and advocacy, and (3) perceptions of people with disabilities with respect to acceptance and inclusion in society.

EEX 6125 Interventions for Language and Learning Disabilities 3 Credits**Grading Scheme:** Letter Grade

Language development and disorders and their impact on learning for students with (or at risk for) disabilities. Classroom-based intervention strategies for promoting language and literacy development.

EEX 6135 Foundations of Literacy Development and Dyslexia 3 Credits**Grading Scheme:** Letter Grade

Addresses the critical components of literacy development and introduces participants to the nature and needs of students with dyslexia. The focus is on the effects of dyslexia on learning to read and write. The course will also address the historical development of the field, relevant laws, and policies.

EEX 6136 Dyslexia: Language and the Brain 3 Credits**Grading Scheme:** Letter Grade

Addresses dyslexia's neurobiological origins, its effect on language and literacy development, and the variations in the processing and development of the various elements of language and literacy among students with and without dyslexia. The course also addresses linguistic structures of and historical influences on the English language.

Prerequisite: EEX 6135**EEX 6137 Dyslexia: Assessment for Intervention 3 Credits****Grading Scheme:** Letter Grade

Addresses the principles and practices of effective assessment for students with dyslexia, including the various purposes of assessment, the psychometric properties of high-quality assessment tools, and issues related to test administration. Students will identify effective assessment tools, develop informal assessment procedures, and interpret assessment data to design intervention.

Prerequisite: EEX 6135 and EEX 6136.**EEX 6138 Dyslexia: Methods for Intervention 3 Credits****Grading Scheme:** Letter Grade

Addresses principles and practices of evidence-based literacy intervention for students with dyslexia, including the stages of literacy development, the varied challenges that students may encounter as they develop literacy, effective intervention in various components of literacy, and the issues involved in designing a comprehensive literacy intervention program.

Prerequisite: EEX 6135 and EEX 6136.**EEX 6219 Reading Assessment and Intervention for Students with Disabilities 3 Credits****Grading Scheme:** Letter Grade

The reading process and dyslexia; particularly the special educator's role in preventing and remediating reading disabilities.

EEX 6222 Evaluation in Special Education 3 Credits**Grading Scheme:** Letter Grade

Issues and practices related to educational assessment of students with special needs.

Prerequisite: or coreq: prior experience with exceptional students; introductory courses in measurement, statistics.

Corequisite: undefined**EEX 6233 Fundamentals of Academic Assessment and Intervention 3 Credits****Grading Scheme:** Letter Grade

Provide theoretical background and practical strategies for teaching academic content to students with disabilities affecting academic performance. Focus on addressing needs of a range of learners through use of evidence-based practices for assessment and intervention. Evidence-based classroom practices and universal design for learning will be addressed for each academic area (e.g., reading, writing, mathematics, content instruction).

Prerequisite: admission to graduate status.**EEX 6266 Strategies for Teaching and Learning 3 Credits****Grading Scheme:** Letter Grade

Examines research-validated teaching strategies for students with and without disabilities. Emphasizes developing a strategic environment for instruction and learning. Participants will demonstrate ability to apply strategic instructional methods with students with learning needs and in inclusive classrooms.

Prerequisite: Students must be admitted into a master's program in the College of Education.

EEX 6290 Mathematics Assessment and Instruction for Struggling Learners 3 Credits**Grading Scheme:** Letter Grade

Designed for educators who teach or co-teach mathematics to elementary, middle, or high school students with disabilities and/or struggling learners in a variety of instructional settings (e.g., inclusive classrooms, resource rooms, self-contained classrooms). Educators will explore current research on the nature of mathematics learning and examine a variety of assessment and instructional strategies for students who struggle to learn math well.

Prerequisite: Graduate status or consent of instructor.**EEX 6296 Differentiated Instruction 3 Credits****Grading Scheme:** Letter Grade

Provides teachers, administrators, and other professionals with information and expertise related to differentiating instruction to effectively meet the academic needs of the full range of students in their schools in inclusive settings.

Prerequisite: graduate status or consent of instructor.

EEX 6308 Single Subject Research Design 3 Credits**Grading Scheme:** Letter Grade

Focused on execution of single-case design research within the context of the p-12 educational setting. Will be offered on a regular rotating schedule to graduate students within and outside of the COE. To minimize conflict of interest, approval from programs offering methodology courses akin to this course have been obtained.

Prerequisite: Be enrolled in a graduate program.**EEX 6347 Meta-Analysis in Prevention and Intervention Science 3 Credits****Grading Scheme:** Letter Grade

This course will provide (a) an overview of meta-analysis in the identification of evidence-based prevention and intervention practices, (b) practical, hands-on training and experience conducting meta-analytic analyses, and (c) an opportunity to conduct a meta-analysis in the prevention and intervention science field.

Prerequisite: Must be graduate student to take course.**EEX 6525 Disability Related Policy and Legislation 3 Credits****Grading Scheme:** Letter Grade

Covers the development and enactment of laws and policies designed to protect the rights of persons with disabilities including the Americans with Disabilities Act and other significant legislation. Students will review recent and pending court cases that affect various aspects of adult life for persons with disabilities.

Prerequisite: None**EEX 6640 Prevention in Practice: MTSS & PBIS 3 Credits****Grading Scheme:** Letter Grade

This course covers the historical, legal, and theoretical foundations of a Multitiered Systems of Support (MTSS) approach in schools, the evidence bases for and against this approach and supports students in developing their own positions for or against advancing the MTSS model. Additionally, the course covers the application of the framework known as Positive Behavioral Interventions and Supports (PBIS), a successful application of MTSS that applies the concepts of PBS to schools (pre-k-12).

EEX 6661 Fundamentals of Behavior Assessment and Intervention 3 Credits**Grading Scheme:** Letter Grade

Overview of behavioral assessment and intervention within K-12 school contexts. Examines remedial programs for children/youth with behavioral needs and issues related to emotional/behavioral problems within school contexts. Focus on structuring individualized and group strategies/techniques for teaching and for understanding and changing behavior using psychoeducational assessment data.

EEX 6745 Historical and Theoretical Foundations of Disability in Education 3 Credits**Grading Scheme:** Letter Grade

This course addresses the evolution of public policy, theoretical perspectives, and professional practice in the education of individuals with disabilities. Topics include influential individuals, historical events, social systems, and political movements.

EEX 6750 Families and Transition for Students with Disabilities 3 Credits**Grading Scheme:** Letter Grade

Information and strategies for using family-centered approach to planning and implementing transitions for students with disabilities.

EEX 6778 Community and Work Access for Individuals with Disabilities 3 Credits**Grading Scheme:** Letter Grade

Covers aspects of the community, work and postsecondary education experience for adults with disabilities. Potential concerns of employers, co-workers and friends will be addressed. Effective practices that foster accepting and supporting environments thus ensuring successful life outcomes for adults with disabilities will be discussed.

EEX 6786 Collaborative Practice in Inclusive Schools 3 Credits**Grading Scheme:** Letter Grade

Collaboration, transition planning, and professional development for serving children and youths with disabilities.

EEX 6841 Practicum in Special Education: Mild Disabilities 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Providing opportunities for practical experiences with K-12 students identified with disabilities or other learning and/or behavior problems. Students will select, design, and/or implement assessment and instructional strategies intended to improve learning outcomes for struggling learners.

Prerequisite: Admission to graduate status in special education**EEX 6855 Dyslexia: Practicum in Dyslexia Assessment and Intervention 3 Credits****Grading Scheme:** Letter Grade

Students apply foundational knowledge about reading, dyslexia, language and the brain, and the principles of effective assessment and intervention as they implement evidence-based practices for students with dyslexia. Students also apply what they have learned to effect change their local settings. This is the culminating course in the certificate sequence.

Prerequisite: EEX 6137 and EEX 6138**EEX 6863 Supervised Practice in Special Education 1-6 Credits, Max 6 Credits****Grading Scheme:** S/U

Supervised teaching in selected school settings designed to serve children and youths who have been classified as having behavioral and/or learning problems. Seminars and continuous evaluation of teaching experiences.

Prerequisite: Approval of special education faculty and Office of Student Services**EEX 6905 Individual Work 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual Work

Prerequisite: consent of department chair, approval of proposed project, and completion of at least 9 hours of graduate work.**EEX 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

EEX 6930 Seminar in Disabilities 3 Credits**Grading Scheme:** Letter Grade

Designed for students to develop a summary project based on the integration of supporting individuals with disabilities in the workplace, postsecondary education, community, and life. Students will develop individual projects.

Prerequisite: Completion of the following courses: EEX 6099 and EEX 6778.

EEX 6936 Special Topics 1-3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Topics

Prerequisite: consent of department chair.**EEX 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

EEX 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

EEX 6973 Project in Lieu of Thesis 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

A project-in-lieu-of-thesis (PILOT) is for students whose career goals are applied. With a faculty advisor, students develop a PILOT which is based on critical examination of research and theoretical frameworks in the discipline. It may involve the development, implementation or evaluation of technology, curriculum materials, or intervention.

Prerequisite: Intended for students who have completed their first year of study.**EEX 7303 Inquiry in Special Education: Analysis of the Literature 3 Credits****Grading Scheme:** Letter Grade

This course addresses methods for reviewing and critiquing special education research literature using rigorous systematic review methods. Topics include developing and refining research questions, search resources and techniques, screening and selecting primary studies using explicit and reproducible criteria, information management, choosing a synthesis approach, and interpreting and communicating findings.

Prerequisite: EDF 6403.**EEX 7304 Introduction to Field of Inquiry in Special Education 3 Credits****Grading Scheme:** Letter Grade

Acquisition, organization, and interpretation of information about research. Nature of inquiry and process of generating questions about a broad array of disability-related research topics. Critical analysis of research outcomes.

Prerequisite: EDF 6403; coreq: EDF 6475.**Corequisite:** undefined**EEX 7305 Applied Research in Special Education 3 Credits****Grading Scheme:** Letter Grade

Provides students with an integrated exploration of theoretical and pragmatic underpinnings of applied research in school and community settings that serve individuals with disabilities. Students will apply a systematic approach to problems of practice in their fields by developing a research prospectus aimed at meaningfully improving the lives of individuals with disabilities.

Prerequisite: EEX 6745.**EEX 7526 Grant Writing Seminar in Education 3 Credits****Grading Scheme:** Letter Grade

Developing basic skills in writing grant proposals for research, training, and/or model demonstration.

EEX 7787 School Improvement for All Students 3 Credits**Grading Scheme:** Letter Grade

Seminar addressing research and professional literature on changing schools to improve academic and behavioral outcomes for all students.

Prerequisite: advanced graduate status or consent of instructor.**EEX 7934 Seminar: Trends in Special Education 3 Credits****Grading Scheme:** Letter Grade

Emphasis on trends in special education and future considerations for research, and local, state, and federal priorities.

Prerequisite: admission limited to advanced degree students in special education.**EEX 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EEX 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EEX 7981 Inquiry in SPED: Proposal Dev 3 Credits**Grading Scheme:** Letter Grade

This course will prepare advanced doctoral students to generate research questions linked to the empirical literature and design a study using appropriate methodology within the context of special education research.

Prerequisite: EEX 7303 and EEX 7304.**SPS 5000 Introduction to Psychoeducational Assessment 3 Credits****Grading Scheme:** Letter Grade

Comprehensive overview of the field of psychological testing and assessment, with emphasis on the basic psychometric concepts and principles underlying test development and use, major uses of psychological tests and other tools of assessment in school, clinical, counseling, business, and other settings, and historical, fairness, and legal/ethical context of assessment.

SPS 6052 Issues and Problems in School Psychology 3 Credits**Grading Scheme:** Letter Grade

History and foundations of school psychology; legal and ethical. Overview of the role and functions of the school psychologist.

Corequisite: SPS 6941.**SPS 6191 Psychoeducational Assessment I 3 Credits****Grading Scheme:** Letter Grade

Techniques for assessing intelligence, adaptive behavior, and achievement of children and school-aged adolescents. Emphasizes standardized instruments.

SPS 6192 Psychoeducational Assessment II 3 Credits**Grading Scheme:** Letter Grade

Techniques for assessing the social and emotional functioning of the school-aged child; supervised experience in assessment and report writing.

Prerequisite: SPS 6191;**Corequisite:** SPS 6941.**SPS 6193 Academic Assessment & Intervention 3 Credits****Grading Scheme:** Letter Grade

Assessment approaches and intervention strategies for students experiencing academic difficulties.

SPS 6195 Developmental Psychopathology 3 Credits**Grading Scheme:** Letter Grade

Overview of developmental psychopathology and its relationship to diagnosis and intervention for children and adolescents.

SPS 6197 Psychoeducational Assessment III 3 Credits**Grading Scheme:** Letter Grade

Synthesis of sources and techniques of psychoeducational assessment for school-related application and problems.

Prerequisite: SPS 6191;**Corequisite:** SPS 6941.**SPS 6410 Direct Interventions I: Applied Behavior Analysis for School Psychologists 3 Credits****Grading Scheme:** Letter Grade

Theory and research of applied behavior analysis for school psychologists to provide systematic assessment and treatment.

Corequisite: SPS 6941.**SPS 6707 Interventions in School Psychology II: Cognitive Behavioral Interventions 3 Credits****Grading Scheme:** Letter Grade

Theory and practice of cognitive behavior.

Prerequisite: SPS 6410.**SPS 6708 Interventions in School Psychology III: System Level Interventions for Children and Youths 3 Credits****Grading Scheme:** Letter Grade

Theory, empirical research, and clinical issues related to primary prevention and crisis intervention.

Prerequisite: SPS 6707.**SPS 6815 Law and Ethics in Psychology 3 Credits****Grading Scheme:** Letter Grade

Knowledge of laws and ethics that impacts psychological practice with emphasis on children and schools.

SPS 6905 Individual Study 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual Study

SPS 6918 Supervised Research 1-5 Credits**Grading Scheme:** S/U

Supervised Research

SPS 6937 Special Topics in School Psychology 1-3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Topics in School Psychology

Prerequisite: consent of instructor.**SPS 6941 Practicum in School Psychology 1-4 Credits, Max 8 Credits****Grading Scheme:** S/U

Practicum in School Psychology

Prerequisite: consent of instructor.**SPS 6942 School Psychology Practicum II 1-6 Credits, Max 6 Credits****Grading Scheme:** S/U

Practicum focused on linking assessment and intervention.

Prerequisite: SPS 6941.**SPS 6945 Advanced Practicum in School Psychology 1-6 Credits****Grading Scheme:** S/U

Advanced practicum focused on complex case management, specialization area practice, and peer supervision.

Prerequisite: SPS 6941 and SPS 6942.**SPS 6948 Supervised Teaching 1-5 Credits****Grading Scheme:** S/U

Supervised Teaching

SPS 7205 School Psychology Consultation 3 Credits**Grading Scheme:** Letter Grade

Concepts, processes, and issues related to the practice of school-based consultation as an intervention technique of school psychologists.

Corequisite: SPS 6941.**SPS 7931 Seminar in School Psychology 1-3 Credits, Max 3 Credits****Grading Scheme:** Letter Grade

Issues pertinent to the professional practice of school psychology.

Prerequisite: consent of instructor.**SPS 7949 Internship in School Psychology 3-6 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Internship in School Psychology

Prerequisite: consent of instructor.**SPS 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Advanced Research

SPS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for doctoral students after admission to candidacy.

Prerequisite: Admission to candidacy.

Education, School of Teaching and Learning

EDE 5940 Integrated Teaching and Learning 3 Credits**Grading Scheme:** Letter Grade

Student interns develop general pedagogical competencies and skills necessary to successful teachers.

Prerequisite: admission to the master's certification program in elementary education plus 15 credits, EDF 6113, and RED 5316 or RED 5355.**EDE 6266 Teaching and Learning in Elementary Classrooms 3 Credits****Grading Scheme:** Letter Grade

Introduction to the program.

Prerequisite: admission to the master's certification program in elementary education.**EDE 6325 Teacher Inquiry/Action Research 3 Credits****Grading Scheme:** Letter Grade

Purpose, goals, and processes of teacher inquiry and application of this methodology in the classroom.

Prerequisite: EDE 6948.**EDE 6905 Individual Work 1-5 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

For advanced students who wish to study individual problems in childhood education and/or early childhood education under faculty guidance.

EDE 6948 Internship in Elementary Schools 1-12 Credits, Max 12 Credits**Grading Scheme:** S/U

Supervised teaching in elementary grades K-6.

Prerequisite: consent of the department.**EDE 7047 Issues in Teacher Education 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Current issues and theory in teacher education and teacher education reform.

EDF 5552 Role of School in Democratic Society 3 Credits**Grading Scheme:** Letter Grade

Common conceptions of democracy, equality, freedom, liberty, and equality and what these conceptions imply for educational aims and practice.

EDF 6520 History of Education 3 Credits**Grading Scheme:** Letter Grade

Salient issues in education from the Reformation to the present.

EDF 6544 Philosophical Foundations of Education 3 Credits**Grading Scheme:** Letter Grade

Philosophical bases for democracy and education.

EDF 6616 Education and American Culture 3 Credits**Grading Scheme:** Letter Grade

Graduate-level introduction to the social foundations of education (history, philosophy, and sociology).

EDF 6636 Theorizing Race and Racism in Educational Research 3 Credits**Grading Scheme:** Letter Grade

Keeping with the diverse traditions of racial thought, this course explores several critical theorizations of race prominently featured in educational research, analyzes neglected theorizations from the East and Global South, traces the socio-historical foundations of various theorizations of race, and applies racial theories to frame educational inequities.

Prerequisite: Admission to a graduate program or instructor/department permission.

EDF 6639 Anti-Black Racism in Education 3 Credits**Grading Scheme:** Letter Grade

Using an antiracist approach, this class seeks to help students engage in the active process of identifying racism in educational spaces. By exploring how to change systems, organizational structures, policies and practices, and attitudes, students will interrogate racism, white supremacy, power, and privilege within educational institutions, classrooms, and teaching practices.

EDF 6812 Comparative Education 3 Credits**Grading Scheme:** Letter Grade

Relationships of school and society in different cultural areas of the world.

EDF 6866 Education in Latin America 3 Credits**Grading Scheme:** Letter Grade

This interdisciplinary graduate seminar situates sociopolitical theory and praxis as a proxy for examining education in Latin America. The course also examines the role of social movements and their impacts on current educational practice and policy throughout Latin America.

EDF 6939 Critical Race Theory in Educational Research 3 Credits**Grading Scheme:** Letter Grade

This doctoral research seminar offers a conceptual understanding of the legal underpinnings of critical race theory, its foundations in and methodological application to educational research, and an evaluation of critical race theory's tensions in educational research.

Prerequisite: Admission to a graduate program or instructor/department permission.

EDF 7934 Seminar in Educational Foundations 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Advanced study in historical, philosophical, social, and comparative foundations.

EDG 5666 Knowing and Learning in Secondary Schools 3 Credits**Grading Scheme:** Letter Grade

Examines theoretical basis for the processes of knowing and learning in disciplines that are taught in secondary schools, supporting development of appropriate instructional strategies. Topics include knowledge and memory structure, early learning foundations, problem solving, reasoning, regulatory processes, representation, and how symbolic thinking emerges from the learner's community.

EDG 6017 Writing for Academic Purposes 3 Credits**Grading Scheme:** Letter Grade

Enhancing the capacity of doctoral students from all academic disciplines to write for academic purposes. Focusing on exploring the ways in which language is used as a creative resource for presenting information, structuring text, embedding perspectives, developing arguments, referencing sources, and addressing audience needs in academic writing.

EDG 6047 Teacher Leadership for Educational Change 3 Credits**Grading Scheme:** Letter Grade

Understanding teachers' roles in the educational change and improvement process.

EDG 6207 Transforming the Curriculum 3 Credits**Grading Scheme:** Letter Grade

Design more rigorous and engaging curriculum leading to increased student understanding and mastery of subject matter. Examine different ways of assessment.

Prerequisite: EDE 6325.

EDG 6226 Foundations of Research in Curriculum & Instruction 3 Credits**Grading Scheme:** Letter Grade

Introduction to research in curriculum and instruction, scholars in the field, and expectations of the professoriate. Students will explore Boyer's domains of scholarship that serve as a framework for STL doctoral programs.

EDG 6228 Qualitative Research for Practitioner Scholars 3 Credits**Grading Scheme:** Letter Grade

A collaborative exploration of qualitative research in curriculum, teaching, and teacher education. This course is designed specifically for practitioner scholars who remain in their educational contexts and design research to improve those settings.

EDG 6229 Qualitative Research in Curriculum and Instruction 3 Credits**Grading Scheme:** Letter Grade

Provides Curriculum and Instruction graduate students with methods for collecting and analyzing data for qualitative research in educational settings. Students will develop and engage with various techniques for coding, analyzing, and representing qualitative data such as interview, observation, and video data.

Prerequisite: EDG 6226 with a minimum grade of C.

EDG 6305 Multiple Perspectives on Teaching and Learning 3 Credits**Grading Scheme:** Letter Grade

Graduate seminar designed to provide a survey of major theoretical perspectives on learning and instruction, including classical and contemporary theories as well as emerging views.

EDG 6348 Instructional Coaching for Enhanced Student Learning 3 Credits**Grading Scheme:** Letter Grade

This course is designed as a graduate study of instructional coaching, a form of job-embedded professional development focused on improving teaching practice in order to improve student learning. It is designed for educators at all levels and in all roles.

EDG 6356 Teaching, Learning and Assessment 3 Credits**Grading Scheme:** Letter Grade

Historical and in-depth exploration of assessment practices related to curricular issues.

EDG 6378 Learning Science with Technology 3 Credits**Grading Scheme:** Letter Grade

Studies the integration of technology into the learning and teaching of science in grades 7-12. The course addresses the use of a broad range of technology to investigate theoretical principles and models of learning and teaching, available tools, practical applications, and relevant literature.

EDG 6415 Culturally Responsive Classroom Management 3 Credits**Grading Scheme:** Letter Grade

Examines the role culture plays in teaching and learning. Explores what is needed to establish a culturally responsive classroom in which all students can succeed.

EDG 6445 Meeting the Educational Needs of Students Living in Poverty 3 Credits**Grading Scheme:** Letter Grade

Enhancing knowledge of the impact of poverty on children, and improve their instructional and management strategies to better meet the needs of children living in poverty.

EDG 6648 Research Design in Curriculum and Instruction 3 Credits**Grading Scheme:** Letter Grade

Examines research design in curriculum and instruction, including study planning, research design and method, data collection, ethics and rigor. Students will create a research proposal specific to their area of interest in the broad field of education.

Prerequisite: Admission in a graduate program in Curriculum & Instruction. EDG6648

EDG 6664 Survey of Research on STEM Education 3 Credits**Grading Scheme:** Letter Grade

Intended to develop an understanding of the existing research on STEM education. Students will explore the relationships among the complex and multidisciplinary nature, contemporary perspectives, methodologies and methods that are being used to address compelling questions related to curriculum, instruction, learning, and policy.

EDG 6668 Teaching Adults 3 Credits**Grading Scheme:** Letter Grade

This course explores theory and practice related to teaching adult learners. We will study theories of adult learning, principles of teaching adults, and beliefs and practices of exemplary instructors. Students will also consider the aims of teaching in higher education and other settings where adults learn.

Prerequisite: Admission to a graduate program or permission of the instructor/department.

EDG 6805C K-12 Computer Programming Foundations I 3 Credits**Grading Scheme:** Letter Grade

Introduces the principles and practices of object-oriented (OO) programming and procedural programming, and the evolution of hardware, software, and networking technologies as they apply to K-12 education

EDG 6806C K-12 Computer Programming Foundations II 3 Credits**Grading Scheme:** Letter Grade

This second course in a two-part series introduces the principles and practices of software design, basic data structures, and the historical and social aspects of computer science, as it relates to K-12 education

Prerequisite: EDG 6805C.

EDG 6807 Issues and Trends in K-12 Computer Science Education 3 Credits**Grading Scheme:** Letter Grade

Explores current and emerging issues and trends impacting K-12 computer science education. Students will critically examine these areas in light of historical trends, social implications, and the future of CS education. The courses will explore relevant educational theories as well as topics such as social justice, accessibility, and the varying roles of teachers and students in current CS educational approaches.

Prerequisite: ETE 6141 and EDG 6805C.

EDG 6905 Individual Work 1-6 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

For advanced students who wish to study individual problems under faculty guidance.

Prerequisite: student must have approval of proposed project before registering.

EDG 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

EDG 6930 Schooling & the Marginalization of Students 3 Credits**Grading Scheme:** Letter Grade

Examines the marginalization of vulnerable student populations, which results in high dropout rates and frequent placement of students in the school-to-prison pipeline. Building upon an examination of the connections between theory, practice, student experiences, and policy, this course will support a deep understanding of issues and potential solutions to alleviate the marginalization of children and develop ways to successfully engage all K-12 students.

EDG 6931 Special Topics 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Topics

Prerequisite: consent of instructor.

EDG 6940 Supervised Teaching 1-5 Credits, Max 2 Credits**Grading Scheme:** S/U

For graduate students serving as teaching assistants under the supervision of a faculty member.

Prerequisite: adviser's consent.

EDG 6953 TLSI Online Portfolio Preparation 1-3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Development of portfolio artifacts. Preparation for defense of program portfolio.

Prerequisite: EDE 6325.

EDG 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

EDG 6973 Project in Lieu of Thesis 1-9 Credits**Grading Scheme:** S/U

Developing, testing, and evaluating original educational technology, curricular materials, or an intervention program.

EDG 7224 Critical Pedagogy 3 Credits**Grading Scheme:** Letter Grade

Core concepts and practice of critical educational theory.

EDG 7252 Perspectives in Curriculum, Teaching, and Teacher Education 3 Credits**Grading Scheme:** Letter Grade

Issues related to curriculum, teaching, and teacher education.

EDG 7303 Teacher Learning and Socialization in High Poverty Schools 3 Credits**Grading Scheme:** Letter Grade

Explores theory and research related to teacher learning, focusing on high-poverty schools.

EDG 7359 Professional Development and Teacher Learning 3 Credits**Grading Scheme:** Letter Grade

Examining teacher learning within professional development, the essential elements of high quality professional development, how to measure the impact of professional development, and multiple ways in which professional development is being played out in the district, state, and national contexts.

EDG 7365 Practitioner Research: Data Collection and Analysis 3 Credits**Grading Scheme:** Letter Grade

Graduate students will continue to cultivate the skills of scholarship through advanced study of practitioner research and its utility within their daily work as educators. Multiple data collection and analysis processes will be explored through experiential learning.

Prerequisite: EDG 7982 – Practitioner Research: Theory and Practice or Instructor approval.**EDG 7941 Field Experience in Curriculum and Instruction 1-4 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Supervised experiences appropriate to the student's professional goals.

Prerequisite: open only to advanced graduate students.**EDG 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EDG 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EDG 7982 Practitioner Research: Theory & Practice 3 Credits**Grading Scheme:** Letter Grade

Develops a strong theoretical understanding of the purposes of practitioner inquiry, as a form of educator professional development, while helping students to translate this knowledge into practices that support school improvement.

Prerequisite: Intended for doctoral students.**EME 5054 Foundations of Educational Technology 3 Credits****Grading Scheme:** Letter Grade

History, foundations, and literature in educational technology.

Prerequisite: consent of instructor.**EME 5207 Designing Technology-Rich Curricula 3 Credits****Grading Scheme:** Letter Grade

Extensive work in curriculum development utilizing instructional technologies. Contrasting views of curriculum development.

EME 5404 Instructional Computing II 3 Credits**Grading Scheme:** Letter Grade

Overview of educational technologies in teaching and learning. Developing meaningful and engaging learning environments that foster critical inquiry in students.

Prerequisite: The prerequisite is acceptance to a UF graduate or certificate program or approval from the program coordinator.**EME 5405 Internet in K-12 Instruction 3 Credits****Grading Scheme:** Letter Grade

Preparing preservice teachers, in-service teachers, and teacher educators to use the Internet.

Prerequisite: Acceptance to a UF graduate program or certificate.**EME 6059 Blended Learning Environments 3 Credits****Grading Scheme:** Letter Grade

Exploring blended learning from perspectives of theory and practice. The course is designed for educators and instructional designers in K-12, higher education, corporate environments, and other professional settings.

EME 6065 Human-Computer Interaction and the Learner 3 Credits**Grading Scheme:** Letter Grade

Explores the interface between pedagogy, educational technology, cognitive science, graphic design, and software engineering, and define effective human-computer interaction. We will discuss relevant methods and seminal research, and deduce implications for learning and design of human computer interfaces such as digital games, mobile applications, and adaptive learning systems.

EME 6066 Issues and Trends in Educational Technology Research 3 Credits**Grading Scheme:** Letter Grade

Providing an overview of the "what" and "how" in educational technology research. Having knowledge of the conceptual frameworks and research design paradigms in the field enables students to evaluate the rigor of educational technology research and think more critically about their own research efforts.

EME 6067 Emerging Learning Technologies 3 Credits**Grading Scheme:** Letter Grade

Interactive project-based course offers an opportunity for students to design and develop learning experience (e.g. virtual trips) while mastering the use of an array of emerging tools/devices. Close consideration will be placed, but not limited, to immersive virtual reality (VR), augmented reality (AR), mixed reality (MR), and 3D modeling/printing.

EME 6074 Mobile Technologies in Education 3 Credits**Grading Scheme:** Letter Grade

Explores national and international perspectives on how mobile technologies are currently being used to teach and learn in formal and informal environments. Students will identify strategies used for implementing mobile technologies and how these are adapted based on socio-political, economic, and educational contexts.

EME 6156 Games and Simulations for Teaching and Learning 3 Credits**Grading Scheme:** Letter Grade

The characteristics and terminology of games and simulations; development life cycles; design principles; evaluation; and an emphasis on connecting principles of learning to the design of games and simulations.

Prerequisite: None.**EME 6208 Designing Integrated Media Environments I 3 Credits****Grading Scheme:** Letter Grade

Design traditional multimedia environments and learn advanced techniques for creating presentation. Importance of cognitive processes and their relationships to design and instruction.

EME 6209 Designing Integrated Media Environments II 3 Credits**Grading Scheme:** Letter Grade

Project based. Applying skills Studying the development and problem-solving as applied to real world educational problems with solutions designed and implemented in various programming and scripting languages. Topics include design principles, testing, and debugging. Prior programming experience is not required. and theories learned previously. Real-world problems.

Prerequisite: EME 6208.**EME 6235 Managing Educational Projects 3 Credits****Grading Scheme:** Letter Grade

Examining principles of planning, scheduling, allocating resources, budgeting, proposals preparation, cost control, risk assessment and personnel management for instructional projects. Students negotiate an effective design project plan, how to implement the plan, and how to control and monitor project activities.

EME 6236 Distance Education Leadership and Management 3 Credits**Grading Scheme:** Letter Grade

Examining the roles and responsibilities of leaders and managers in distance education programs. Focuses on contributors to quality program delivery in K-12, higher education, corporate, healthcare, and international contexts.

EME 6458 Distance Teaching and Learning 3 Credits**Grading Scheme:** Letter Grade

Topics assist educators who teach at distance in synchronous time. Effective teaching methodologies, along with various theories about distance learning, examined.

EME 6480 Quantitative Methods in Educational Technology Research 3 Credits**Grading Scheme:** Letter Grade

This applied quantitative methods course focuses on examining educational technology research and will provide students with the knowledge and skills to apply appropriate statistical methods, interpret results from statistical analyses, and write the results appropriate for scholarly publication. All statistical techniques use real-world datasets addressing research problems in educational technology.

Prerequisite: EDF 7486 or EDF 6401 or instructor permission.**EME 6606 Advanced Instructional Design 3 Credits****Grading Scheme:** Letter Grade

Focuses on the student who is becoming an instructional design (ID) Professional by refining skills and adding to the skills learned in the beginning Instructional Design course, building on the foundational knowledge about the practice of ID, and encouraging the development of communication skills through formal project management.

Prerequisite: EME 6609.**EME 6609 Instructional Design 3 Credits****Grading Scheme:** Letter Grade

Focuses on the application of instructional design principles to the development of instruction. Topics include contemporary issues and trends in instructional design, foundations in learning research, requirements for instruction, task and needs analysis, learning situations and instructional models, learner characteristics, hardware and software innovations, assessing instructional outcomes, and factors affecting utilization.

EME 6637 Managing and Analyzing Multimodal Educational Data 3 Credits**Grading Scheme:** Letter Grade

This course is designed to prepare educational researchers and practitioners to manage and analyze multimodal educational data. In this online course, students will learn about the unique characteristics of multimodal educational data and apply appropriate techniques to discover useful knowledge and insights.

Prerequisite: Acceptance into a UF graduate or certificate program or approval from course coordinator.**EME 6638 Theory, Design, and Development of Stealth Assessment for Learning 3 Credits****Grading Scheme:** Letter Grade

Explains an innovative assessment method for learning called stealth assessment which is ubiquitous, unobtrusive, and in real-time. It aims to blur the boundaries between gameplay, learning, and assessment. Students in this course learn how to design a valid and reliable assessment and embed it in a technology-rich environment (e.g., an educational game). Students also learn about the related theories, examples, and the design and development processes of stealth assessment.

Prerequisite: Graduate students only.**EME 6645 Neurotechnologies in Education 3 Credits****Grading Scheme:** Letter Grade

This seminar focuses on the neuroscience frameworks and technologies that are gaining popularity in educational research as a way to supplement and offset the weaknesses of self-reported data. We will be reading and discussing seminal works linking attention, cognition, emotion, and learning, and engage in hands-on practice with the neurotechnologies.

Prerequisite: Admission to a graduate degree program or instructor permission.**EME 6651 Learning Analytics Concepts and Techniques 3 Credits****Grading Scheme:** Letter Grade

This course equips students to leverage educational data collected from technology-enhanced learning environments. Students will explore data mining techniques and process and analyze various types of educational data to discover useful insights/ knowledge. This course prepares students as educational researchers/ practitioners able to use learning analytics in their subject area.

Prerequisite: Admission to a graduate (degree or certificate) program or instructor permission.**EME 6935 Seminar: Distance Education Issues and Applications 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

Mechanisms and logistics that support distance education development and delivery.

EME 6945 Practicum in Educational Media and Instructional Design 3-8 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Supervised experiences appropriate to the student's professional goals.

EME 7345 Implementing Educational Technology Innovations (ETIs) 3 Credits**Grading Scheme:** Letter Grade

Focuses on diffusion and evaluation as key components to successfully implementing ETIs. Students will study innovation diffusion theory, change theory, frameworks and considerations for evaluating ETIs and study designs and instruments for appropriate for ETI implementation. Students will gain authentic practice implementing ETIs.

EME 7938 Seminar in Educational Media and Instructional Design 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Seminar for advanced degree graduate students.

ESE 5426 Data-Driven Decision Making for Secondary Teachers 3 Credits

Grading Scheme: Letter Grade

Data-Driven Decision making focuses on discipline-specific assessments and the use of data to impact learning and teaching practices. Students will develop and adopt an inquiry stance as they integrate authentic assessment practices with standards-based instruction.

ESE 6345 Effective Teaching and Classroom Management 3 Credits

Grading Scheme: Letter Grade

Advanced strategies for planning and presenting the general academic content of mathematics, science, foreign language, social studies, and English in the secondary school.

Prerequisite: consent of departmental.

ESE 6905 Individual Work 1-4 Credits, Max 12 Credits

Grading Scheme: Letter Grade

Individual Work

ESE 6939 Special Topics 3 Credits, Max 10 Credits

Grading Scheme: Letter Grade

Special Topics

ESE 6945 Student Teaching in Secondary School 2-9 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Supervised teaching in the secondary school, Grades 6-12.

Prerequisite: consent of instructor.

ETE 6141 K-12 Computer Sc Pedagogy I 3 Credits

Grading Scheme: Letter Grade

This is the first of a two-course sequence, where students will be introduced to a variety of different conceptualizations and pedagogical approaches for computer science education for K-12. Students will spend their time at the micro level, learning about the strategies for teaching computer science as well as lesson planning.

Prerequisite: Admission into the graduate certificate program in K-12 Computer Science Education or master's program in the UF College of Education;

Corequisite: EDG 6805C.

ETE 6142 K-12 Computer Sc Pedagogy II 3 Credits

Grading Scheme: Letter Grade

This is the second of a two-part sequence focused on computer science pedagogy in K-12 schools. Previously, students spent their time at the micro-level, learning how to develop lesson plans. In this course, students will spend their time at the macro-level and learn how to develop entire units of instruction.

Prerequisite: ETE 6141 and EDG 6805C;

Corequisite: EDG 6806C.

FLE 6165 Bilingual-Bicultural Education 3 Credits

Grading Scheme: Letter Grade

Foundational principles and practices in the field of bilingual-bicultural education in the U.S. and in other nations. Critical examination of theories and practices related to language policy in education.

FLE 6167 Cross-Cultural Communication for Teachers 3 Credits

Grading Scheme: Letter Grade

Critically explores ways educators can establish equitable and culturally responsive classrooms. Examines theories related to language, culture, and social justice.

LAE 5341 Language Arts: Teaching Nonfiction Writing 3 Credits

Grading Scheme: Letter Grade

Deepen knowledge of the teaching of nonfiction writing, including writing across the curriculum. An examination of approaches to the teaching of informational, explanatory, opinion, and argumentative texts; create informational projects; and design classroom applications.

LAE 6298 Literacy & Language Instruction 3 Credits

Grading Scheme: Letter Grade

Prepares preservice teachers to teach language arts integrated with writing children's literature. The study combines theory practice in language/writing development, differential instruction assessment for diverse students using literature for language writing instruction.

LAE 6339 Curriculum, Methods, and Assessment in Secondary English Language Arts 3 Credits

Grading Scheme: Letter Grade

Introduction to the theory and practice of teaching English.

Prerequisite: 30 hours of upper-division English. Designed for Proteach students only.

LAE 6348 Teaching Multiliteracies 3 Credits

Grading Scheme: Letter Grade

Application of theory and methods in teaching multiple modes of literacy.

LAE 6407 Early Childhood Children's Literature 3 Credits

Grading Scheme: Letter Grade

Methods of involving young children (birth through kindergarten) with literature and the role of literature in the home and school.

Prerequisite: a course in children's literature.

LAE 6446 Multicultural Literature for Children and Adolescents 3 Credits

Grading Scheme: Letter Grade

Examines diverse cultures and theories in multicultural literature.

LAE 6865 Teaching Media Literacy with the Internet 3 Credits

Grading Scheme: Letter Grade

Application of literacy theory and pedagogy to teaching multimodal internet texts.

LAE 6869 Teaching Digital Storytelling 3 Credits

Grading Scheme: Letter Grade

Focusing on educators by using storytelling and digital tools to advance literacy, learning, and the meaningful use of technology in educational settings.

LAE 6939 Literacy, Family, and Culture 3 Credits

Grading Scheme: Letter Grade

Examines various literacy patterns of students with non-mainstream cultural, social, and linguistic backgrounds; explores the impact of home literacy on school learning.

LAE 6945 Practicum and Assessment for Teachers of Secondary School English 3 Credits

Grading Scheme: Letter Grade

Directed experiences focused on applying instructional strategies, assessing student progress, and reflecting on ethical issues. Includes experiences in field and laboratory work.

Prerequisite: consent of department chair.

LAE 6946 Children's Literature in Educational Settings 3 Credits

Grading Scheme: Letter Grade

Field studies in library or school settings with high involvement in children's literature.

Prerequisite: LAE 3005.

LAE 7934 Seminar in Composition Theory and Practice 3 Credits**Grading Scheme:** Letter Grade

Examines the theory of composition, and research on the impact of writing.

LAE 7936 Seminar in English Language Arts 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Contemporary developments and research in English language arts and education.

Prerequisite: consent of instructor.**LAE 7938 Lit, Cult and Politics 3 Credits****Grading Scheme:** Letter Grade

Lit, Cult and Politics

MAE 5332 Secondary School Mathematics Methods and Assessment 3 Credits**Grading Scheme:** Letter Grade

Patterns of mathematics curriculum; practices in teaching mathematics; preparing, selecting, and using instructional materials; assessment techniques.

Prerequisite: preparation in the subject area equivalent to the requirements for high school certification.**MAE 5347 Teaching K-8 Mathematics for Understanding 3 Credits****Grading Scheme:** Letter Grade

Instructional strategies to support young learners' mathematical understanding.

Prerequisite: Admission to graduate status.**MAE 5396 Using Formative Assessment to Improve Mathematical Learning 3 Credits****Grading Scheme:** Letter Grade

Developing the use of formative assessment in the practicing teacher's mathematics classroom for selecting instructional strategies appropriate for the teacher's particular students. Topics include developing a definition of formative assessment, investigating tiered instruction, supporting low achieving students, challenging high achieving students, and implementing management strategies.

Prerequisite: Admission to graduate status.**MAE 5945 Secondary School Mathematics Practicum 3-6 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Directed experiences emphasizing instructional strategies, selecting instructional materials, sequencing student activities, using instructional moves, and diagnosing student progress. Field and laboratory settings.

MAE 6177 Mathematics Teaching and Learning in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Strategies for teaching mathematics in higher education. Explore learning theories, evidence-based teaching methods, and assessment strategies through readings, activity design, case discussions, and classroom observations.

MAE 6313 Problem Solving in School Mathematics 3 Credits**Grading Scheme:** Letter Grade

Analyzes problem solving as an underlying theme in mathematics education focused on K-12 schools. Emphasizes development of pedagogical content knowledge in mathematics through modeling, inquiry, and problem solving.

MAE 6349 Classroom Contexts that Support Self-Regulated Learning and Mathematical Understanding 3 Credits**Grading Scheme:** Letter Grade

Examining instructional strategies for supporting learners' self-regulated learning and mathematical understanding. Topics include mathematical proficiency and teaching for mathematical proficiency, classroom environments that support mathematical understanding, setting norms for classroom discourse, teaching via problem solving, and developing contexts that support self-regulated learning.

MAE 6916 Inquiry in Mathematics Teaching 3 Credits**Grading Scheme:** Letter Grade

Promoting reflective practices in teaching mathematics, this online course will be centering around a self-directed classroom inquiry project.

The course first solidifies expertise in key topics in mathematics education. It then moves to the teacher's development, implementation, and evaluation of the classroom inquiry project in his/her classroom.

Prerequisite: EDE 6325 Teacher Inquiry/Action Research**MAE 7899 Mathematics Education Seminar 3 Credits****Grading Scheme:** Letter Grade

Issues and problems in mathematics education. Investigating and planning research relevant to selected problems.

Prerequisite: MAE 6138.**MUE 7938 Music Education Seminar 3 Credits****Grading Scheme:** Letter Grade

Contemporary issues and problems in music education. Investigating and planning research relevant to selected problems.

RED 5337 Reading in the Secondary School 3 Credits**Grading Scheme:** Letter Grade

Patterns of reading instruction in the secondary school; methods of teaching reading for teachers of all subject areas; preparing, selecting, and using instructional materials; selected field or micro-teaching experiences.

RED 5355 Reading Instruction in the Elementary School 3 Credits**Grading Scheme:** Letter Grade

Emphasizes materials and methods for teaching reading to students in the upper elementary grades, middle, and junior high schools.

RED 5399 Practices in Beginning Reading Instruction 3 Credits**Grading Scheme:** Letter Grade

Providing students with deeper knowledge in specific areas related to beginning reading instruction. Course content focuses on instruction in advanced phonics/word study and structural analysis, vocabulary, and comprehension, integrating assessment and instruction for classroom application, and differentiating instruction for students, including ELLs, Gifted and ESE students.

Prerequisite: LIN 3710 and RED 3310.**RED 6346 Seminar in Reading 3-6 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Variable topics on reading and literacy.

Prerequisite: consent of instructor.**RED 6448 Diagnosing and Remediating Reading Difficulties 3 Credits****Grading Scheme:** Letter Grade

Learn about assessments and materials that may be used by a classroom teacher to observe and document K-12 learners' reading performance, design and implement appropriate instruction and remediation activities, and evaluate learner progress.

Prerequisite: Admission to a graduate program or certificate in the College of Education.

RED 6520 Classroom Literacy Assessment and Instruction 3 Credits**Grading Scheme:** Letter Grade

Using classroom assessment information to guide literacy instruction.

Prerequisite: minimum of 1 introductory reading instruction course.**RED 6546C Diagnosis of Reading Difficulties 3 Credits****Grading Scheme:** Letter Grade

Individual assessment techniques for locating difficulties in literacy acquisition.

RED 6548C Remediation of Reading Difficulties 3 Credits**Grading Scheme:** Letter Grade

Advanced procedures and practices for remediating reading difficulties in the classroom and clinic.

Prerequisite: RED 6546C.**RED 6647 Trends in Reading 3 Credits****Grading Scheme:** Letter Grade

Understanding current trends and issues in literacy education.

RED 6843 Reading Practicum 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Combine the theoretical study of teaching methods, techniques, and practices with on-going classroom experiences. Students will collect and analyze assessment data, plan instruction based on information from data, implement effective instruction, and monitor students' progress.

Prerequisite: 3 credits of prior coursework with an RED or TSL prefix.**RED 6941 Practicum in Diagnosis and Remediation of Reading Difficulties 3 Credits****Grading Scheme:** Letter Grade

Diagnosis and remediation of reading difficulties with at-risk K-12 learners.

RED 7019 Foundations of Literacy 3 Credits**Grading Scheme:** Letter Grade

Foundational understanding of theories and discussions related to (and research methods involved in) studying literacy and literacy education.

SCE 5140 Science Curriculum Development 3 Credits**Grading Scheme:** Letter Grade

Allows teachers to explore science curriculum development from theoretical and practical perspectives. Focuses on reform-based science curriculum and the research and science-specific pedagogical themes underlying their development. The course is divided into three sections: Science Curriculum Reform, Models of Science Curriculum Development, and Curriculum Exemplars.

SCE 5316 Inquiry-Based Science Teaching 3 Credits**Grading Scheme:** Letter Grade

Inquiry into science content pedagogy and practice in elementary classrooms.

SCE 5695 Diversity and Equity in Science Teaching 3 Credits**Grading Scheme:** Letter Grade

Providing an overview of the challenges and issues that face diverse populations of learners as they struggle to gain acceptance, recognition, and access to an appropriate science education.

SCE 5765 Data-Driven Science Instruction 3 Credits**Grading Scheme:** Letter Grade

Focusing on assessment of science instruction and learning. The course will include the study of research-based approaches to assessment, learning, and teaching. In addition, the course will facilitate the adoption of an inquiry stance for integrating assessment data into teaching decisions.

SCE 6117 Science Education in the Elementary School 3 Credits**Grading Scheme:** Letter Grade

Current problems, new materials and teaching techniques, research and recent developments in the sciences.

SCE 6337 Secondary Science Methods and Assessment 3 Credits**Grading Scheme:** Letter Grade

Introduction to the theory and practice of teaching secondary school science, emphasizing planning, instruction, and assessment.

SCE 6930 Seminar in Science Education 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Examine current issues and trends in science education, the research base upon which modern science education has been constructed, and the historical, philosophical, and methodological underpinnings of researchers in the discipline.

Prerequisite: Admission to graduate program in the College of Education or instructor permission.**SCE 6947 Practicum in Secondary Science Teaching and Assessment 3 Credits****Grading Scheme:** Letter Grade

Directed experiences emphasizing instructional strategies, selecting instructional materials, sequencing student activities, using instructional moves, and diagnosing student progress. Field and laboratory settings.

Prerequisite: consent of department chair.**SMT 6066 Data Wrangling and Visualization in Educational Research 3 Credits****Grading Scheme:** Letter Grade

Data wrangling is the systematic process of transforming raw data into a more structured form, while visualization is the use of graphical representations for reasoning and summarizing. This course will improve your understanding and comfort in working with data as well as your confidence and efficiency with research. Coursework will be practical and include ample hands-on experience and transferable expertise. Students are welcome and encouraged to use existing personal data sources.

SMT 6106 Informal STEM Practice 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

For students who are interested in learning about informal STEM education, including that practiced at museums, science centers, aquaria, zoos, and parks. The online portion will involve weekly lectures, readings, and discussions. The internship may occur at any approved physical or virtual venue of the student's choosing.

Prerequisite: SMT3100 - Knowing and Learning in Mathematics and Science Teaching or EDG 5666: Knowing and Learning in Secondary Schools**SSE 5945C Practicum in Secondary Social Studies Teaching and Assessment 3 Credits****Grading Scheme:** Letter Grade

Directed experiences emphasizing instructional strategies, instructional materials, and student assessment. Field and laboratory settings with microteaching assignments.

SSE 6117 Social Studies Education--Elementary School 3 Credits**Grading Scheme:** Letter Grade

Contributions of social education to the total elementary school program, emphasizing social interaction and programs and procedures in the social studies area.

Prerequisite: graduate curriculum course.

SSE 6133 Secondary School Social Studies Methods and Assessment 3 Credits**Grading Scheme:** Letter Grade

Preparing, selecting, and using instructional methods, materials, and assessments in the social studies content area.

SSE 6478 Global Studies Methods for Social Studies 3 Credits**Grading Scheme:** Letter Grade

Provides pre-service middle and secondary social studies teachers with an overview of standards-based global issues appropriate for grades 6-12 social studies classes. This course focuses on effective techniques for planning, implementing, and assessing teacher-directed and teacher-facilitated global education learning experiences.

TSL 5142 ESOL Curriculum, Methods, and Assessment 3 Credits**Grading Scheme:** Letter Grade

Curriculum, methods, and assessment for second language learners in K-12 classrooms.

Prerequisite: TSL 3526.**TSL 5335 ESOL and Reading for Secondary Teachers 3 Credits****Grading Scheme:** Letter Grade

This course is designed to develop students' understanding of literacy teaching and learning, with a dual focus on native speakers of English and English Language Learners. It focuses on methods and materials that can be used to support the development of proficient and critical adolescent readers in academic content areas.

TSL 6145 Curriculum and Materials Development for ESOL K-12 3 Credits**Grading Scheme:** Letter Grade

Developing and adapting standards-based curriculum and materials for L2 oral language and literacy, academic content, and K-12 ESOL instruction.

TSL 6245 Language Principles for ESOL Teachers 3 Credits**Grading Scheme:** Letter Grade

Applied linguistics for teachers. Language-acquisition theories related to learning a second language in school. Connections between language and literacy development and effective instruction for English language learners.

TSL 6373 Methods of Teaching ESOL K-12 3 Credits**Grading Scheme:** Letter Grade

Effective oral language and literacy instruction for K-12 English language learners.

TSL 6385 Technology for Language and Reading Education 3 Credits**Grading Scheme:** Letter Grade

Explores foundational issues at the intersection of technology and language and reading education. Prepares students to research, create, and evaluate technologically enhanced instruction and assessment for foreign language education (FLE), English for speakers of other languages (ESOL), and reading education in K-20 contexts.

Prerequisite: Permission of Instructor.**TSL 6440 Testing and Evaluation of ESOL 3 Credits****Grading Scheme:** Letter Grade

Introduction to assessment issues and experience in developing assessment techniques for learners of English as a second language.

TSL 6670 Multilingualism from a Global Perspective 3 Credits**Grading Scheme:** Letter Grade

Explores key educational issues and dilemmas in multilingual societies today from an international perspective. Examines the role of language education in times of globalization and how language ideologies, language policies and language practices shape schooling experiences in multilingual contexts.

Prerequisite: Admission to a graduate program in the College of Education, Linguistics, or Latin American Studies.**TSL 6700 Issues in ESOL for School Counselors and Psychologists 3 Credits****Grading Scheme:** Letter Grade

Gives school counselors and psychologists an overview of key concepts and issues related to ESOL students in K-12 schools.

Electrical and Computer Engineering

EEE 5216 Introduction to Biophotonics 3 Credits**Grading Scheme:** Letter Grade

Introduction to the principles of optics, lasers and biology, the interaction of light with cells and tissues, and various optical imaging, sensing and activation techniques and their applications in biomedicine.

Prerequisite: Students may not take this course if they have already taken EEE4210.**EEE 5225 Resonant MEMS 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of resonant micro-electro-mechanical systems (Resonant MEMS) and their applications.

Prerequisite: Familiarity with ordinary differential equations, elementary signals and systems and circuit theory.**EEE 5283 Neural Signals, Systems and Technology 3 Credits****Grading Scheme:** Letter Grade

Biophysical principles of neural signaling, characterization of neural circuits and systems, technology design principles for interfacing with biological neural systems, overview of clinical applications and industrial opportunities for neurotechnology.

Prerequisite: Graduate standing in engineering and/or neuroscience or undergraduate senior standing with consent of instructor.**EEE 5317C Introduction to Power Electronics 3 Credits****Grading Scheme:** Letter Grade

Components and circuits for power applications. Switched-mode power supplies.

Prerequisite: Solid State Devices, Electronic Circuits and Linear Controls. Students may not take this course if they have already taken EEL4242C.**EEE 5320 Analog IC Design I 3 Credits****Grading Scheme:** Letter Grade

Amplifier stages, active loads, output stages, op-amps, feedback, frequency response, compensation.

Prerequisite: Analog Electronics.**EEE 5322 VLSI Circuits and Technology 1 3 Credits****Grading Scheme:** Letter Grade

Introduction to VLSI circuit technology and manufacturing. Fabrication, device models, layout, parasitics, and simple gate circuits.

Prerequisite: Electronic Circuits. Students may not take this course if they have already taken EEE 4310.**EEE 5354L Semiconductor Device Fabrication Laboratory 3 Credits****Grading Scheme:** Letter Grade

This course will be offering hands-on experience in semiconductor material characterization and device fabrication techniques.

EEE 5364 Fundamentals of Data Converters 3 Credits**Grading Scheme:** Letter Grade

Exploring different data conversion techniques with an emphasis on IC implementation. Discussion of circuit building blocks and the effects of their non-idealities in the overall system performance will be analyzed.

Prerequisite: Basic Electronic Circuits.**EEE 5374 Radio Frequency Integrated Circuits 1 3 Credits****Grading Scheme:** Letter Grade

Teaches RF Electronic circuit design for a modern wireless transceiver and the RF circuit theory necessary to guide good design choices. The students learn to use RF IC design tools to design an RF low noise amplifier IC as part of a team final design project.

Prerequisite: Basic Electronic Circuits. Students may not take this course if they have already taken EEE 4373.**EEE 5379 Introduction to RF Circuits 3 Credits****Grading Scheme:** Letter Grade

This course is co-listed with the undergraduate class. The homework portion of the graduate section will involve additional work with respect to the undergraduate section. The exams will also involve additional questions or take-home questions for the graduate section with respect to the undergraduate section. Grading for the homework and projects of the graduate section is different from that of the undergraduate course. The graduate and undergraduate sections will be graded separately, for which the graduate section has additional problems and different weights for all problems.

Prerequisite: Electromagnetic Fields and Applications and Electronic Circuits or their equivalent.**EEE 5400 Future of Microelectronics Technology 3 Credits****Grading Scheme:** Letter Grade

Survey of state-of-the-art microelectronics technology and prospects for future technologies. Nanoscale MOSFETs, strained Si, high-K gate dielectrics, carbon nanotubes, molecular electronics, and single-electron devices.

Prerequisite: Solid State Devices. Students may not take this course if they have already taken EEE4329.**EEE 5405 Microelectronic Fabrication Technologies 3 Credits****Grading Scheme:** Letter Grade

Principles of microelectronic device fabrication. Emphasis on fundamentals of microfabrication processing and microelectronic device process flows. Computerized process simulation.

Prerequisite: Solid State Devices. Students may not take this course if they have already taken EEE4331.**EEE 5408 Mixed Signal IC Testing I 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of Testing IC Devices and systems: test specifications, parametric testing, measurement accuracy, test hardware, sampling theory, digital signal processing based testing, and calibrations. Circuit analysis and design with analog and mixed-signal systems. Labs on testing passive components, LDOs, Op-amps, DACs/ADCs, Mixed-Signal ICs Labview and the National Instruments Savage Tester.

Prerequisite: Analog and Digital Electronics. Students may not take this course if they have already taken EEE 4404.**EEE 5415 Modern Memory Device Technologies 3 Credits****Grading Scheme:** Letter Grade

This course discusses state-of-the-art volatile and nonvolatile memory device technologies and their limitations. It also discusses emerging memory device technologies, including those that could be adopted by industry in the next decades due to their potential performance, density, power and cost advantages.

Prerequisite: Solid State Devices.**EEE 5426 Introduction to Nanodevices 3 Credits****Grading Scheme:** Letter Grade

Physical principles of modern solid-state devices and their applications; quantum mechanics; fundamentals of nanoelectronics.

Prerequisite: Students may not take this course if they have already taken EEE4420.**EEE 5467 Micro/Nano Machined Metamaterials 3 Credits****Grading Scheme:** Letter Grade

Study course on the micro-/nano machined metamaterials and their applications for radio frequency (RF) and microwave devices including transmission line, waveguides, resonators, filters, and antennas.

Prerequisite: Electromagnetic Fields and Applications**EEE 5480 Physical Attacks and Inspection of Electronics 3 Credits****Grading Scheme:** Letter Grade

Focuses on the physical inspections, physical attacks, reverse engineering, counterfeit detection, etc. of electronics from the device to system level using advanced microscopy, failure analysis techniques combined with image analysis and machine learning. In additions, students will also learn about the associated countermeasures.

Prerequisite: Basic signal processing and circuit analysis knowledge.**EEE 5502 Foundations of Digital Signal Processing 3 Credits****Grading Scheme:** Letter Grade

Analysis and design of digital filters for discrete signal processing, spectral analysis, and fast Fourier transform.

Prerequisite: None. Students may not take this course if they have already taken EEL4750.**EEE 5544 Stochastic Methods for Engineering 1 3 Credits****Grading Scheme:** Letter Grade

Fundamental analytical techniques for modeling, analyzing, and processing electrical signals and computer data in the presence of noise and randomness. Covers from probability to filtering of random processes, with applications to communications, signal and image processing, data compression, and simulation.

Prerequisite: Students may not take this course if they have already taken EEL4516.**EEE 5590 Introduction to Quantum Computing 3 Credits****Grading Scheme:** Letter Grade

Introduces quantum computing concepts and the hardware implementations in a self-contained manner to Electrical and Computer Engineering students. Teaches fundamentals of quantum mechanics and introduces important concepts of superposition and entanglement, hardware realization of quantum computing technologies and quantum computing algorithms.

Prerequisite: Solid State Devices and linear algebra or equivalent

EEE 5702 Automated Hardware/Software Verification 3 Credits**Grading Scheme:** Letter Grade

Develop modeling, formal specification, and automated verification skills for analyzing complex hardware and/or software systems. Hands-on experience with model checking tools.

Prerequisite: Data Structures, Algorithms and Architecture (Prerequisites allow students to register without departmental intervention. Students are expected to review the syllabus and consult the instructor if they have questions regarding prerequisites).

EEE 5716 Introduction to Hardware Security and Trust 3 Credits**Grading Scheme:** Letter Grade

Fundamentals of hardware security and trust for integrated circuits. Cryptographic hardware, invasive and non-invasive attacks, side-channel attacks, physically unclonable functions (PUFs), true random number generation (TRNG), watermarking of Intellectual Property (IP) blocks, FPGA security, counterfeit detection, hardware Trojan detection and prevention in IP cores and integrated circuits.

Prerequisite: Digital Design. Students may not take this course if they have already taken EEE4714.

EEE 5725 Acoustics 3 Credits**Grading Scheme:** Letter Grade

Governing equations for wave theory of sound; Character of plane acoustic waves and 3-D acoustic fields; Sound transmission/reflection at an interface between two media; Waves transmission/attenuation inducts; Low frequency approximations (lumped-element modeling) and transducers; sources of sound.

Prerequisite: Permission of instructor. Students may not take this course if they have already taken EEE4720.

EEE 6321 Analog IC Design II 3 Credits**Grading Scheme:** Letter Grade

Design of analog circuits in CMOS IC technology. MOS switches, MOS op amp circuits, circuit simulation using SPICE.

Prerequisite: EEE 5320 .

EEE 6323 VLSI Circuits and Technology 2 3 Credits**Grading Scheme:** Letter Grade

Advanced very large scale integrated circuit design, testability, and performance evaluation. Use of industrial VLSI software. Building an advanced CMOS VLSI circuit.

Prerequisite: EEE 5322 .

EEE 6328C Microwave IC Design 3 Credits**Grading Scheme:** Letter Grade

Fundamentals of microwave integrated circuit design. Use of computer software to design simple microwave circuits. Microwave circuit testing.

EEE 6374 RF Circuits and Systems 3 Credits**Grading Scheme:** Letter Grade

Requirements for RF integrated circuits. Design and implementation. Interdependence of RF circuit performance with devices, parasitics, packages, and process technology.

Prerequisite: EEE 5322.

EEE 6382 Semiconductor Physical Electronics 3 Credits**Grading Scheme:** Letter Grade

Crystal structure and symmetry, carrier statistics, lattice dynamics, energy band theory, equilibrium properties of semiconductors, recombination-generation and trapping processes, electronic transport phenomena, scattering mechanisms, and optical properties.

Prerequisite: EEE 5426.

EEE 6390 VLSI Device Design 3 Credits**Grading Scheme:** Letter Grade

Criteria and tradeoffs in designing high-performance semiconductor devices in scaled (VLSI) Si-based integrated-circuit technologies.

Prerequisite: EEE 5426 or EEE 5400.

EEE 6397 Semiconductor Device Theory I 3 Credits**Grading Scheme:** Letter Grade

Semiconductor device physics, equilibrium and non-equilibrium processes, pn junctions, BJT operation, charge-control modeling, and high-current and heavy-doping effects.

Prerequisite: EEE 5426.

EEE 6428 Nanoscale Devices for VLSI Technology 3 Credits**Grading Scheme:** Letter Grade

Using nanotechnology simulation tools to study nanoscale devices in future very large scale integration (VLSI) technologies; band structure, transport; molecular transistors, nanowires, nanotransistors, and quantum dots.

Prerequisite: EEE 5426.

EEE 6431 Carbon Nanotubes 3 Credits**Grading Scheme:** Letter Grade

Basic semiconductor and solid-state physics of carbon nanotubes, nanotube geometrical and electronic structure, and current nanotube research.

Prerequisite: EEE 5426.

EEE 6460 Advanced Microsystem Technology 3 Credits**Grading Scheme:** Letter Grade

Advanced micro-fabrication technologies, micro-system design, interface circuits, and MEMS packaging. CMOS, Optical, and RF MEMS.

Prerequisite: EEL 5225.

EEE 6465 Design of MEMS Transducers 3 Credits**Grading Scheme:** Letter Grade

Design of MEMS transducer systems with physical, technological and economic constraints.

Prerequisite: EEL 5225.

EEE 6504 Machine Learning for Time Series 3 Credits**Grading Scheme:** Letter Grade

Theory of adaptation with stationary signals; performance measures. LMS, RLS algorithms. Implementation issues and applications.

Prerequisite: EEE 5502 and EEL 5840.

EEE 6512 Image Processing and Computer Vision 3 Credits**Grading Scheme:** Letter Grade

Pictorial data representation; feature encoding; spatial filtering; image enhancement; image segmentation; cluster seeking; two-dimensional z-transforms; scene analysis; picture description language; object recognition; pictorial database; interactive graphics; picture understanding machine.

Prerequisite: Digital Signal Processing.

EEE 6545 Stochastic Methods for Engineering 2 3 Credits**Grading Scheme:** Letter Grade

An introduction to stochastic process theory with emphasis on applications to communications, control, signal processing and machine learning. The course covers basic models, including Markov processes, and how they lead to algorithms for classification prediction, inference and model selection.

Prerequisite: EEE 5544. Experience with Matlab or Python is essential.

EEE 6561 Fundamentals of Biometric Identification 3 Credits**Grading Scheme:** Letter Grade

Methods and principles for the automatic identification/authentication of individuals. Technologies include fingerprint, face, and iris biometrics. Additional topics include biometric system design, performance evaluation, multi-modal biometric systems, and biometric system security.

Prerequisite: EEE 6512 or instructor approval**EEE 6586 Automatic Speech Processing 3 Credits****Grading Scheme:** Letter Grade

Various models of speech production and perception. Operation of speech synthesizers. Discussion of speech recognition. Mathematical models of speech signals.

Prerequisite: EEE 5502 .**EEE 6742 Advanced Hardware Security and Trust 3 Credits****Grading Scheme:** Letter Grade

Expands on the foundation provided by the Introduction to Hardware Security and highlights the challenges arising from the end of Moore's law as well as the rapid evolution of attackers. Hands-on experience with various commercial and open-source CAD tools will be developed via lectures, tutorials, and projects.

Prerequisite: EEE 5716, undergraduate course in digital design, and familiarity with VHDL, Verilog, and CAD/EDA tools.**EEE 6744 Hands-On Hardware Security 3 Credits****Grading Scheme:** Letter Grade

Focuses on practical learning of computer hardware security using a hands-on approach. Students will work on a custom-designed hardware platform to understand innards of a computer system and ethically "hack" into it at different levels. They will examine it to understand security vulnerabilities, mount attacks, and implement countermeasures.

Prerequisite: EEE 5716**EEL 5182 State Variable Methods in Linear Systems 3 Credits****Grading Scheme:** Letter Grade

Linear algebra and state variable methods for design and analysis of discrete and continuous linear systems.

Prerequisite: Linear Controls. Students may not take this course if they have already taken EEL4610.**EEL 5225 Principles of Micro-Electro-Mechanical Transducers 3 Credits****Grading Scheme:** Letter Grade

Introduction to principles of micro-electro-mechanical devices and systems.

Prerequisite: Solid State Devices.**EEL 5249 Fundamentals of RF and Power Electronic Devices 3 Credits****Grading Scheme:** Letter Grade

The course is designed to introduce important semiconductor device technologies for high speed electronics, power electronics and energy harvesting applications.

Prerequisite: Solid State Devices.**EEL 5250 Power System Analysis 3 Credits****Grading Scheme:** Letter Grade

Development of power system equivalents by phase, network analysis, load flow, symmetrical components, sequence networks, and fault analysis.

Prerequisite: Basic Electric Energy Engineering. Students may not take this course if they have already taken EEL4251.**EEL 5285 Smart Grid for Sustainable Energy 3 Credits****Grading Scheme:** Letter Grade

Survey of power grid operations and markets for students with interest in power systems and/or sustainable energy. Characteristics of traditional and new energy resources; how resources impact the grid; control on many time-scales; how the power grid and power markets of tomorrow will differ from those of today.

Prerequisite: Linear Controls and Experience with MATLAB.**EEL 5406 Computational Photography 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of computational photography, sensing, imaging and illumination.

Prerequisite: Signals and Systems. Students may not take this course if they have already taken EEL 4403.**EEL 5417 Applied Magnetism & Magnetic Materials 3 Credits****Grading Scheme:** Letter Grade

Introduction to magnetism, magnetic materials, and magnetic devices.

The course offers a balance of theory and application from an applied engineering perspective.

Prerequisite: None. Students may not take this course if they have already taken EEL4412.**EEL 5426 RF/Microwave Passive Circuits 3 Credits****Grading Scheme:** Letter Grade

Radio frequency (RF)/microwave passive components and circuits such as transmission lines, waveguides, couplers, filters, and resonators.

Prerequisite: Electromagnetic Fields and Applications.**EEL 5441 Fundamentals of Photonics 3 Credits****Grading Scheme:** Letter Grade

Review of electromagnetic fields and waves, energy bands in semiconductors, p-n junctions and optical properties of semiconductors. Fundamentals of optical modulators and switches, laser theory, laser characteristics, photodetectors, optical waveguides, and photonic applications.

Prerequisite: Solid State Devices & Electromagnetic Fields and Applications.**EEL 5447 Laser Theory and Design 3 Credits****Grading Scheme:** Letter Grade

Studies the field of semiconductor optoelectronics and the physics of optoelectronic devices including the interaction of photons with electrons and holes in a semiconductor leading to the realization of optoelectronic devices such as photon amplifiers, LEDs, diode lasers, electro-absorption modulators, and detectors, including their design and application-specific characteristics.

Prerequisite: Physics of Electrical Engineering**EEL 5462 Advanced Antenna Systems 3 Credits****Grading Scheme:** Letter Grade

Electromagnetic field theory and its application to antenna design.

Prerequisite: Electromagnetic Fields. Students may not take this course if they have already taken EEL4461.

EEL 5486 Electromagnetic Fields and Applications 3 Credits**Grading Scheme:** Letter Grade

Rigorous development of fundamental electrostatic, magnetostatic, and electromagnetic behavior, with special attention toward practical applications. Electrostatics: Gauss' law, electric fields, scalar potential, and energy in simple media. Magnetostatics: Ampère's law, Faraday's law, magnetic fields, vector potential, and energy in simple media. Electromagnetics: Maxwell's equations, time-varying fields, and Poynting's theorem.

Prerequisite: Undergraduate course in fields and waves. Students may not take this course if they have already taken EEL4473.

EEL 5490 Lightning 3 Credits**Grading Scheme:** Letter Grade

Introduction to lightning discharge processes. Electromagnetics relevant to lightning measurements. Applications for determining lightning charge, current, location, and characteristics. Lightning protection.

Prerequisite: Electromagnetic Fields. Students may not take this course if they have already taken EEL4495.

EEL 5547 Introduction to Radar 3 Credits**Grading Scheme:** Letter Grade

Basic principles of cw and pulsed radar; angle, range, and doppler tracking; accuracy and resolution; signal design.

Prerequisite: Wave propagation, noise in communications systems, and Fourier Transforms. Students may not take this course if they have already taken EEL 4540.

EEL 5632 Safety and Security of Vehicular Electronic Systems 3 Credits**Grading Scheme:** Letter Grade

Provides a comprehensive overview of safety and security of electronic systems in current and emergent vehicles, including automotive and aerospace systems. Topics covered include: vehicular functional safety practices, standards, and limitations; vehicular security and trust; approaches to trustworthy vehicular communications; robustness, resiliency and reliability.

Prerequisite: Computer Architecture, Digital Systems Design, and familiarity with C/C++ and Linux.

EEL 5655 Control of Biological Systems 3 Credits**Grading Scheme:** Letter Grade

The automatic control principles that govern critical processes in human biology are explored. Through the development of mathematical models of biological systems, the course creates an understanding of metabolic, immunologic, and genetic processes. Applications include the manufacture of vaccines, monoclonal antibodies, cancer treatments, insulin, and many others.

Prerequisite: Basic knowledge of biology & basic knowledge of control systems.

EEL 5666C Intelligent Machines Design Laboratory 4 Credits**Grading Scheme:** Letter Grade

Design simulation, fabrication, assembly, and testing of intelligent robotic machines.

Prerequisite: EEL 4744C.

EEL 5718 Computer Communications 3 Credits**Grading Scheme:** Letter Grade

Design of data communication networks: modems, terminals, error control, multiplexing, message switching, and data concentration.

Prerequisite: Communication Systems and Components. Students may not take this course if they have already taken EEL4598.

EEL 5721 Reconfigurable Computing 3 Credits**Grading Scheme:** Letter Grade

Fundamental concepts at introductory graduate level in reconfigurable computing based upon advanced technologies in field-programmable logic devices. Topics include general concepts, device architectures, design tools, metrics and kernels, system architectures, and application case studies.

Prerequisite: Digital Design. Students may not take this course if they have already taken EEL4720.

EEL 5733 Advanced Systems Programming 3 Credits**Grading Scheme:** Letter Grade

Develop a deep understanding of operating system concepts and systems programming fundamentals and gain hands-on experience in systems programming by using Pthreads as well as implementing Linux device drivers and testing/verifying systems code for deadlock and race-freedom.

Prerequisite: Operating Systems and Architecture (Prerequisites allow students to register for course without departmental intervention. Students are expected to review the syllabus and consult the instructor if they have questions regarding prerequisites.)

EEL 5737 Principles of Computer System Design 3 Credits**Grading Scheme:** Letter Grade

This class will be providing a broad introduction to the main principles and abstractions for engineering hardware and software systems, and in-depth studies of their use on computer systems across a variety of designs, be it in operating system, a client/server application, a database server, or a fault-tolerant disk cluster.

Prerequisite: Dig. Des. and Comp. Prog.. The project's programming component uses a scripting language (Python) and requires basic understanding of data structures, algorithms, and Unix. Students may not take this course if they have taken EEL 4736.

EEL 5739 IoT Security and Privacy 3 Credits**Grading Scheme:** Letter Grade

Introduce the advanced topics of IoT security and privacy challenges. Systematically analyze IoT security from hardware, communication, and system perspectives.

Prerequisite: Knowledge of microprocessor applications and proficiency in programming in C.

EEL 5749 IoT Design 3 Credits**Grading Scheme:** Letter Grade

This course focuses on the design of IoT-based solutions for multi-discipline challenges. The course consists of lectures on the fundamental building blocks and protocols in IoT. Then the course will run as a hands-on, multi-discipline project-oriented course, with project discussions, presentations and demonstrations led by student teams.

Prerequisite: Graduate-level standing in science or engineering.

EEL 5764 Computer Architecture 3 Credits**Grading Scheme:** Letter Grade

Fundamentals in design and quantitative analysis of modern computer architecture and systems, including instruction set architecture, basic and advanced pipelining, superscalar and VLIW instruction-level parallelism, memory hierarchy, storage, and interconnects.

Prerequisite: Digital Design.

EEL 5840 Fundamentals of Machine Learning 3 Credits**Grading Scheme:** Letter Grade

Engineering and hardware concepts pertaining to design of intelligent computer systems.

Prerequisite: None; Students may not take this course if they have already taken EEL 4773.

EEL 5855 Cross Layered Systems Security 3 Credits**Grading Scheme:** Letter Grade

Develop an understanding of the principles of computer security, as it crosses layers of abstraction (application, operating system, hardware and network). Students will learn challenges of building secure computer systems with examples and hands-on assignments. Current research on these challenges will be discussed. Students will review and present conference papers.

Prerequisite: Programming knowledge & Principles of computer systems design knowledge

EEL 5905 Individual Work 1-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Selected problems or projects.

Prerequisite: consent of adviser.

EEL 5934 Special Topics in Electrical Engineering 1-3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Topics in Electrical Engineering

EEL 6246 Power Electronics II 3 Credits**Grading Scheme:** Letter Grade

Advanced topics including the modeling of single and three-phase power electronics systems, control design for single and three-phase power electronics systems, reduction and modeling of EMI for power electronics systems and resonant power converters.

Prerequisite: EEE 5317C or equivalent.

EEL 6275 Power System Protection 3 Credits**Grading Scheme:** Letter Grade

Unbalanced Load Flow; Fault Analysis on Distribution Systems; Multi-machine Stability; Balanced/Unbalanced State Estimation; Principles of Protection, Transducers and Relay Classification; Circuit Breakers; Protection of Distribution and Transmission Lines, Transformers, Generators, Motors/Buses, Reactors/Capacitors, Distributed Generation; Power System Phenomena and Relaying Considerations System Performance; Fault Location.

Prerequisite: EEL 5250

EEL 6487 Electromagnetic Field Theory and Applications II 3 Credits**Grading Scheme:** Letter Grade

Electromagnetic radiation, antennas, wave propagation in anisotropic media.

Prerequisite: EEL 5486.

EEL 6507 Queuing Theory and Data Communications 3 Credits**Grading Scheme:** Letter Grade

Introduction to basic queuing models; performance analysis of multiple access protocols; error control strategies.

Prerequisite: EEE 5544.

EEL 6509 Wireless Communication 3 Credits**Grading Scheme:** Letter Grade

Introduction. Satellite and cellular systems, propagation, modulation techniques, multiple access techniques, channel coding, speech and video coding, and wireless computer networks.

Prerequisite: Graduate level course in noise in linear systems.

EEL 6528 Digital Communications with Software-defined Radios 3 Credits**Grading Scheme:** Letter Grade

Basics of software-defined radios; Introduction to USRP radios and GNU Radio software platform; Practical communication algorithms and designs; Implementation of communication systems in USRP radios.

Prerequisite: EEL 6535 or EEL 6509.

EEL 6532 Information Theory 3 Credits**Grading Scheme:** Letter Grade

Applications of information theory to communications and other related areas.

Prerequisite: EEE 5544 or equivalent.

EEL 6533 Data Analytics and Decision Sciences 3 Credits**Grading Scheme:** Letter Grade

Hypothesis testing of signals in the presence of noise by Bayes, Neyman-Pearson, minimax criteria; estimation of signal parameters.

Prerequisite: EEE 5544.

EEL 6535 Digital Communications 3 Credits**Grading Scheme:** Letter Grade

Digital modulation techniques; analysis of digital communication systems in presence of noise; optimum principles; synchronization; equalization.

Prerequisite: EEE 5544.

EEL 6537 Spectral Sensing and Sparse Signal Recovery 3 Credits**Grading Scheme:** Letter Grade

Measurement and analysis of signals and noise. Digital filtering and spectral analysis; fast Fourier transform.

Prerequisite: EEE 5544, EEE 5502 .

EEL 6550 Error Correction Coding 3 Credits**Grading Scheme:** Letter Grade

Introduction to abstract algebra, block coding and decoding, convolutional coding and decoding, trellis coded modulation, and run-length-limited codes.

Prerequisite: EEE 5544 or equivalent. ;

Corequisite: EEE 5544 or 4516.

EEL 6555 Signal Processing for Active Sensing 3 Credits**Grading Scheme:** Letter Grade

Theoretically developing an active sensing system by taking into account the probing waveform synthesis considerations under various spectrum restrictions, as well as the sophisticated receiver statistical and array signal processing methodologies to combat diverse adverse effects such as interference and jamming.

Prerequisite: EEL 6537 or equivalent.

EEL 6588 Wireless Ad Hoc Networks 3 Credits**Grading Scheme:** Letter Grade

Advanced research-oriented course covering various topics relevant to a cutting-edge technology, namely wireless ad hoc networks, mobile ad hoc networks, wireless sensor networks, and/or wireless mesh networks.

Prerequisite: EEL 5718, Graduate student standing.

EEL 6591 Wireless Networks 3 Credits**Grading Scheme:** Letter Grade

Design and analysis of wireless networks including channel characteristics, physical layer, cellular concepts, multiple access control protocols, FEC and ARQ protocols, resource allocation, and wireless standards.

Prerequisite: EEL 5718 and knowledge of probability and statistics.

EEL 6614 Modern Control Theory 3 Credits**Grading Scheme:** Letter Grade

Optimization of systems using the calculus of variations, dynamic programming, and the maximum principle. Extensive study of the linear plant with a quadratic performance index. Observers and dynamic compensators.

Prerequisite: EEL 5182.

EEL 6617 Linear Multivariable Control 3 Credits**Grading Scheme:** Letter Grade

Transfer matrix theory of systems, emphasis on feedback, internal stability, model matching, and assignment of invariant factors.

Prerequisite: EEL 5182.**EEL 6686 Embedded Systems Seminar 3 Credits****Grading Scheme:** Letter Grade

An embedded system is any computing system other than traditional computer systems. Examples include set-top boxes, digital cameras, alarm systems, automotive systems, aerospace systems, and cell phones. Structured as a seminar course and will review cutting-edge publications with student presentations.

Prerequisite: CDA 5636.**EEL 6706 Fault-Tolerant Computer Architecture 3 Credits****Grading Scheme:** Letter Grade

Design and quantitative analysis of fault-tolerant architectures and dependable systems including fundamental issues, redundancy techniques, evaluation methods, design methodology, and applications.

Prerequisite: EEL 5764 or CDA 5155.**EEL 6761 Cloud Computer Systems and Applications 3 Credits****Grading Scheme:** Letter Grade

A broad introduction to cloud and distributed computing, big data platforms and intelligent platforms. It covers system architecture, programming models, algorithmic design, and big data applications. Selected applications will be used as case studies.

Prerequisite: EEL 5737 or EEL 5764. Instructor approval possible if student demonstrates familiarity with algorithms, data structure, computer systems, and programming (such as Java, Python, C/C++, Go, Scala).

EEL 6763 Parallel Computer Architecture 3 Credits**Grading Scheme:** Letter Grade

Advanced architecture emphasizing design and quantitative analysis of parallel architecture and systems, including theory, hardware technologies, parallel and scalable architectures, and software constructs.

Prerequisite: EEL 5764.**EEL 6814 Neural Networks and Deep Learning 3 Credits****Grading Scheme:** Letter Grade

Nonlinear modeling and neural networks. Gradient descent learning in the additive neural model; statistical learning concepts; dynamic neural networks, function approximation and short-term memory; unsupervised learning networks; generative models and statistical representation; autonomous learning using cognitive principles. Importance and challenges of deep learning; applications for image, video, speech recognition.

Prerequisite: EEL 5840**EEL 6825 Pattern Recognition and Intelligent Systems 3 Credits****Grading Scheme:** Letter Grade

Decision functions; optimum decision criteria; training algorithms; unsupervised learning; feature extraction, data reduction; potential functions; syntactic pattern description; recognition grammars; machine intelligence.

Prerequisite: Machine Learning.**EEL 6841 Machine Intelligence and Synthesis 3 Credits****Grading Scheme:** Letter Grade

Theory of machine intelligence applied to general problem of engineering intelligent computer systems and architecture. Applications emphasized.

Prerequisite: EEL 5840.**EEL 6871 Cloud Computing Systems Management 3 Credits****Grading Scheme:** Letter Grade

An introduction to models, software platforms, optimization techniques, predictive modeling, feedback-based computing approaches, monitoring techniques and applications of software-defined cloud management. These concepts are needed to enable the automated management of the scale and service orientation of cloud computing systems.

Prerequisite: EEL 5737 or EEL 6892**EEL 6892 Virtual Computers 3 Credits****Grading Scheme:** Letter Grade

Techniques for virtualization of networked computer systems. Virtual machines (classic VMs, application binary interface VMs, para-virtualization), virtual distributed file systems (file system proxies, call-forwarding), and virtual networks (tunneling, virtual private networks).

Prerequisite: EEL 5737 or instructor approval.**EEL 6905 Individual Work 1-4 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Selected problems or projects.

Prerequisite: consent of adviser.**EEL 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

EEL 6933 Electrical and Computer Engineering Graduate Seminar 1 Credit, Max 3 Credits**Grading Scheme:** S/U

Exploring ECE research through presentations by faculty members, graduate students, and invited speakers.

Prerequisite: Graduate student status**EEL 6935 Special Topics in Electrical Engineering 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Special Topics in Electrical Engineering

EEL 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

EEL 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

EEL 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EEL 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.

EGN 6640 Entrepreneurship for Engineers 3 Credits**Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

Engineering, General

CAP 5771 Introduction to Data Science 3 Credits**Grading Scheme:** Letter Grade

Introducing the basics of data science including programming for data analytics, file management, relational databases, classification, clustering and regression. The foundation is laid for big data applications ranging from social networks to medical and business informatics.

Prerequisite: COP 3530 Data Structures and Algorithms or equivalent.**EEE 5354L Semiconductor Device Fabrication Laboratory 3 Credits****Grading Scheme:** Letter Grade

This course will be offering hands-on experience in semiconductor material characterization and device fabrication techniques.

EEE 5776 Applied Machine Learning 3 Credits**Grading Scheme:** Letter Grade

Major machine learning concepts with a focus on application. Topics include classification, regression, unsupervised learning, maximum likelihood, Bayesian, and deep learning models.

Prerequisite: Math for Intelligent Systems, Programming for ADE, and Applied Data Science.**EEE 6778 Applied Machine Learning II 3 Credits****Grading Scheme:** Letter Grade

Advanced topics in applied machine learning with an applied focus. Topics include graphical models, unsupervised learning, model selection, as well as variational auto-encoder, generative adversarial network, and recursive deep learning architectures.

Prerequisite: EEE 5776 Applied Machine Learning.**EGN 5215 Machine Learning Applications in Civil Engineering 3 Credits****Grading Scheme:** Letter Grade

Students will leverage state-of-the-art techniques and tools in machine learning to solve Civil Engineering problems. Fundamentals of data analytics and machine learning techniques will be applied to real-world tasks in Civil Engineering. Students will gain essential knowledge and programming skills (using R) in data preprocessing, feature selection, model comparison, hyperparameter tuning and machine-learning interpretation. Case studies and applications are included for hands-on experience.

Prerequisite: Undergraduate level courses in probability and statistics.**EGN 5216 Machine Learning for Artificial Intelligence Systems 3 Credits****Grading Scheme:** Letter Grade

This course aims to provide a framework to develop real-world machine learning systems that are deployed, reliable, and scalable. The focus of this course is to introduce basic modules of machine learning systems, namely, data management, data engineering, approaches to model selection, training, scaling, monitoring, and deploying to Machine Learning systems.

Prerequisite: (MAC 2313 OR EQUIVALENT) AND (MAS 4105 OR MAS 3114 OR EQUIVALENT) AND (STA 4321 OR STA 3032 OR EQUIVALENT) and familiarity with at least one programming language (Python preferred).**EGN 5442 Programming for Applied Data Science 3 Credits****Grading Scheme:** Letter Grade

Concepts used to skillfully apply and create new Data Science algorithms using a high-level language such as Python or R.

Prerequisite: Previous experience with computer programming strongly encouraged.**EGN 5447 Mathematical Foundations for Data Science for Engineers I 3 Credits****Grading Scheme:** Letter Grade

The first of a two-part series designed to equip students with the essential mathematical skills required in the rapidly evolving field of data science. This course lays a solid groundwork in the fundamentals of linear algebra, probability, and information theory, with a particular emphasis on their relevance and practical applications in data science.

Prerequisite: Undergraduate level statistics, linear algebra, and calculus.**EGN 6216 Artificial Intelligence Systems 3 Credits****Grading Scheme:** Letter Grade

Apply the concepts, frameworks and tools used for building Artificial Intelligence (AI) systems in the real world. Examines the life cycle of AI systems and how such systems can be successfully deployed at scale and be monitored in production.

Prerequisite: One (1) of two ML course options: EGN 5216 or ABE 6933.**EGN 6217 Applied Deep Learning 3 Credits****Grading Scheme:** Letter Grade

Covers the concepts, frameworks, and tools used for building deep learning models. It will also examine applications of deep learning systems in AI involving topics such as computer vision, natural language processing (NLP), speech recognition, sensor signal analysis, and security.

Prerequisite: One of three machine learning course options CAP 6610 or EEL 5840 or ABE 6933.**EGN 6446 Mathematical Foundations for Applied Data Science 3 Credits****Grading Scheme:** Letter Grade

Understand and apply machine learning statistical models including functions of random variables, Monte Carlo, convergence, estimation, and hypothesis testing. Understand and apply optimization algorithms including constrained and unconstrained, first and second order, stochastic and gradient descent, and nonconvex.

Prerequisite: COT 5615.**EGN 6640 Entrepreneurship for Engineers 3 Credits****Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6642 Engineering Innovation 3 Credits**Grading Scheme:** Letter Grade

Concepts of innovative thinking and innovation practices. Using lectures, case studies, team exercises, and guest speakers, the course teaches life skills in innovative thought and action that students can use in careers ranging from starting companies to executing RD projects in large companies.

EGN 6937 Engineering Fellowship Preparation 0-1 Credits**Grading Scheme:** Letter Grade

Engineering Fellowship Preparation will instill in students an understanding of the fellowship and grant process.

EGN 6951 Integrated Product and Process Design G1 3 Credits**Grading Scheme:** Letter Grade

The first part of the two-semester Integrated Product and Process Design (IPPD) course sequence where multidisciplinary teams of students partner with industry sponsors to design and build authentic products and processes on time and within budget. Working along industry liaisons and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.

Prerequisite: 18 credits of graduate course work approved.**EGS 6039 Engineering Leadership 3 Credits****Grading Scheme:** Letter Grade

Concepts, theory and practice of engineering leadership; effective written and oral communications and presentations; engineering leadership characteristics, individual differences and self-awareness; developing and building teams; managing change, conflicts, and crises; and understanding real-world ethics and core values.

EGS 6101 Divergent Thinking 3 Credits**Grading Scheme:** Letter Grade

Focuses on student acquisition of divergent thinking skills to support the engineering design process. It emphasizes the importance of student practices such as observing, questioning, learning and experimenting, and stresses cultivating an openness to new experiences, in order to generate ideas and devise solutions to complex design problems.

EGS 6216 AI Ethics for Technology Leaders 3 Credits**Grading Scheme:** Letter Grade

Students learn core concepts of AI ethics and apply them to real-world scenarios. As future technology leaders, students completing this elective course will be able to identify, analyze and evaluate ethical considerations in developing and deploying AI systems. AI's global impact and navigating complex issues while respecting diverse values are examined. A major focus is on AI safety and beneficial AI development, providing current knowledge on social issues.

Prerequisite: Graduate student status. Course registration priority will be given to MS students enrolled in the MSADA and MSAIS programs. Preferably, students will have completed an undergraduate course in engineering ethics and/or AI systems

EGS 6512 Managing Engineering with Integrity 3 Credits**Grading Scheme:** Letter Grade

Managing Engineering with Integrity explores ethical norms in research, intellectual property, authorship, and RD management found within the engineering field. Through interactive lectures, team projects, and case studies, students develop strategies for ethical leadership. Weekly presentations enhance collaboration and communication. Emphasizing ethics, innovation, and leadership, the course equips graduate students to foster ethical cultures, resolve conflicts, and guide teams in high stakes.

EGS 6626 Fundamentals of Engineering Project Management 3 Credits**Grading Scheme:** Letter Grade

Provides engineering students with a comprehensive understanding of how to plan, optimize and efficiently manage projects (or tasks) to implement products, services or developments. This includes building the structure, processes, components and linkages with a team for successful project delivery within schedule, budget and quality requirements.

EGS 6628 Advanced Practices in Engineering Project Management 3 Credits**Grading Scheme:** Letter Grade

Applied Engineering Project Management expands on foundational project management practices to include complex as well as new project delivery concepts. Topics include project acquisition; negotiation skills; advanced risk planning and management; program management; project.

Prerequisite: EGS 4625/6626, Fundamentals of Engineering Project Management, or equivalent (with permission of the instructor).

EGS 6629 Agile Project Management for Engineers and Scientists 3 Credits**Grading Scheme:** Letter Grade

Provides students with a comprehensive understanding of the agile mindset and why agility is needed when managing complex-adaptive products in a volatile and uncertain environment. The course promotes agile thinking by building a complex-adaptive product using industry-leading agile frameworks (e.g., Scrum). Students explore conditions that foster personal and organizational agility.

Prerequisite: Students enrolled in a Herbert Wertheim College of Engineering graduate degree program or students enrolled at UF as a graduate certificate seeking student.

EGS 6681 Advanced Engineering Leadership 3 Credits**Grading Scheme:** Letter Grade

Designed to further develop the leadership framework and capabilities of graduate engineering students. It involves a case study-based instructional approach that reviews and applies strategic leadership concepts and knowledge critical to the success of engineering-based companies that now operate in a highly-uncertain and volatile business environment.

Prerequisite: EGS 6039 or instructor approval.

ESI 6900 Principles of Engineering Practice 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Course work in specialized topics for graduate students.

Prerequisite: consent of instructor.

English

AML 6017 Studies in American Literature Before 1900 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Studies in American Literature Before 1900

AML 6027 Studies in 20th-Century American Literature 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Studies in 20th-Century American Literature

CRW 6130 Fiction Writing 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Fiction Writing

CRW 6166 Studies in Literary Form 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Formal aspects of literature.

Prerequisite: consent of instructor.

CRW 6331 Verse Writing 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Verse Writing

CRW 6906 Individual Work 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual study in reading literature and criticism, required for MFA specialization in creative writing.

ENC 5236 Advanced Business Writing for Accounting 4 Credits**Grading Scheme:** Letter Grade

Practice in and examination of theories of professional writing.

ENC 6428 Digital English 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Digital technologies, media, and programs related to the discipline of English. Scholarship and theory about (and production of work in) such media (web, MOO).

ENC 7760 From Paper to Publication: The Peer-Reviewed Journal Article in English Studies and Related Fields 3 Credits**Grading Scheme:** Letter Grade

Publishing peer-reviewed articles is essential to job placement and promotion in the humanities; this course teaches strategies for success in academic writing, the review process, and assessing journals. By the end of the semester, students revise a paper and submit it to a peer-reviewed journal in their area of specialization.

ENG 6016 Psychological Approaches to Literature 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Psychological Approaches to Literature

ENG 6075 Literary Theory: Issues 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Literary Theory: Issues

ENG 6077 Literary Theory: Forms 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Forms of theory studies (e.g., "schools," writing practices, assemblages of theoretical issues).

ENG 6137 The Language of Film 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

The Language of Film

ENG 6138 Studies in the Movies 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Studies in the Movies

ENG 6824 Proseminar in Graduate Studies in English: Research, Writing, and the Profession 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

The proseminar has a two-fold objective: to introduce students to research methods, scholarly writing, and professionalization and to examine of a specific topic in English, Writing, or Media Studies. Students have the opportunity to work in their areas of research. Assignments include bibliographies, academic genres, presentations, and peer reviews.

ENG 6906 Individual Work 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual Work

ENG 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ENG 6932 Film and Video Production 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

A variable-topics film and video production seminar.

Prerequisite: None.**ENG 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ENG 7960 Prospectus and Dissertation in the Humanities 3 Credits, Max 6 Credits**Grading Scheme:** S/U

Provides guidance and structure for students who have completed their course work and are preparing for their qualifying exams and writing their dissertation prospectus. Teaches research methods and writing, as well as skills in project and time management.

ENG 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ENG 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ENL 6246 Studies in Romantic Literature 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Studies in Romantic Literature

ENL 6256 Studies in Victorian Literature 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Studies in Victorian Literature

ENL 6276 Studies in 20th-Century British Literature 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Studies in 20th-Century British Literature

LAE 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

LAE 6947 Writing Theories & Practices 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Writing Theories Practices

Prerequisite: English major.**LIT 6047 Studies in Drama 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Studies in Drama

LIT 6236 Postcolonial Studies 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Postcolonial literature and theory, including theories of colonialism and globalization, as well as the literature of Africa, Asia, the Caribbean, Australia, New Zealand, and Canada as they pertain to colonialism and its legacies.

LIT 6357 African-Amer. or African Diaspora Lit./Cultures 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

African-Amer. or African Diaspora Lit./Cultures

LIT 6358 Theoretical Approaches to Black Cultural Studies 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Explorations of theory and black writing and the variety of theoretical approaches.

LIT 6855 Issues in Cultural Studies 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Issues in Cultural Studies

LIT 6856 Cultural Studies: Interventions 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Praxes, perspectives, and limitations of cultural and theoretical studies within the multiple contexts of their production.

LIT 6934 Variable Topics 1-5 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Studies in topics not normally offered in the regular curriculum, including intensive study of topics within a literary period, extensive study of motifs crossing several periods, and studies in various national or ethnic literatures (African, Afro-American, Jewish, Scots).

Entomology and Nematology

ALS 5156 Agricultural Ecology Principles and Applications 3 Credits**Grading Scheme:** Letter Grade

Introduction to agroecosystems. Ecological principles with examples and applications from agriculture.

ALS 6046 Grant Writing 2 Credits**Grading Scheme:** Letter Grade

Preparation, submission, and management of competitive grants, including operations of national review panels and finding sources of extramural funding.

Prerequisite: admitted to doctoral program.**ALS 6166 Exotic Species and Biosecurity Issues 3 Credits****Grading Scheme:** Letter Grade

U.S. policies and programs affecting agricultural biosecurity, Attention is devoted to current agricultural and extension and regulatory programs. Emphasizes policies and procedures in detecting and reporting non-indigenous species. Students will develop the analytical capabilities to assess the consequences of agricultural biosecurity threats.

Prerequisite: BSC 2010, BSC 2010L, BSC 2011, BSC 2011L, or equivalent.**ALS 6502C Linear Models in Agriculture and Natural Resources 3 Credits****Grading Scheme:** Letter Grade

This applied research methods and analysis course addresses common challenges of biological data, such as dealing with nested experimental designs, repeated measurements, and non-normal distributions using the program R.

Prerequisite: STA 6093 or equivalent.**ALS 6935 Topics in Biological Invasions 3 Credits****Grading Scheme:** Letter Grade

Non-native species invasions and environmental effects of these invaders. Students will develop analytical capabilities to assess the consequences of biological invasions.

Prerequisite: BSC2010/BSC2010L and BSC2011/BSC2011L or equivalent.**ENY 5006 Graduate Survey of Entomology 3 Credits****Grading Scheme:** Letter Grade

Introduces basic principles of insect science, including insect diversity, evolution, morphology, physiology, behavior, and ecology, as well as applications of insect biology.

ENY 5006L Graduate Survey of Entomology Laboratory 1 Credit**Grading Scheme:** Letter Grade

Practical experience working with insects, using laboratory equipment, dissecting insects, and preparing laboratory reports. Collection required.

Corequisite: ENY 5006.**ENY 5160C Survey of Science with Insects 3 Credits****Grading Scheme:** Letter Grade

Interactions of insects with man and environment.

ENY 5212 Insects and Wildlife 3 Credits**Grading Scheme:** Letter Grade

Insects and other arthropods and their relationships with wild vertebrate animals.

ENY 5223C Biology and Identification of Urban Pests 3 Credits**Grading Scheme:** Letter Grade

Biology, behavior, identification. Damage recognition of species that infest houses, damage structures, and affect pets and humans.

ENY 5226C Principles of Urban Pest Management 3 Credits**Grading Scheme:** Letter Grade

Methods of controlling household, structural, and occasional pests. Chemical and nonchemical control of cockroaches, termites, and fleas.

ENY 5241 Biological Control 4 Credits**Grading Scheme:** Letter Grade

Principles involved in the natural and biological control of insects.

ENY 5332 Graduate Survey of Urban Vertebrate Pest Management 2 Credits**Grading Scheme:** Letter Grade

Biology, ecology, health risks, exclusion, and control of vertebrate pests in urban environment.

ENY 5405 Insects as Vectors of Plant Pathogens 3 Credits**Grading Scheme:** Letter Grade

This course will be presenting information on insect, other arthropod and nematode vectors of plant pathogens, and the role and management of these vectors in agricultural and environmental areas. Including material on identification and morphology of important vectors and how these features affect transmission of plant pathogens.

Prerequisite: ENY3005, ENY5006, or equivalent**ENY 5516 Turf and Ornamental Entomology 3 Credits****Grading Scheme:** Letter Grade

Identification, biology, and integrated management of common arthropod families and species inhabiting turfgrasses and popular ornamental plants in the urban environment with emphasis on the Southeastern U.S.

ENY 5566 Tropical Entomology 3 Credits**Grading Scheme:** Letter Grade

Natural history, ecology, behavior, natural ecosystems, and agroecosystems of tropics.

ENY 5567 Tropical Entomology Field Laboratory 2 Credits**Grading Scheme:** Letter Grade

Field experience observing the natural history, ecology, and behavior of insects in natural ecosystems and agroecosystems in the tropics.

Prerequisite: ENY 5566.**ENY 5611 Immature Insects 4 Credits****Grading Scheme:** Letter Grade

Structure and identification of immature forms of insects, especially the Holometabola.

ENY 5820 Insect Molecular Genetics 3 Credits**Grading Scheme:** Letter Grade

Basics of DNA, RNA, gene transcription and translation, and tools used in molecular genetics of insects.

ENY 6166 Insect Classification 3 Credits**Grading Scheme:** Letter Grade

Classification of adult insects to family and of some to species level. Habitat, niche, and relationship to environment.

ENY 6203 Insect Ecology 3 Credits**Grading Scheme:** Letter Grade

Advanced course on concepts in ecology with emphasis in insects; relationships with their biotic and physical environments and basics of ecological research.

Corequisite: ENY 6203L**ENY 6203L Insect Ecology Laboratory 1 Credit****Grading Scheme:** Letter Grade

Methodology and instrumentation used in ecological research with insects.

Corequisite: ENY 6203**ENY 6206 Ecology of Vector-Borne Disease 3 Credits****Grading Scheme:** Letter Grade

Introduces the critical components of vector-borne disease systems and the basic concepts inherent to disease ecology. The course also focuses on various vector-borne diseases of humans and wildlife and how aspects of the environment and host/vector biology influence disease transmission. Other topics include epidemiology, transmission models and emerging diseases.

Prerequisite: General Biology or equivalent**ENY 6207 Ecology and Conservation of Pollinators 3 Credits****Grading Scheme:** Letter Grade

Examines interactions between animals and the plants that they pollinate, current threats to pollinator populations, and the conservation of pollinators worldwide. In this course, we will explore these topics through readings, discussion, and a field research project.

Prerequisite: BSC 2010 and BSC 2010L or equivalents with minimum grades of C-, and graduate standing.**ENY 6248 Termite Biology and Control 2 Credits****Grading Scheme:** Letter Grade

Taxonomy, identification, behavior, ecology, and methods of control for the economically important termites of the New World.

ENY 6259 Global Change and Insect Declines 2 Credits**Grading Scheme:** Letter Grade

Introduces students to the global impacts of anthropogenic change on insect diversity and abundance. Each week students will read pertinent papers on important topics such as pollution, pesticides, and climate change, followed by group discussions on how these factors are impacting insects in Florida and globally.

ENY 6401 Insect Physiology 3 Credits**Grading Scheme:** Letter Grade

Physiology and biochemistry of insect development and adaptation for survival.

ENY 6401L Insect Physiology Laboratory 1 Credit**Grading Scheme:** Letter Grade

This graduate-level laboratory course complements the lecture course in Insect Physiology (ENY 6401). Students will learn internal and external anatomy of insects and gain proficiency in physiological, biochemical, and molecular biology techniques such as estimating respiratory gas exchange, protein purification and quantification, and estimating enzyme activity

Prerequisite: ENY 3005 & BSC 2010 & BSC 2011**ENY 6406 Molecular Biology of Insects and Nematodes 3 Credits****Grading Scheme:** Letter Grade

Provides foundation knowledge of molecular biology, with emphasis on scientific discoveries from insects and nematodes. Presents information on the current innovations and trends of molecular technologies (e.g. high throughput sequencing, different types of omics, genome editing by CRISPR).

Prerequisite: BSC 2005, BSC 2010, ABE 2062, AGR 3303, ANS 3006, BCH 4024, ENY 2040, ENY 3005, or equivalent; or instructor permission.**ENY 6454 Behavioral Ecology and Systematics of Insects 3 Credits****Grading Scheme:** Letter Grade

A theoretical and practical treatment of behavioral ecology and how phylogenetic methods can be employed to both develop and test hypotheses of how insect behavior has evolved.

ENY 6456C Social Insects 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of social insect biology in the context of comparative social evolution. Topics include the diversity of social behaviors in insects, evolutionary origins of sociality, kin recognition, caste systems, communication in social groups, and impacts of social insects.

ENY 6572 Apiculture I 3 Credits**Grading Scheme:** Letter Grade

The biology of honey bees and the craft of apiculture will be examined by exploring the life cycle of honey bees, biogeography and evolution of beekeeping. Equipment, techniques, management practices, pollination ecology, economic practices and current issues within beekeeping will be discussed.

ENY 6575 Apiculture II 3 Credits**Grading Scheme:** Letter Grade

This course will provide more depth on topics introduced in Apiculture I including beekeeping styles, colony stressors and yearly management. This course will also explore issues affecting the beekeeping industry including integrated pest management, pests/diseases, African bees, commercial pollination, queen production, bee removals and pesticides will be discussed.

Prerequisite: ENY 6572.**ENY 6576 Honey Bee Biology 3 Credits****Grading Scheme:** Letter Grade

This course will provide an in-depth look into the fascinating world of honey bee biology. Herein, we will explore topics including honey bee sociality, taxonomy, biogeography, behavior, anatomy, physiology, reproduction, nutrition and genetics. Additionally, these topics will be discussed via the paradigm of the honey bee superorganism.

ENY 6591C Advanced Mosquito Identification 3 Credits**Grading Scheme:** Letter Grade

Intensive, hands-on training on morphological features and the identification of adult and larval mosquitoes species that occur in North America, and discussions on historical and current issues in mosquito taxonomy.

Prerequisite: ENY 3005 or ENY 4161**ENY 6593 Advanced Mosquito Biology 3 Credits****Grading Scheme:** Letter Grade

This course will be covering six critical areas of mosquito biology; classification, natural history and ecology, physiology, population dynamics, mosquito-borne diseases, and control of mosquitoes. Students will understand the fundamental processes governing mosquitoes and mosquito-borne diseases.

ENY 6651C Insect Toxicology 3 Credits**Grading Scheme:** Letter Grade

Chemistry, toxicity, mode of action, metabolism, and environmental considerations of insecticides and related compounds. Mechanisms of resistance to insecticides.

ENY 6665 Advanced Medical and Veterinary Entomology I 3 Credits**Grading Scheme:** Letter Grade

Taxonomy, morphology, and biology of arthropods of medical and veterinary importance. A collection and project proposal will be required.

Corequisite: ENY 6665L.**ENY 6665L Advanced Medical and Veterinary Entomology Laboratory 1 Credit****Grading Scheme:** Letter Grade

Identification of mosquitoes, ticks, lice, fleas, and other disease vectors. Collection required.

Corequisite: ENY 6665: Advanced Medical and Veterinary Entomology I.**ENY 6706 Forensic Entomology 3 Credits****Grading Scheme:** Letter Grade

The role of arthropods in decomposition, in criminal and civil investigations and the increasing importance of science on society. The material discussed in this course deals with death and some may consider images and concepts disturbing.

ENY 6821 Insect Microbiology 3 Credits**Grading Scheme:** Letter Grade

Associations existing between insects and microorganisms including mutualistic relationships, commensalism, vector biology, and insect-pathogen interactions.

Prerequisite: consent of instructor.**ENY 6905 Problems in Entomology 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual study under faculty guidance. Student and instructor to agree on problem and credits prior to registration.

ENY 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Research for nonthesis M.S. students.

ENY 6920L Invasive Ant Boot Camp 1 Credit**Grading Scheme:** Letter Grade

Three-day hands-on, workshop-style course focused on learning to recognize the world's most invasive and problematic ant species in the laboratory and the field. Topics include threats posed by invasive ants to agriculture, the economy, and the environment; collection techniques; identification resources; regulation and policy; and monitoring, management, and control of invasive ants.

ENY 6931 Entomology Seminar 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

Presentation and discussion of current research topics.

ENY 6932 Special Topics in Entomology 1-2 Credits, Max 4 Credits**Grading Scheme:** S/U

Reports and discussions on selected topics announced in advance.

ENY 6934 Selected Studies in Entomology 1-4 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Current issues. Subject matter variable, may be repeated with different subject each time.

ENY 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

ENY 6942 Insect Diagnostics 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Identifying insects and diagnosing plant damage caused by insects.

ENY 6943 Entomology Internship 1-3 Credits, Max 6 Credits**Grading Scheme:** S/U

Diagnosing plant disorders caused by complex of insects and other factors.

ENY 6944 Entomology Extension Internship 1-3 Credits, Max 6 Credits**Grading Scheme:** S/U

Diagnosing insect damage to plants in field and greenhouse. Learning to make control recommendations.

ENY 6945 Practical Work Experience in Entomology and Nematology 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Firsthand, authentic work experience in Entomology or Nematology under the supervision of a faculty member and workplace supervisor. Projects vary depending upon the program requirements.

ENY 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

ENY 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ENY 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

IPM 6021 Insect Pest and Vector Managem 3 Credits**Grading Scheme:** Letter Grade

Covers the principles and practices used in pest and vector management, and also emphasizes the arthropod pests affecting crop and ornamental plants, humans and livestock.

Prerequisite: an introductory course in entomology is required.**NEM 5004C Graduate Survey of Nematology 3 Credits****Grading Scheme:** Letter Grade

Morphology, anatomy, development, feeding habits, life cycles, disease cycles, and control of nematodes that parasitize plants and animals. Role of plant parasitic nematodes in disease complexes and as vectors of plant viruses. "Free-living" nematodes that inhabit oceans, fresh water, and soil.

NEM 5707C Plant Nematology 3 Credits**Grading Scheme:** Letter Grade

Identification of plant parasitic nematodes, diseases they cause, interactions with other plant parasites, and management schemes to control population densities.

NEM 6101 Nematode Morphology and Anatomy 2 Credits**Grading Scheme:** Letter Grade

The course provides advanced knowledge on morphology and anatomy of free-living, plant-parasitic, and animal-parasitic nematodes. It covers detailed morphological structures and anatomical systems in the context of their physiological and ecological functions as well as systematics, classification, and identification.

NEM 6101L Nematode Morphology and Anatomy Lab 2 Credits**Grading Scheme:** Letter Grade

The course provides advanced knowledge on morphology and anatomy of freelifing, plant-parasitic, and animal-parasitic nematodes. It covers detailed morphological structures and anatomical systems in the context of their physiological and ecological functions as well as systematics, classification, and identification.

Corequisite: NEM 6101.**NEM 6102 Nematode Systematics and Molecular Phylogeny 2 Credits****Grading Scheme:** Letter Grade

Theory and practice of using molecular evidence, particularly DNA sequence data, for addressing diverse systematic and evolutionary questions will be explored. Morphological, molecular, and basic bioinformatics tools will be addressed.

Prerequisite: NEM 6942 (Nematode Diagnosis)**NEM 6102L Nematode Systematics and Molecular Phylogeny Laboratory 2 Credits****Grading Scheme:** Letter Grade

Morphological, molecular, and basic bioinformatics tools used in nematode species identification will be explored. Emphasizing basic molecular techniques, such as DNA extraction and quantification, restriction enzyme digestion, polymerase chain reaction and agarose gel electrophoresis.

Corequisite: NEM6102 (Nematode Systematics and Molecular Phylogeny)**NEM 6103 Insect Parasitic Nematodes 2 Credits****Grading Scheme:** Letter Grade

Insect-parasitic nematodes in all taxons, including their pathogenicity, life cycles, etc. Steinernematidae and Heterohibditidae emphasized.

NEM 6103L Entomopathogenic Nematodes Laboratory 1 Credit**Grading Scheme:** Letter Grade

Intensive lab that focuses on entomopathogenic nematodes. Students will learn the morphological, molecular, and basic bioinformatics tools used to identify entomopathogenic nematodes to species. In addition, soil sampling techniques, nematode isolation and baiting methods will be covered.

NEM 6201 Nematode Ecology 3 Credits**Grading Scheme:** Letter Grade

Population and community ecology of plant-parasitic and other soil-inhabiting nematodes. Mathematical descriptions and relationships will be emphasized where appropriate.

NEM 6708 Field Plant Nematology 2 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Field trips to various agricultural research stations and production areas in Florida to learn plant symptoms and current research methods.

NEM 6905 Problems in Nematology 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Problems in Nematology

NEM 6931 Nematology Seminar 1 Credit, Max 6 Credits**Grading Scheme:** Letter Grade

Presentation and discussion of current research, research topics.

NEM 6932 Special Topics in Nematology 1-4 Credits, Max 4 Credits**Grading Scheme:** S/U

Reports and discussions.

NEM 6934 Selected Studies in Nematology 1-4 Credits**Grading Scheme:** Letter Grade

Current issues with subject matter variable.

NEM 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

NEM 6942 Nematode Diagnostics 2 Credits**Grading Scheme:** Letter Grade

Diagnosing nematode problems from soil and plant samples.

NEM 6943 Nematode Internship 1-3 Credits, Max 6 Credits**Grading Scheme:** S/U

Diagnosing complex plant disorders caused by nematodes and other factors.

NEM 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

NEM 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

NEM 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PMA 5205 Citrus Pest Management 3 Credits**Grading Scheme:** Letter Grade

Arthropod and nematode pests of citrus. Ecological principles of host and pest community relationships. Pest identification, biology, and interactions with citrus. Pest monitoring, diagnosis, and management.

PMA 6228 Field Techniques in Integrated Pest Management 2 Credits**Grading Scheme:** Letter Grade

Practical aspects of pest management, emphasizing sampling, diagnostics, decision making processes, and informational resources available to IPM practitioner.

Environmental Engineering Sciences

CWR 5125 Groundwater Flow I 3 Credits**Grading Scheme:** Letter Grade

Porous media flow. Darcy's law. Conservation of mass. Laplace equation. Flownets. Well hydraulics.

Prerequisite: Undergraduate coursework including Differential Equations, Dynamics, Hydrodynamics (Fluid Mechanics), and Hydraulics.**CWR 6116 Advanced Surface Hydrology 3 Credits****Grading Scheme:** Letter Grade

Physical and quantitative concepts and principles of hydrologic processes and their engineering applications. Reynolds Transport Theorem, the Continuity and Momentum Equations applied to phenomena and processes. Hydrologic analyses, including unit hydrograph theory, lumped flow routing, and distributed flow routing. Engineering concepts of hydrologic design, design storms and hydrologic chemistry.

Prerequisite: ENV3040C or equivalent numerical methods, STA 3032 or equivalent statistics, CWR3201 or equivalent hydrodynamics

CWR 6252 Environmental Biochemistry of Trace Metals 3 Credits**Grading Scheme:** Letter Grade

Environmental impact and fate of trace metals and metalloids as they cycle through geological and biological environmental compartments. Emphasizes anthropogenic activities of metals with growing environmental concerns, including arsenic, mercury, chromium, and lead.

Prerequisite: consent of instructor.

CWR 6537 Contaminant Subsurface Hydrology 3 Credits**Grading Scheme:** Letter Grade

Physical-chemical-biological concepts and modeling of retention and transport of water and solutes in unsaturated and saturated media. Applications of environmental aspects of soil and groundwater contamination.

Prerequisite: None.**EES 6007 Advanced Energy and Environment 3 Credits****Grading Scheme:** Letter Grade

Energy basis for a system of humanity and nature, including principles of systems ecology, ecological economics, and public policy.

EES 6051 Advanced Environmental Planning and Design 3 Credits**Grading Scheme:** Letter Grade

Sustainable communities and regions. Quantitative methods for evaluating environmental impacts and carrying capacity. Theories of spatial and temporal organization of systems of humanity and nature.

EES 6208 Principles of Water Chemistry I 3 Credits**Grading Scheme:** Letter Grade

Applying chemical principles to aqueous reactions. Emphasizes thermodynamics, kinetics, and aqueous equilibria including acid-base, solubility, complexation, precipitation, and redox.

Prerequisite: Undergraduate coursework in both chemistry and calculus.**EES 6225 Atmospheric Chemistry 3 Credits****Grading Scheme:** Letter Grade

Nature, sources, and sinks of fixed and variable constituents of atmosphere. Chemical changes occurring. Influences and properties of atmospheric components of natural and anthropogenic origin.

Prerequisite: Undergraduate coursework including foundations of air pollution.**EES 6307 Advanced Ecological Engineering 3 Credits****Grading Scheme:** Letter Grade

An advanced course in the fundamental principles of ecology and engineering methods that enables students to use their engineering training to design and quantitatively evaluate interface ecosystems and restoration of drastically altered lands to create symbiotic relationships between humans and the environment.

EES 6309 Wetland Design and Restoration 3 Credits**Grading Scheme:** Letter Grade

Applied and theoretical aspects of wetlands use for water quality management; natural and constructed treatment wetlands; engineering and ecology of wetland systems; design for sustainability and ancillary benefits. Theoretical and applied aspects of the restoration and management of wetland ecosystems.

Prerequisite: EES 6308C; SWS 5242 or WIS 6934**EES 6344 Coastal Policy Lab 3 Credits****Grading Scheme:** Letter Grade

Provides students hands-on experience working on applied engineering and policy challenges faced by real-world stakeholders. Lectures will be given that provide foundational knowledge about how science, engineering and policy interconnect around coastal resilience challenges and solutions. Students will work in small groups to develop engineering research and policy outcomes that can be deployed by clients in the marine and coastal environments.

EES 6345 Florida Marine and Coastal Law and Policy 3 Credits**Grading Scheme:** Letter Grade

Introduces students in the engineering, science, and policy disciplines to the complex legal and regulatory framework that governs Florida's coast and nearshore waters. Among the areas that will be addressed are the law and policy of estuarine and nearshore water quality, submerged lands management, coastal and marine habitat restoration, protected species, and coastal resiliency. The role of climate change and climate science in the policy process will be featured.

EES 6346 Engineering Nature-Based Coastal Solutions 3 Credits**Grading Scheme:** Letter Grade

Provides students with the intellectual background, conceptual framework, and introductory skills needed to develop and incorporate Nature-Based Solutions (NBS) to engineering problems on the coast. Students will learn about the scientific, economic, and engineering rationale for nature-based solutions, engage with the research in nature-based solutions in coastal ecosystems, and develop their understanding of the relationships between ecosystem services, coastal dynamics, and coastal ecology.

EES 6932 Modeling the Fate of Air Pollutants 3 Credits**Grading Scheme:** Letter Grade

Provides the concept/skill that integrate atmospheric kinetic and thermodynamic data obtained from photochemical reactors into gas/aerosol models using a kinetic solver. This course provides flexibility in modeling topics that allow students to study emerging issues in atmospheric chemistry and to individualize topics based on their backgrounds/research.

Prerequisite: Undergraduate coursework including general chemistry and foundations of air pollution.**EEN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits****Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.**EEN 6640 Entrepreneurship for Engineers 3 Credits****Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EEN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

ENV 5105 Foundations of Air Pollution 3 Credits**Grading Scheme:** Letter Grade

Principal types, sources, dispersion, effects, and physical, economic and legal aspects of control of atmospheric pollutants.

ENV 5306 Municipal Refuse Disposal 3 Credits**Grading Scheme:** Letter Grade

Quantities and characteristics of municipal refuse and hazardous materials. Collection methods, transfer stations, equipment and costs. Refuse disposal practices, regional planning and equipment.

ENV 5518 Field Methods in Environmental Hydrology 3 Credits**Grading Scheme:** Letter Grade

Field methods for characterizing sites for environmental and hydrologic evaluation. Focuses on subsurface systems and ground water interactions.

Prerequisite: Coursework including introductory concepts of fluid flow.**ENV 5619 Principles of Sustainable Engineering Design 3 Credits****Grading Scheme:** Letter Grade

Principles of Sustainable Engineering Design is a 3-credit hour course for civil and environmental engineering seniors and graduate students. Students will learn the meaning of sustainability and sustainable development and how those concepts apply to the planning, design and operation of civil infrastructure.

ENV 6043 Life Cycle Assessment 3 Credits**Grading Scheme:** Letter Grade

Life Cycle Assessment

ENV 6126 Air Pollution Control Design 3 Credits**Grading Scheme:** Letter Grade

Design, analysis, operational limitations, cost and performance evaluation of control processes and equipment. Field visits to and inspection of industrial installations.

Prerequisite: Undergraduate coursework including Differential Equations, Physics and Chemistry.**ENV 6130 Aerosol Mechanics 3 Credits****Grading Scheme:** Letter Grade

Generating, collecting, and measuring aerosols. Theory of fluid dynamic, optical, electrical, inertial, and thermal behavior of gas-borne particles.

Prerequisite: Undergraduate coursework including Differential Equations, Physics and Fluid Mechanics.**ENV 6301 Advanced Solid Waste Containment Design 3 Credits****Grading Scheme:** Letter Grade

Current practice in designing solid and hazardous waste landfills, waste piles, monofills, and surface impoundments. Regulations, siting, sizing, liners, leachate and gas management, operations, closure, and post-closure.

ENV 6416 Advanced Stormwater Control Systems 3 Credits**Grading Scheme:** Letter Grade

Chemical, physical, biological and hydrologic aspects of rainfall-runoff; and control through unit operations and processes (UOP); interactions between hydrologic processes; water chemistry, sediment transport, infrastructure materials and UOPs; constituent physical properties, chemistry and loads related to design of UOPs for control, treatment and/or reuse.

Prerequisite: Undergraduate coursework in water chemistry and water & wastewater treatment.**ENV 6435 Advanced Water Treatment Process Design 3 Credits****Grading Scheme:** Letter Grade

Design of selected water treatment processes including disinfection, air stripping, adsorption, ion exchange and membrane processes.

Prerequisite: Undergraduate course work in water and/or wastewater treatment process design, calculus, and chemistry.**ENV 6437 Advanced Wastewater System Design 3 Credits****Grading Scheme:** Letter Grade

Layout and design of sanitary sewage systems, pumping stations, force mains, wastewater treatment plants, and methods of effluent disposal. Emphasizes preparing design drawings and estimating costs.

Prerequisite: Undergraduate coursework including water and wastewater treatment;**Corequisite:** Undergraduate coursework including hydraulic system design.**ENV 6438 Advanced Potable Water Systems Design 3 Credits****Grading Scheme:** Letter Grade

Design of water treatment operations, including coagulation, flocculation, mixing, sedimentation, filtration, softening, corrosion control, and sludge management. Design costs.

Prerequisite: Undergraduate course work in water and/or wastewater treatment process design, hydraulics, and chemistry.**ENV 6439 Activated Carbon: Environmental Design and Application 3 Credits****Grading Scheme:** Letter Grade

Theory and application of manufacturing activated carbon, its use in water treatment/remediation (i.e., design of activated carbon systems), and thermal reactivation.

ENV 6441 Water Resources Planning and Management 3 Credits**Grading Scheme:** Letter Grade

Principles and practice of water resource planning and management. Protocols used at local, state, federal, regional, and international levels. Plan formulation, evaluation, and implementation. Stakeholder involvement in planning processes. Analytical tools. Case studies.

ENV 6455 Microbiology of Environmental Engineering Systems 3 Credits**Grading Scheme:** Letter Grade

Divided into three sections that will introduce the morphological and metabolic characteristics of microbial groups and discuss the role of microorganisms in natural (water, soil, and air) and environmental engineered systems.

ENV 6508 Wetland Hydrology 3 Credits**Grading Scheme:** Letter Grade

Water flow and chemical transport in wetlands. Surface water and ground water interaction in wetlands. Constructed wetlands for water treatment.

Prerequisite: Undergraduate coursework in Hydrology, Hydrodynamics, or Fluid Mechanics.**ENV 6511 Biological Wastewater Treatment 3 Credits****Grading Scheme:** Letter Grade

Theory and current research associated with biological treatment processes.

ENV 6905 Individual Work 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Faculty-supervised individual research or study of material not covered in formal courses.

ENV 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ENV 6916 Nonthesis Project 1-3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Nonthesis Project

ENV 6932 Special Problems in Environmental Engineering 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Problems in Environmental Engineering

ENV 6935 Graduate Environmental Engineering Seminar 1 Credit, Max 6 Credits**Grading Scheme:** S/U

Graduate Environmental Engineering Seminar

ENV 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Practicum course to provide students with supervised teaching experience on developing effective instructional methods and materials in engineering education.

Corequisite: EGS 6056.**ENV 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ENV 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ENV 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

LAW 6472 Natural Resources Law 3-4 Credits**Grading Scheme:** Letter Grade

Natural Resources Law

Environmental Horticulture

ALS 5934 Graduate Professional Development Seminar 2 Credits**Grading Scheme:** S/U

Presentations and group discussion of topics essential to enhance awareness, personal satisfaction, and professional success of graduate students

BCH 5045 Graduate Survey of Biochemistry 4 Credits**Grading Scheme:** Letter Grade

Introduction to plant, animal, and microbial biochemistry for graduate students who have not had biochemistry. Integration and regulation of biochemical processes stressed; limited discussion of some biochemical techniques.

Prerequisite: inorganic chemistry, organic chemistry, biology.**HOS 5117C Horticultural Plant Morphology and Identification 3 Credits****Grading Scheme:** Letter Grade

Principles and practices of horticultural plant identification using vegetative and floral morphology.

Prerequisite: for graduate students who have not taken ORH 3513C.**HOS 5432 Advanced Nutritional Management of Ornamental Crops 3 Credits****Grading Scheme:** Letter Grade

Techniques for determining, interpreting, and managing the nutritional status of ornamental plants in the greenhouse, nursery or landscape. Topics include: meter selection and calibration, water analysis, substrate/soil analysis, report interpretation and writing, diagnosis and recommendations.

Prerequisite: SWS 3022/3022L, ORH3253C, or consent of instructor**HOS 5515C Greenhouse and Nursery Operations 3 Credits****Grading Scheme:** Letter Grade

Principles involved in managing nurseries. Interaction among media components, irrigation, and nutrition. Weekend field trips may be required.

Prerequisite: for graduate students needing introduction to the principles of planning, organizing, and managing production operations. Not open to students who have taken ORH 3254.

HOS 5516C Cultivation, Extraction, and Application of Medicinal Plants and Their Bioactive Compounds 3 Credits**Grading Scheme:** Letter Grade

Strong interest in cultivation, extraction, and use of medicinal crops has recently emerged in the fields of plant science, biochemistry and pharmacology. This graduate level course focuses on development of a more thorough understanding of plant production and management as well as secondary plant compound synthesis, extraction, analysis, and use. This course prepares students for careers in natural plant product development and commercial cultivation of medicinal crops.

HOS 6070 Plant Materials for Conservation and Restoration 3 Credits**Grading Scheme:** Letter Grade

Understand how to protect, select, produce, and establish native plants for ecological restoration. Learn the scientific basis for guidelines on planning revegetation, selecting plant material, and formulating successful conservation and restoration plans for rare, threatened and endangered species.

HOS 6295 Methods in Plant Biotechnology 3 Credits**Grading Scheme:** Letter Grade

Plant biotechnology is a highly interdisciplinary field with new advances and techniques emerging at a fascinating speed. This graduate level course is designed as a comprehensive exploration to established and new methodologies used in the field of Plant Biotechnology.

HOS 6523 Research and Development in Turfgrass Science 3 Credits**Grading Scheme:** Letter Grade

Principles and practices of turfgrass improvement and management, including propagation, nutrition, physiology, soil management, and experimental methods applied to turf research.

HOS 6905 Problems in Horticultural Science 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Independent study.

HOS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

HOS 6931 Horticultural Science Seminar 1 Credit, Max 3 Credits**Grading Scheme:** S/U

Oral presentation of material in one of the following areas: literature review, related to student's research; research results; or published paper, of relevance to horticulture. Subject matter determined by instructor. Offered in spring.

HOS 6932 Special Topics 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Study of contemporary research in horticultural science.

HOS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** Letter Grade

Supervised Teaching

HOS 6941 Practicum in Horticultural Science 2-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Supervised and individual work in professional areas of horticulture.

Prerequisite: admission is limited to graduate students majoring in horticultural science.

HOS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

HOS 6991 Fundamentals of Seed Biology 4 Credits**Grading Scheme:** Letter Grade

Students critically analyze pertinent seed biology literature, lead discussions, engage in student-centered mini-lectures, and complete a self-directed project throughout the semester to expand their seed biology knowledge.

Prerequisite: Basic knowledge in plant sciences, botany, and biology or equivalent courses in related fields.

HOS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HOS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ORH 5026C Advanced Annual and Perennial Gardening 3 Credits**Grading Scheme:** Letter Grade

Identification, selection, use, and management of annuals, perennials, herbs, and ornamental grasses in the landscape.

Prerequisite: Junior standing or higher.

ORH 5086 Advanced Golf and Sports Turf Management 2 Credits**Grading Scheme:** Letter Grade

Golf course and sports turf management.

Prerequisite: for graduate students who have not taken ORH 4223.

ORH 5282 Orchid Biology and Culture 3 Credits**Grading Scheme:** Letter Grade

Orchid plants and flowers, including nomenclature, breeding, seed culture, harvesting, and handling.

Prerequisite: for graduate students who have not taken ORH 4280; or consent of instructor.

ORH 5817C Advanced Florida Native Landscaping 3 Credits**Grading Scheme:** Letter Grade

Introduction to nomenclature, effective use, and design elements of plants native to Florida.

Prerequisite: ORH 1520 or 3513.

PLS 5222C Propagation of Horticultural Crops 3 Credits**Grading Scheme:** Letter Grade

Theoretical and practical applications of macro- and micropropagation techniques for higher plants.

Prerequisite: for students who have not taken PLS 3221.

PLS 5241C Advanced Plant Micropropagation 4 Credits**Grading Scheme:** Letter Grade

Practical application of plant tissue for clonal propagation of horticultural crops.

Prerequisite: PLS 3221 or consent of instructor.

Epidemiology

GMS 7858 Causal Artificial Intelligence for Health Research 3 Credits**Grading Scheme:** Letter Grade

This course covers foundational issues in "causal Artificial Intelligence" embedding machine learning with causal inference methods on real-world data, and methodologies for automated causal learning. Health research approaches such as target trials and transportability will be discussed, as well as Artificial Intelligence fairness to tackle health disparities and inequity.

Prerequisite: Instructor approval.GMS7858

PHC 6000 Epidemiology Methods I 3 Credits**Grading Scheme:** Letter Grade

Overview of epidemiology methods used in research studies that address disease patterns in community- and clinic-based populations.

Prerequisite: PHC 6001, PHC 6050 or PHC 6052, or departmental approval.

PHC 6002 Epidemiology of Infectious Diseases 3 Credits**Grading Scheme:** Letter Grade

Epidemiology, prevention, and control of infectious diseases affecting local, national, and global community health; epidemiologic methods used in disease surveillance and measures used in slowing or preventing spread of disease.

Prerequisite: PHC 6001, and PHC 6052 or PHC 6050: Statistical Methods for Health Sciences Research I or departmental approval.

PHC 6003 Epidemiology of Chronic Diseases and Disability 3 Credits**Grading Scheme:** Letter Grade

Overview of epidemiology of chronic diseases and disabilities prevalent in various populations. Introduces contemporary methods for surveillance including risk factors, etiology, and changes over time.

Prerequisite: PHC 6001, and PHC 6052 or PHC 6050 or departmental approval.

PHC 6009 Biology and Epidemiology of HIV/AIDS 3 Credits**Grading Scheme:** Letter Grade

Examining the biological process by which HIV causes infection and AIDS, including the physiologic and cellular processes involved in HIV infection and treatment. Developing skills in finding and interpreting current epidemiologic data on HIV/AIDS, including risk factors, comorbid health issues, special populations, and health outcomes. Overview of HIV prevention strategies and their effectiveness. Special emphasis on epidemiology of HIV/AIDS in the rural south.

PHC 6011 Epidemiology Methods II 3 Credits**Grading Scheme:** Letter Grade

Analytic methods in epidemiology with a foundation in applied epidemiological analysis and experience in peer-review productivity based on secondary data analysis.

Prerequisite: PHC 6000 & PHC 6052 & PHC 6053, or approval of instructor

PHC 6016 Social Epidemiology in Public Health 3 Credits**Grading Scheme:** Letter Grade

Social determinants of population health, including acute and chronic disease outcomes, and health behavior. Introduces methodological approaches to the field of social epidemiology with specific attention to measurement issues.

Prerequisite: PHC 6000, PHC 6001, PHC 6410, or consent of instructor.

PHC 6041 Landmarks in Psychiatric Epidemiology 2 Credits**Grading Scheme:** S/U

Landmarks in psychiatric epidemiology, including mental health and substance use disorders, are reviewed with emphasis on student discovery. The focus is on findings, methodology, and historical development of methods in case finding and diagnosis; cohort discovery; and geographical, social, and community risk factors. Topics include relevance to current methodological challenges.

PHC 6194 Spatial Epidemiology 3 Credits**Grading Scheme:** Letter Grade

Spatial Epidemiologic research methods, with major focus on Geographic Information Systems (GIS) and Exploratory Spatial Data Analysis (ESDA) applied to public health issues.

Prerequisite: All of the following courses: PHC 6000 , PHC 6011 , PHC 6052 , PHC 6053 (or equivalent).

PHC 6517 Public Health Concepts in Infectious Diseases 3 Credits**Grading Scheme:** Letter Grade

Topics and methods used in modern infectious disease epidemiology.

Prerequisite: PHC 6001 and PHC 6002.

PHC 6591 Maternal and Child Health Epidemiology 3 Credits**Grading Scheme:** Letter Grade

This is a 3-credit course offered on campus to graduate students on the epidemiology of maternal and child health. This course is designed to provide a graduate level understanding of how epidemiological principles can be applied to maternal and child mortality and morbidity.

Prerequisite: PHC 6001 and PHC (or equivalent research methods coursework). Students with no prior instruction in epidemiology but with methodological coursework from another related discipline may be admitted with permission from the instructor.

PHC 6598 Foundations in Precision Medicine: Genetic Epidemiology 1 Credit**Grading Scheme:** Letter Grade

Genetic epidemiology, a rapidly evolving field of research, utilizes specialized molecular and statistical methods to identify genetic factors that might be involved in disease etiology. This course provides an exposure to fundamental concepts, terminologies and principles in human population genetics and molecular biology relevant to understanding genetic epidemiologic approaches.

Prerequisite: Enrollment in the Certificate for Precision Medicine or permission of the instructor

PHC 6711 Measurement in Epidemiology and Outcomes Research 3 Credits**Grading Scheme:** Letter Grade

Major designs and principles of measurement for epidemiology and health services outcomes research, with emphasis on use of primary data collection.

Prerequisite: PHC 6001 and PHC 6050 or equivalent.

PHC 6717 Public Health Surveillance 3 Credits**Grading Scheme:** Letter Grade

The purpose of this course is to prepare master's- and doctoral-level students to be able to design, evaluate, and operate epidemiological surveillance systems, and to be able to critically evaluate surveillance systems and reports.

Prerequisite: PHC 6001 and PHC 6000, or equivalent graduate-level coursework in epidemiologic methods, or instructor permission.

PHC 6932 Psychiatric Epidemiology Online Seminar Series 1 Credit**Grading Scheme:** S/U

Epidemiology seminars from the Department of Epidemiology and other epidemiology departments, and associated publications will be used to provide students with an understanding of new developments in the field of epidemiology as applied to psychiatric epidemiology.

PHC 6937 Special Topics in Public Health 1-6 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Special Topics in Public Health

PHC 6939 CPE Psychiatric Grand Rounds 1 Credit**Grading Scheme:** S/U

World-renowned experts are invited to address a wide spectrum of specialties and sub-specialties and often introduce new and interesting developments. Mental health care professionals and epidemiologists will receive up-to-date information on trends and techniques in psychiatry.

Prerequisite: Enrollment in Certificate in Psychiatric Epidemiology

PHC 6971 Research for Master's Thesis 1-4 Credits, Max 4 Credits**Grading Scheme:** S/U

The thesis requires the student to formulate a research question, conduct relevant background research, generate hypotheses, gather and analyze appropriate data, interpret and discuss findings, and determine conclusions. Students submit a written thesis consistent with UF requirements, pass an oral defense of their research and submit their work for publication under the direction of a mentor.

Prerequisite: Satisfactory completion of the first semester of coursework and instructor's permission. All Human Subjects Participation/IRB required training must be completed prior to registering for this course.

PHC 7000 Epidemiology Seminar II: Critical Evaluation, Research Proposals, and Methods 2 Credits**Grading Scheme:** Letter Grade

This course is taken in the second year of the epidemiology PhD program curriculum. Seminar series is designed to introduce students to a range of advanced epidemiologic concepts and research methods to help PhD students advance their dissertation ideas and help students obtain skills needed for a PhD in epidemiology.

Prerequisite: PHC 6001 and PHC 6000 , one semester of biostatistics, and PhD student status in epidemiology or permission of the instructor

PHC 7007 Cancer Epidemiology 3 Credits**Grading Scheme:** Letter Grade

Providing students with skills to evaluate the burden associated with cancers and develop public health interventions to reduce the burden of cancer worldwide. From the population perspective, the course will familiarize students with exposures associated with cancer risk. Practical applications of genome analysis and phenotypic profiling are included/

Prerequisite: PHC 6001 and PHC 6000 or equivalent. PhD student status required; other students need instructor permission. Students with no prior instruction in epidemiology but with methodological coursework from another related discipline may be admitted.

PHC 7017 Advanced Epidemiologic Methods III 3 Credits**Grading Scheme:** Letter Grade

To expand the methodology inventory by introducing advanced and new statistical and modeling methods to address measurement, descriptive, comparative, associative and causal relations in modern epidemiology.

Prerequisite: GMS 6800, GMS 6810, consent of instructor.

PHC 7038 Psychiatric Epidemiology 3 Credits**Grading Scheme:** Letter Grade

Concepts, history, measures, methods and analytical techniques to study the risks, prevalence and incidence, course, comorbidities, and consequences of major mental disorders, in general and specific populations internationally.

Prerequisite: PHC 6000 and PHC 6011**PHC 7065 Advanced Skills in Epidemiological Data Management 2 Credits****Grading Scheme:** Letter Grade

Provides knowledge and skills in data manipulation for population science. Included are: data context, concepts; relational databases; data collection, extraction; parallel manipulation of massive datasets; NoSQL systems, concepts. The course is designed for advanced students to learn the “code of best practice” for data engineering in population science.

Prerequisite: PHC 6052 Introduction to Biostatistical Methods and PHC 6000 Epidemiology Methods I, or equivalents, or instructor permission.**PHC 7083 Artificial Intelligence and Data Science for Epidemiology and Population Health 3 Credits****Grading Scheme:** Letter Grade

This computational epidemiology course blends methodological, practical, and translational aspects with emphasis on new data science methods. The course is not intended to provide statistical training, but rather to teach students to recognize suitable computational approaches to handle data. Practice sessions will acquaint students with statistical and machine learning software.

Prerequisite: PHC 6000, and at least one among PHC 6052, PHC 6053, PHC 7065 or PHC 6711 (or equivalent quantitative stats/programming course with permission of instructor).**PHC 7199 Topics in Precision Medicine and Public Health Informatics 1 Credit****Grading Scheme:** Letter Grade

The course introduces methodological and translational topics in precision medicine and public health informatics and provides knowledge and skills for planning and managing such research.

Prerequisite: Epidemiology Methods I and II and a SAS course, or graduate statistical and quantitative research courses in any relevant department, or permission from the instructor.**PHC 7427 Ethics in Population Science 2 Credits****Grading Scheme:** S/U

Covering federally mandated topics in the Responsible Conduct of Research: Data Acquisition, Management, Sharing, Ownership; Conflict of Interest/Commitment; Human Subjects; Animal Welfare; Research Misconduct; Publication Practices and Responsible Authorship; Mentor/Trainee Responsibilities; Peer Review; and Collaborative Science. This ethics course is for those enrolled in research intensive graduate programs.

Prerequisite: Advanced degree or PhD candidacy or permission of the instructor.**PHC 7594 Genetic Epidemiology 3 Credits****Grading Scheme:** Letter Grade

Covers fundamental concepts and principles in genetic epidemiology. At the completion of this course, students are expected to critically discuss literature, design and conduct basic genetic analysis, and interpret research finding. Advanced methods course for PhD program.

Prerequisite: PHC 6000, PHC 6011 (can be taken concurrently), and PHC 6050C. Talk to the instructor for a prerequisite waiver or further information. For PhD students; MS/MPH students may contact the instructor for permission.**PHC 7595 Introduction to Molecular Epidemiology 3 Credits****Grading Scheme:** Letter Grade

Covering the theoretical concepts in molecular epidemiology and use of biomarkers in epidemiologic studies. Class topics include: basics of molecular epidemiology, potential uses and limitations of biomarkers, sample collection and storage, issues in epidemiologic study design and analysis, and discussion of specific research examples involving molecular markers.

Prerequisite: Knowledge of basic concepts in epidemiology and study designs: PHC 6001**PHC 7727 Grant Writing for Population Health Research 3 Credits****Grading Scheme:** Letter Grade

This course provides practical instruction in the grant process, with a specific focus on National Institutes of Health (NIH) procedures. It provides the student with experience in writing parts of the grant application and in reviewing other's grant applications. It also contains a Mock Grant Review session to assist students in understanding the process and content of grant review.

Prerequisite: PHC 6011 Epidemiology Methods II**PHC 7744 Causal Artificial Intelligence for Health Research 3 Credits****Grading Scheme:** Letter Grade

Will cover theoretical and practical approaches related to causal Artificial Intelligence (AI), embedding machine learning with causal inference methods on real-world data, and methodologies for automated causal learning. Health research topics such as target trials and transportability will be taught. The students will learn theory behind causal inference methods applied under different constraints, and how to build predictive models and risk scores utilizing causal AI.

Prerequisite: PHC 6053 or PHC 7065 or GMS 6803 or GMS 6822 or GMS 6856 Introduction or instructor approval.**PHC 7901 Epidemiology Literature Review and Critique (Journal Club) 1 Credit, Max 3 Credits****Grading Scheme:** S/U

Preparing students to perform peer-review and to think critically. In weekly class discussion sessions, students will review peer-reviewed, published research studies that demonstrate innovative or faculty epidemiologic content or methods. Feedback will be given by student peers and faculty.

Prerequisite: PhD candidacy status or permission from the instructor**PHC 7902 Scientific Writing for Peer Reviewed Publications for Popular Science 3 Credits****Grading Scheme:** Letter Grade

Practice reviewing and critiquing research studies.

Prerequisite: PhD student status or permission of the instructor ;**Corequisite:** Conducting mentored doctoral research

PHC 7910 International Field Epidemiology 3 Credits**Grading Scheme:** S/U

This is an independent study for a student who wishes to accomplish a primary data collection effort internationally.

Prerequisite: PHC 6011 Epidemiology Methods II**PHC 7916 National Field Epidemiology 1-3 Credits****Grading Scheme:** S/U

This applied epidemiology field experience is designed as an opportunity for doctoral students to integrate their growing expertise in epidemiology in a field research experience among a population in the United States.

Prerequisite: PHC 6011 Epidemiology Methods II**PHC 7918 Epidemiology Independent Study 1-3 Credits, Max 12 Credits****Grading Scheme:** S/U

Independent Study is designed for graduate level students who want to pursue in depth an area of study not provided in regularly offered courses. It can involve independent readings or independent projects under the guidance of a faculty sponsor.

Prerequisite: Consent of faculty member supervising the study.**PHC 7934 Seminar I: Epidemiology Past, Present, and Future 2 Credits****Grading Scheme:** Letter Grade

The principal goals of this doctoral seminar include becoming familiar with major programs of research in epidemiology, discussing findings and implications of classic/prominent epidemiologic studies, reviewing the strengths and weakness of major epidemiologic study designs, and applying knowledge of epidemiologic study design to students' formulation of their own research studies.

Prerequisite: PhD standing**PHC 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHC 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

European Studies

EUS 6005 Intro Euro Studies 1 Credit**Grading Scheme:** Letter Grade

Intro Euro Studies

EUS 6905 Individual Work 1-3 Credits**Grading Scheme:** Letter Grade

Individual Work

EUS 6930 Special Topics 3 Credits**Grading Scheme:** Letter Grade

Special Topics

EUS 6932 Seminar: the Eu Today 1-3 Credits**Grading Scheme:** Letter Grade

Seminar: the Eu Today

Family, Youth and Community Sciences

FYC 5935 Personal and Family Financial Planning Capstone 3 Credits**Grading Scheme:** Letter Grade

Critical thinking and decision making about personal and family financial management topics in the context of the financial planning process.

Students analyze and prioritize goals and make recommendations for a client in areas of household accounting, taxes, investments, risk management, retirement planning and estate planning.

Prerequisite: FYC 5009 and FYC 5106.**FYC 6026 Human Resource Management for Nonprofits 3 Credits****Grading Scheme:** Letter Grade

This course analyzes core nonprofit human resource management functions including recruitment, selection, performance management, labor relations, volunteer management, compensation and training, for effective nonprofit management. Experiential exercises are used to simulate situations and issues that managers face in nonprofit organizations.

Prerequisite: Students must be enrolled in a UF graduate program.**FYC 6105 Youth and Family Relationships 3 Credits****Grading Scheme:** Letter Grade

This course will examine youth (children, adolescents, emerging adults) and family development within the family system. It will review basic theory and research on youth development and how it is linked with family development, family processes, and extended family systems. Using theory and research when working with youth and their families will be highlighted.

Prerequisite: Graduate standing.**FYC 6111 Families and Violence 3 Credits****Grading Scheme:** Letter Grade

Examines the major types of family violence across the life span, including all forms of child maltreatment, intimate partner violence, and elder abuse.

FYC 6117 Military Families in Community Context 3 Credits**Grading Scheme:** Letter Grade

Military culture and procedures, issues related to service in the military, the impact that military service can have on the individual and family, and strategies for providing services to military personnel and their families.

Prerequisite: None.**FYC 6131 Ethics for FYCS Practitioners 3 Credits****Grading Scheme:** Letter Grade

Basic elements of ethics, professional ethics, and professionals as ethical "agents."

FYC 6207 Adolescent Problematic Behavior 3 Credits**Grading Scheme:** Letter Grade

Ecological model to examine common themes of adolescent development with challenges that lead to problematic behavior.

Prerequisite: core major courses.**FYC 6221 Grant Proposals for Community-Based Organizations 3 Credits****Grading Scheme:** Letter Grade

Skills needed to develop funding proposals to support community-based projects and organizations.

FYC 6222 Parenting and Child Relationships 3 Credits**Grading Scheme:** Letter Grade

Relationships affecting child development outcomes.

Prerequisite: core courses.

FYC 6223 Promoting Positive Youth Development 3 Credits**Grading Scheme:** Letter Grade

Examines risk and protective factors for promoting youth development.

Prerequisite: FYC 6207.**FYC 6230 Theories of Family Development, Systems and Change 3 Credits****Grading Scheme:** Letter Grade

Provides an overview of the major theoretical perspectives on families, including family development and family systems; and emerging theories relevant to diverse and changing families. Special attention is given to the application of these perspectives for research and practice.

Prerequisite: SYG 2430 or FYC 3101 and 3201.**FYC 6234 Theoretical Approaches to Youth Development 3 Credits****Grading Scheme:** Letter Grade

An in-depth examination and synthesis of historical (macro) and contextual contemporary (micro) theories of youth development, spanning from childhood through emerging adulthood, as they are used to inform research, including applying principles and theories of youth development to community-based settings.

FYC 6235 Prevention Science in Youth Development and Family Science 3 Credits**Grading Scheme:** Letter Grade

Explores the theoretical and empirical foundations for the science of prevention and its application to youth development and family science. Taking an ecological approach, this course will explore methods and processes for designing, delivering, and evaluating YDFS prevention programs and the implications for families, schools, and communities.

FYC 6302 Sustainable Community Development 3 Credits**Grading Scheme:** Letter Grade

Relationships among economic, social, and environmental aspects of sustainability. Analytic and professional skills to build sustainable communities. Community study and in-depth analysis.

FYC 6320 Community Development and Civic Engagement 3 Credits**Grading Scheme:** Letter Grade

Examining the process and methods for community development with an emphasis on research related to civic engagement and public participation. Students will develop skills for managing change in communities.

FYC 6330 Theories of Community Development 3 Credits**Grading Scheme:** Letter Grade

Sociological concept of community and its application in public development policies.

FYC 6421 Nonprofit Organizations 3 Credits**Grading Scheme:** Letter Grade

Community nonprofit organizations. Governance, policy and decision making, and planning.

FYC 6424 Fund Raising for Community Nonprofit Organizations 3 Credits**Grading Scheme:** Letter Grade

Critical evaluation of fund raising theory, research on the profession, and best contemporary fund raising practices in the nonprofit sector.

Prerequisite: FYC 6421.**FYC 6425 Risk Management in Nonprofit Organizations 3 Credits****Grading Scheme:** Letter Grade

A foundation in the concepts, principles and strategies associated with risk management in nonprofit organizations. Topics include the nature and purpose of risk management; the general risk management exposures facing nonprofit organizations; and risk mitigation strategies for nonprofits.

Prerequisite: FYC 6421 Nonprofit Organizations.**FYC 6620 Program Planning and Evaluation for Human Service Delivery 3 Credits****Grading Scheme:** Letter Grade

Contemporary theories and process for planning and evaluating human service education and delivery programs.

Prerequisite: core FYCS courses.**FYC 6662 Public Policy and Human Resource Development 3 Credits****Grading Scheme:** Letter Grade

Current policies and laws impacting youths, families, and communities. Strategies to change these policies and laws.

FYC 6800 Scientific Reasoning and Research Design 3 Credits**Grading Scheme:** Letter Grade

Scientific reasoning, scientific method, and quantitative and qualitative research design.

FYC 6802 Advanced Research Methods for Family, Youth, and Community Sciences 3 Credits**Grading Scheme:** Letter Grade

Research tools and techniques appropriate for an ecological model, emphasizing a multi-method approach.

Prerequisite: FYC 6800 or equivalent.**FYC 6804 Applied Data Analysis in Family, Youth and Community Sciences 3 Credits****Grading Scheme:** Letter Grade

This course introduces Family, Youth and Community Sciences graduate students to basic quantitative data analysis techniques that can be applied to critical social science research questions, public management and policy problems, and program evaluation. The course emphasizes proper pairing of analysis techniques to data types; application and interpretation of statistical analyses; use of data analysis in decision-making; and implementation of data analysis using computer software.

FYC 6901 Problems in Family, Youth, and Community Sciences 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Advanced students select and study problem related to family, youth, and community sciences.

FYC 6912 Nonthesis Project in Family, Youth, and Community Sciences 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Developing an original applied project such as program evaluation, policy analysis, or in-depth review of current issue in human resource development.

FYC 6920 Capstone Project 3 Credits**Grading Scheme:** Letter Grade

Students will complete a final project addressing an issue within Family, Youth and Community Sciences, prepare an e-portfolio of academic and professional accomplishments, and deliver a professional presentation. The successful completion of these course assignments satisfies the graduate school requirement for a comprehensive examination for a master's degree without thesis.

Prerequisite: Permission of department.

FYC 6932 Topics, in Family, Youth, and Community Sciences 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Critical review of selected topics.

FYC 6933 Seminar in Human Resource Development 1 Credit, Max 2 Credits**Grading Scheme:** S/U

Explores current topics, trends, and research findings.

FYC 6934 Professional Internship/Practicum in Family, Youth, and Community Sciences 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Directed work experience or internship in professional capacity.

FYC 6936 Professional Development Seminar in YDFS 3 Credits**Grading Scheme:** Letter Grade

This course examines the developmental knowledge and skills necessary for doctoral candidates to become successful faculty members in the field of Youth Development and Family Sciences (YDFS).

Prerequisite: Graduate Status.**FYC 6970 Thesis/Dissertation Proposal Writing in Family, Youth and Community Sciences 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

This course focuses on the application of principles, practices, and strategies for conducting social and behavioral research in family, youth, and community sciences with a focus on thesis and dissertation proposal development.

Prerequisite: Registration is departmentally controlled based on instructor approval.**FYC 6971 Research for Master's Thesis 1-6 Credits****Grading Scheme:** S/U

Research for Master's Thesis

FYC 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

FYC 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

N/A/.

Finance

FIN 5405 Business Financial Management 3 Credits**Grading Scheme:** Letter Grade

Analysis of business financing and investing decisions.

Prerequisite: ACG 5065. Required of all MBA degree candidates who have had no basic business finance course.**FIN 5437 Finance I: Asset Valuation, Risk, and Return 2 Credits****Grading Scheme:** Letter Grade

Analysis of business financing and investing decisions. Selected financial tools and concepts. Risk analysis and capital budgeting.

Prerequisite: must be M.B.A. student. Required of all M.B.A. students who lack basic business finance course.**FIN 5439 Finance II: Capital Structure and Risk Management Issues 2 Credits****Grading Scheme:** Letter Grade

Continuation of FIN 5437. Focus on corporate financial decision making.

Prerequisite: FIN 5437 or admission to the Master of Accounting program. Required of all M.B.A. students.**FIN 6108 Personal Financial Management 1 Credit, Max 2 Credits****Grading Scheme:** Letter Grade

Personal financial planning, how to accumulate and preserve personal wealth, creating an integrated financial plan, financial modeling, tax planning, portfolio construction and the fundamentals of risk and insurance.

Prerequisite: designed for students admitted in MBA program.**FIN 6246 Money and Capital Markets 3 Credits****Grading Scheme:** Letter Grade

Financial markets, with emphasis on flow of funds, interest rate determination, and allocation of resources.

Prerequisite: FIN 5405, college-level mathematics, and statistics.**FIN 6296 Capitalism 2 Credits****Grading Scheme:** Letter Grade

This course introduces the concept of capitalism including the evolution of capitalism and its role in a modern free market economy. The course places particular emphasis on securities markets covering the sources and users of capital. Each of these topics considers the interaction of government, financial markets and society.

Prerequisite: FIN 5439 or Master of Science-Finance students.**FIN 6306 Investment Banking 2 Credits****Grading Scheme:** Letter Grade

Hands-on approach to various aspects of investment banking industry. Lectures and guest speakers from investment banking firms.

Prerequisite: FIN 5439. Designed for M.B.A. students.**FIN 6314 Financial Intermediation, Financial Services and Technology 2 Credits****Grading Scheme:** Letter Grade

An in-depth exploration of the theory and practice of financial intermediation is provided. An emphasis is on a comprehensive understanding of the role of financial intermediaries, their function in various financial markets, the services they provide, and the regulatory framework that governs these institutions. Special attention is given to how technology has revolutionized the landscape of financial intermediation, giving rise to innovative products and services.

Prerequisite: FIN 5439.**FIN 6425 Corporation Finance 3 Credits****Grading Scheme:** Letter Grade

Applying business finance problems. Students prepare written solutions to case problems.

Prerequisite: FIN 5405 or consent of instructor. Designed for MBA students.**FIN 6427 Measuring and Managing Value 2 Credits****Grading Scheme:** Letter Grade

Applying basic financial theory to valuing companies and creating value through sound financial decision making.

Prerequisite: FIN 5439 or Master of Science-Finance students.

FIN 6429 Financial Decision Making 2 Credits**Grading Scheme:** Letter Grade

Applying basic financial theory to help managers determine how to finance their businesses. Optimal debt policy, distribution of firm cash flow policies, equity issuance strategies, risk management, and using hybrid securities in financing business.

Prerequisite: FIN 5439 or Master of Science-Finance students.**FIN 6432 Asset Valuation and Corporate Finance 2 Credits****Grading Scheme:** Letter Grade

Financial concepts and tools that are essential to managing a business. Financial information to succeed as general managers. Provide foundation for students planning to take further elective courses in finance.

Prerequisite: Master of Business Administration students**FIN 6438 Study in Valuation 2 Credits****Grading Scheme:** Letter Grade

Independent analysis of firms in industry. Assessment of relative investment attractiveness of these firms and industry. Projects presented and critiqued by investment professionals.

Prerequisite: FIN 5439 or Master of Science-Finance students.**FIN 6465 Financial Statement Analysis 2 Credits****Grading Scheme:** Letter Grade

Examination of fundamental analysis of corporate financial statements. Identification of reliable estimates of fundamental corporate earning power and earning risks.

Prerequisite: FIN 5439 or Master of Science-Finance students, or Master of Accounting students.**FIN 6477 Entrepreneurial Finance 2 Credits****Grading Scheme:** Letter Grade

Investigate conventional principles of corporate finance that can be used to analyze the financing needs of new ventures.

FIN 6489 Financial Risk Management 2 Credits**Grading Scheme:** Letter Grade

This course is a practical introduction to the main concepts of managing risk, namely market, credit, liquidity, operational, legal and regulatory, business, strategic, and reputation risk. However, the bulk of the course will focus on financial market and credit risk. The course will make little use of mathematical formalism and will emphasize intuitive quantitative arguments. Students are expected to be comfortable with basic probability and statistics and be able to program either in a formal language such as MATLAB or in Excel.

Prerequisite: FIN 5437 and FIN 5439 or enrolled in Master of Science-Finance Program.**FIN 6496 Mergers & Acquisitions 2 Credits****Grading Scheme:** Letter Grade

The primary objective of this course is to survey the process of mergers and acquisitions ("MA"), develop your skills in the design and evaluation of these transactions, and expose students to the key tactical issues typically confronted in MA transactions.

Prerequisite: FIN 5439 OR Enrolled in Master of Science-Finance Program.**FIN 6518 Investment Concepts 2 Credits****Grading Scheme:** Letter Grade

Survey of current theory and practice. Asset pricing theory and empirical test, bond and equity valuation, efficient markets, international management, and valuation and use of derivative securities.

Prerequisite: FIN 5439 or Master of Science-Finance students.**FIN 6525 Asset Management Project 1 Credit, Max 2 Credits****Grading Scheme:** Letter Grade

Training in optimal portfolio allocation, measuring tracking error/value at risk and performance attribution. Group experience to manage and evaluate portfolios.

FIN 6526 Portfolio Theory 2 Credits**Grading Scheme:** Letter Grade

Survey of modern approaches in security portfolio management. Two levels of examination: (1) management of owner's aggregate portfolio and (2) security selection strategies, such as mutual funds, followed by managers.

Prerequisite: FIN 5439 or Master of Science-Finance students.**FIN 6528 Asset Allocation and Investment Strategy 2 Credits****Grading Scheme:** Letter Grade

Providing an introduction to investment strategy as practiced by fund managers. Course content will include a review of the analytical tools and models typically used in asset allocation, but will also provide an appraisal of the successes and failures of the most common investment strategies. While there will be some treatment of stock selection, the main focus will be on strategies involving allocation across broad asset classes.

Prerequisite: FIN 5437 and FIN 5439 OR Enrolled in Master of Science-Finance students.**FIN 6537 Derivative Securities 2 Credits****Grading Scheme:** Letter Grade

Principles of derivatives. Structure and operation of markets, theoretical foundations and valuation models for various securities, and practical applications in investments and risk management, and financial engineering.

Prerequisite: FIN 5439 or Master of Science-Finance students.**FIN 6545 Fixed Income Security Valuation 2 Credits****Grading Scheme:** Letter Grade

Basics of interest rate determination, forward rates, and effects of interest rate uncertainty on holding period returns. Also pricing of fixed income securities with attached options.

Prerequisite: FIN 5439 or admission to the Master of Accounting program. Designed for M.B.A. students.**FIN 6547 Interest Rate Risk Management 2 Credits****Grading Scheme:** Letter Grade

Basic tools. Concepts of duration, immunization, and hedging with financial futures.

Prerequisite: FIN 6545.**FIN 6549 Special Topics in Fixed Income Securities 2 Credits****Grading Scheme:** Letter Grade

Municipal bond markets and timing strategies; performance attribution and tracking error; and asset allocation for pensions and endowments.

Prerequisite: FIN 6545.**FIN 6575 Emerging Markets Finance I 2 Credits****Grading Scheme:** Letter Grade

This course provides an introduction to the economic and institutional context in which investing and finance occurs in developing countries. The objective is to equip students with the analytical tools and institutional knowledge that will be helpful in understanding emerging financial markets.

Prerequisite: FIN 5439 or students enrolled in the MSF program

FIN 6576 Emerging Markets Finance II 2 Credits**Grading Scheme:** Letter Grade

Introduction to the essential elements of investing and raising capital in the emerging markets. The main perspective is that of an investment manager. Focuses on valuation, investment strategies, and corporate finance in the emerging markets.

Prerequisite: FIN 5439 or Master of Science-Finance students.**FIN 6585 Securities Trading 2 Credits****Grading Scheme:** Letter Grade

This course focuses on the operations of securities markets and broker/dealer intermediaries. We will evaluate a spectrum of issues regarding the formulation of trading decisions, the design of market structures, and the regulation of securities trading. Trading simulation will be used to provide in-class demonstrations of relevant concepts and hands-on experience in making trading decisions in different market structures.

Prerequisite: FIN 5439 or students enrolled in the MSF program**FIN 6586 Behavioral Finance 2 Credits****Grading Scheme:** Letter Grade

Explores how psychological biases lead to poor financial decision making and how security market prices can be influenced by psychological bias. Also gives insights of how behavioral finance complements the traditional financial theory paradigms and sheds light on the behavior of asset prices, corporate finance, and investor behavior

Prerequisite: FIN 5437.**FIN 6596 Introduction to Computational Methods & Derivative Pricing 2 Credits****Grading Scheme:** Letter Grade

Providing practical applications of MATLAB functions and programming to fundamental financial instruments, such as bonds and stocks, and their derivatives. Though this is an introductory course, where mathematical and programming tools will be kept at a basic level, students must be familiar with undergraduate calculus and be comfortable with elementary programming.

Prerequisite: FIN 5437 and FIN 5439 OR Master of Science-Finance Program.**FIN 6597 Financial Modeling for Investments 2 Credits****Grading Scheme:** Letter Grade

Provides a comprehensive introduction to modern financial modeling, prediction techniques, and data analysis for effective decision-making in the financial industry. Students will learn to build advanced financial models, optimize investment portfolios, assess and manage risk, and efficiently gather and process financial data.

Prerequisite: Master's of Science in Finance students.**FIN 6608 Financial Management of the Multinational Corporation 2 Credits****Grading Scheme:** Letter Grade

Issues unique to global operating environment or significantly different from their purely domestic counterparts. Use of different national as well as global capital markets to manage the finance function.

Prerequisite: FIN 6638, FIN 5439 or M.S.-finance student or M.A.-international business students.**FIN 6626 International Finance 3 Credits****Grading Scheme:** Letter Grade

Financial markets and institutions, and problems by corporations operating in the international environment.

FIN 6636 Open Economy Macrofinance 2 Credits**Grading Scheme:** Letter Grade

This class will focus on the operation of an economy in an international context, exploring the determination of interest rates and exchange rates, output and inflation, trade and capital flows, and the sustainability of current account deficits and public debt. While the course builds a foundation of macroeconomics, it is also about finance — how economic activity affects financial markets, and how financial markets affect economic activity. It will be concerned with both theory and policies.

Prerequisite: Instructor permission. Students should have some familiarity with economic terminology and the analysis of supply and demand as presented in undergraduate economics courses.**Corequisite:** FIN 6575 recommended.**FIN 6638 International Finance 2 Credits****Grading Scheme:** Letter Grade

Introduction to markets. Focus on foreign exchange markets, international bond markets, and international equity markets.

Prerequisite: FIN 5439 or Master of Science-Finance or Master of Arts-International Business students.**FIN 6728 Capitalism and Regulation 2 Credits****Grading Scheme:** Letter Grade

Analyzes the role of capital markets in creating economic welfare. Examines the impact of regulations of capital markets. Students consider the rationality of certain financial market regulations in the context of traditional arguments for market regulation. Explores regulations across countries and over time impact financial market development and economic growth. Examines the political economy of the regulation of financial and product markets is examined.

Prerequisite: FIN 5439 or finance students pursuing a Master of Science.**FIN 6729 Economics Organizations and Markets 3 Credits****Grading Scheme:** Letter Grade

Economics-based approach to organizational issues including compensation, assignment of decision rights, and assessment of performance. Examination of corporate governance issues, i.e., conflicts between stockholders and managers.

FIN 6779 Artificial Intelligence & Machine Learning Applications for Finance & FINTECH 2 Credits**Grading Scheme:** Letter Grade

This course deals with the application of data-intensive computer methods broadly known as “machine learning” to certain financial issues. Fintech can be approached from a number of different angles but the focus here will be on using data for autonomous (AI-based) financial decisions such as lending and portfolio selection.

Prerequisite: ISM 6413 and FIN 5437 or by consent of instructor.**FIN 6785 Investment Banking and Corporate Financial Modeling I 2 Credits****Grading Scheme:** Letter Grade

Giving the analytical foundations to assess financial transactions, with the emphasis on constructing integrated spreadsheets to model firm financial statements and cash flows. The course has students develop models from scratch using source data to determine hypothetical valuations in an acquisition using discounted cash flows and multiples techniques.

Prerequisite: Enrolled in Master of Science-Finance Program.

FIN 6786 Investment Banking and Corporate Financial Modeling II 2 Credits**Grading Scheme:** Letter Grade

Extending the use of basic models developed in Investment Banking and Corporate Modeling I to mergers, IPOs, private equity placements, and LBOs. Modeling techniques go beyond traditional valuation techniques to also consider viability of the financial structures of these transactions and puts greater emphasis on assessing the impact of uncertainty.

Prerequisite: FIN 6785 and Enrolled in Master of Science-Finance Program.**FIN 6905 Individual Work in Finance 1-4 Credits, Max 7 Credits****Grading Scheme:** Letter Grade

Reading and/or research in finance as needed by graduate students.

Prerequisite: permission of department and Director of Graduate Studies.**FIN 6930 Special Topics in Finance 1-4 Credits, Max 16 Credits****Grading Scheme:** Letter Grade

Selected topics in financial research, theory, or of special current significance.

FIN 6935 Finance Professional Speaker Series 1 Credit, Max 2 Credits**Grading Scheme:** Letter Grade

Rotating presentations by prominent finance professionals, providing informed perspective on career strategies, opportunities, and real-life applications.

FIN 6936 Special Topics In Investment Finance 2 Credits**Grading Scheme:** Letter Grade

Examining special investment topics pertaining to certain asset classes such as commodities, inflation protected bonds, and currencies and to provide a link between economic theory and live applications using the Bloomberg Professional Terminal. For each topic we will be covering the basic theoretical underpinnings and examine market/security structure, portfolio implications, and how Bloomberg data can be used to understand these implications.

Prerequisite: (FIN 5437 & FIN 5439) or be enrolled in Master of Science-Finance program, or Master of Accounting program.**FIN 6957 International Studies in Finance 1-4 Credits, Max 12 Credits****Grading Scheme:** S/U

International Studies in Finance

Prerequisite: admission to approved study abroad program and permission of department.**FIN 6958 International Finance Study Tour 2 Credits****Grading Scheme:** Letter Grade

Academic and practical exposure to international financial markets and international business practices.

FIN 7446 Financial Theory I 4 Credits**Grading Scheme:** Letter Grade

The first in a two-course sequence. Emphasis on the theory of the firm's investment and financing decisions.

FIN 7447 Financial Theory II 4 Credits**Grading Scheme:** Letter Grade

Emphasis on the theory of the financial intermediary system asset pricing theory.

FIN 7808 Corporate Finance 4 Credits**Grading Scheme:** Letter Grade

Theory and empirical analyses of corporate financial decisions in a world of risk with both perfect and imperfect markets.

FIN 7809 Investments 4 Credits**Grading Scheme:** Letter Grade

Theory and empirical analyses of security investment decisions in a world of risk with both perfect and imperfect markets.

FIN 7938 Finance Research Workshop 1-4 Credits, Max 30 Credits**Grading Scheme:** Letter Grade

Analysis of current research topics. Paper presentation and critiques by doctoral students, faculty, and visiting scholars.

FIN 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

FIN 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

FIT 6335 Blockchain and Cryptocurrencies 2 Credits**Grading Scheme:** Letter Grade

Equips students with a foundational understanding of blockchain technology and its applications in cryptocurrencies, stablecoins, decentralized finance (DeFi), and non-fungible tokens (NFTs). Students will explore the fundamentals of FinTech, including the principles of money and payment systems, as well as key concepts from cryptography and distributed systems. They will analyze the core components of the Bitcoin network and evaluate the distinguishing features of the Ethereum platform.

Prerequisite: FIN 5437.**FIT 6356 Decentralized Finance Project 2 Credits****Grading Scheme:** Letter Grade

Students formulate business proposals to be deployed on blockchain. Crucially, blockchain technology enables access to financial services without intermediaries, enabling cost savings. Student projects must leverage blockchain technology to enhance the value of business proposals. Lectures initially focus upon hurdles for blockchain businesses and solutions employed in practice, then cover regulatory issues faced by blockchain-based businesses and discuss approaches to address those issues.

Prerequisite: FIT 6335.**FIT 6710 Natural Language Processing & Generative AI for Finance 2 Credits****Grading Scheme:** Letter Grade

Introduction to the fundamental principles and the application of natural language processing (NLP) and generative artificial intelligence (AI) techniques in finance. Applications of these techniques include their implementation in finance-related tasks such as sentiment analysis, automated trading, risk assessment, fraud detection, and financial forecasting. Emphasis placed on hands-on experience with real-world datasets and on ethical considerations when deploying AI in financial contexts.

Prerequisite: FIN 6779.

REE 6007 Fundamentals of Real Estate Development 2 Credits**Grading Scheme:** Letter Grade

Introduces students to the commercial real estate development process. Variables as to the type of development project sought (office, retail, multi-family, etc.), the end user (owner-occupied or lease-up), and the desired holding period (develop-stabilize-sell or long-term asset), design, construction methods, materials, cost estimating and budgeting (to name just a few of the variables) are examined. Return requirements, development financing, and the timing and type of cash flows during different phases of development are examined, relative to the impact on the project's overall IRR.

Prerequisite: Grade of 'C' or better in REE 6045 Introduction to Real Estate.**REE 6045 Introduction to Real Estate 2 Credits****Grading Scheme:** Letter Grade

Real estate finance, appraisal, and law.

Prerequisite: graduate standing.**REE 6058 Real Estate Research and Technology 1 Credit****Grading Scheme:** Letter Grade

A critical element of real estate valuation, development, and investment decision making is the utilization of research data, technologies, and software applications to provide support for assumptions and strategic decisions. This course provides hands-on exposure to widely used commercial real estate data sources, software applications, and research methodologies.

Prerequisite: (Master of Science-Real Estate or MBA students) and REE 6045.**REE 6105 Real Estate Appraisal 2 Credits****Grading Scheme:** Letter Grade

Tools and techniques used in the fee appraisal business to estimate market value of real property. Emphasis on commercial appraisal using actual case studies.

Prerequisite: REE 6045 or REE 6395.**REE 6206 Primary Mortgage Markets and Institutions 2 Credits****Grading Scheme:** Letter Grade

Introduces firms, institutions, practices, and legal issues involved in housing finance. Also potential variation in home mortgage product design and issues that dictate mortgage choice.

Prerequisite: MSRE student (REA_MS Academic Plan);**Corequisite:** REE 6045. FIN5437/FIN5439 highly recommended.**REE 6208 Secondary Mortgage Markets and Securitization 2 Credits****Grading Scheme:** Letter Grade

High-level overview of secondary markets for mortgage debt and mortgage-backed securities in U.S. Considers instruments, decisions, problems, and current issues.

Prerequisite: REE 6045 or REE 6206 or Master of Science-Finance students or FIN 5437 and FIN 5439.**REE 6315 Real Estate Market and Transaction Analysis 2 Credits****Grading Scheme:** Letter Grade

Application of analytical process for analyzing market potential of both developed and undeveloped real estate. Broadened historic perspective on modern city and understanding of how to apply analytical framework to real estate market analysis. Process and documents associated with acquiring and disposing of commercial real estate areas discussed.

Prerequisite: Master of Science-Real Estate or MBA students; REE 6045.**REE 6395 Real Estate Private Equity 2 Credits****Grading Scheme:** Letter Grade

Introduction to major concepts, principles, analytical methods, and tools useful for investment and finance decisions regarding commercial real estate assets. Property acquisition analysis, leasing, effects of debt financing and taxes, risk and return considerations.

Prerequisite: REE 6045 or Master of Science-Finance students or FIN 5437 and FIN 5439 (REE 6045 is highly recommended).**REE 6397 Real Estate Securities and Portfolios 2 Credits****Grading Scheme:** Letter Grade

Securitized equity real estate investment topics, including real estate investment trusts. Emphasis on multiple property valuation and decision making.

Prerequisite: REE 6045 or REE 6395 or Master of Science-Finance students or FIN 5437 and FIN 5439.**REE 6455 Law of Real Estate Transactions 2 Credits****Grading Scheme:** Letter Grade

Focuses on the major legal concepts, principles, statutes, and contracts that regulate and govern the negotiation, financing and closing of real estate transactions. Both residential and commercial transactions will be discussed; however, the focus will be on commercial real estate. Emphasis will be on the legal aspects of a transaction: ownership of real property, contract law, types of conveyances, legal descriptions, surveys and plats, ad valorem taxation and financing.

Prerequisite: Acceptance to the Master of Science in Real Estate (MSRE) program or graduate standing.**REE 6705 Geographic Information Systems and Location Analysis 2 Credits****Grading Scheme:** Letter Grade

Examines many traditional ways of analyzing and evaluating location. Introduces relevant data sources, GIS software and numerical and statistical techniques for computer-based study of spatial relationships.

Prerequisite: Graduate standing.**REE 6737 Real Estate Development 2 Credits****Grading Scheme:** Letter Grade

Exploring of the fundamental concepts and techniques involved in the real estate development process by recognizing forces that transform existing real estate to its highest and best use. Providing a decision-making framework, understanding of the process and management decisions during the real estate development activities.

Prerequisite: REE 6007**REE 6905 Individual Work in Real Estate 1-6 Credits, Max 7 Credits****Grading Scheme:** Letter Grade

Reading and/or research in real estate.

Prerequisite: permission of department and Director of Graduate Studies.**REE 6930 Special Topics in Real Estate 1-4 Credits, Max 16 Credits****Grading Scheme:** Letter Grade

Selected topics in real estate research, theory, or of special current significance.

REE 6935 Real Estate Case Studies 1-2 Credits, Max 5 Credits**Grading Scheme:** Letter Grade

Project- and case-oriented approach, using "real world" projects and data. Introduction to data sources and computer programs widely used in the industry.

Prerequisite: Master of Science-Real Estate or joint MSRE/JD students.

REE 6948 Capstone Seminar and Applied Project 2 Credits**Grading Scheme:** Letter Grade

Establishes direct link between concepts developed in prior courses and current industrial practices. Presentations by professionals on current issues and industry practices. Students develop an applied project case.

Prerequisite: REE 6208.

Fisheries and Aquatic Sciences

FAS 5015 Aquaculture I 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of the field of aquaculture, including water quality, production systems, nutrition, spawning, and the common fish and invertebrate groups cultured in the United States.

FAS 5203 Biology of Fishes 3 Credits**Grading Scheme:** Letter Grade

A survey of the diversity of fishes, including their anatomy, taxonomy, ecology, and conservation. Evolutionary trends are stressed, along with biogeography and biodiversity hotspots. The last section of the course is focused on fish ecology and conservation.

Prerequisite: Graduate standing**FAS 5203C Biology of Fishes 4 Credits****Grading Scheme:** Letter Grade

Emphasizes trends in evolution, integrative and sensory biology, physiology, feeding ecology, reproduction, growth, and population dynamics as they relate to fisheries. Offered fall term in odd-numbered years.

Prerequisite: BSC 2011/2011L or consent of instructor.**FAS 5255 Diseases of Warmwater Fish 3 Credits****Grading Scheme:** Letter Grade

Instruction in the methodology of diagnosis, treatment and management of parasitic, bacterial, viral, nutritional, and environmental diseases of warm water food and aquarium species. Fish biology and general husbandry, aquatic systems and water quality management, infectious agents, treatment plans, and biosecurity, quarantine and regulatory issues relevant to fish health.

Prerequisite: consent of instructor.**FAS 5276C Field Ecology of Aquatic Organisms 4 Credits****Grading Scheme:** Letter Grade

Understanding principles of fish and shellfish ecology through field studies. Intensive study in lakes, rivers, and coastal marshes to gain understanding of how fish and shellfish interact with their environment. Requires extensive field trips. Offered summer term.

Prerequisite: FAS 4305C or consent of instructor.**FAS 5335C Applied Fisheries Statistics 4 Credits****Grading Scheme:** Letter Grade

Population sampling and estimation, statistical assumptions and robustness, mark-recapture, growth, and empirical modeling of populations. Offered fall term in even-numbered years.

Prerequisite: FAS 5276C or consent of instructor.**FAS 5407 Biology of Fishery and Aquaculture Invertebrates 3 Credits****Grading Scheme:** Letter Grade

Examines the biology of marine and freshwater invertebrates that are important as fisheries or in aquaculture. Topics will include taxonomy, morphology, distribution, habitat requirements, nutrition, major predators and parasites, significant ecological interactions, and life cycles. Non-food fisheries, such as commercial sponges and pearl oysters, will be included.

FAS 5901 Scientific Thinking in Ecology 2 Credits**Grading Scheme:** Letter Grade

General philosophical foundations of science and specific critiques and perspectives found in ecology and aquatic sciences. Offered fall term.

FAS 6154 Marine Adaptations: Environmental Physiology 3 Credits**Grading Scheme:** Letter Grade

Examines and compares the physiological adaptations of marine, estuarine, and freshwater organisms to environmental conditions at various organizational levels. Habitats discussed include freshwater, rocky intertidal, salt marsh, coral reef, and deep sea.

Prerequisite: undergraduate course in animal physiology.**FAS 6165 Fish and Crustacean Nutrition 3 Credits****Grading Scheme:** Letter Grade

Aquaints students with basic principles of nutrition and formulation of diets for fish and crustaceans in aquaculture. Lectures will cover digestive physiology, nutrients, feed formulation, and specific nutritional requirements for numerous aquatic organisms.

FAS 6176 Algae Biology and Ecology 3 Credits**Grading Scheme:** Letter Grade

Covers the biology and ecology of aquatic algae, including evolution, classification, structure, photosynthesis, growth, and reproduction. Emphasis on the ecological role of algae in different aquatic ecosystems (e.g. open ocean, estuaries, coral reefs, rocky intertidal), their impacts (e.g. harmful algae blooms, food webs), and their applications (e.g. food, biochemical).

FAS 6238 Environmental Physiology of Fishes 3 Credits**Grading Scheme:** Letter Grade

Advanced topics on physiology of fishes, such as features and adaptations at different levels of biological organization, their implications, and applications. Students will gain an appreciation for, understanding of, and ability to formulate controlled scientific experiments to generate new knowledge about how fishes function.

FAS 6256 Fish and Aquatic Invertebrate Histology 3 Credits**Grading Scheme:** Letter Grade

Covering interpretations of the fixed tissue microanatomy and physiology of fish, bivalves, and corals, and introduces common histopathologic (disease) findings.

Prerequisite: Previous coursework in animal biology, or permission of the instructor.**FAS 6272 Marine Ecological Processes 3 Credits****Grading Scheme:** Letter Grade

The ecological, biological, and environmental processes that drive patterns in productivity, behavior, population dynamics, and community structure in marine and estuarine ecosystems.

Prerequisite: Graduate student status**FAS 6273 Trophic Ecology of Fishes 3 Credits****Grading Scheme:** Letter Grade

Trophic ecology of fishes, including: food habit analyses, diet breadth, diet overlap, prey selectivity, prey digestion, gut evacuation, consumption, food-web linkages, foraging connections through stable isotope ratios, trophic cascades, feeding bioenergetics, and interactions among feeding, growth reproduction.

Prerequisite: STA 6166 & FAS 5203C or equivalent.

FAS 6275 Freshwater Ecology 3 Credits**Grading Scheme:** Letter Grade

Provides students with an understanding of the concepts in freshwater ecology that are important for controlling the traits, distribution, and abundance of aquatic organisms. Material will focus on the major groups of organisms found in freshwater habitats, the physical and chemical properties that are important for structuring freshwater communities, and the ecological processes that affect freshwater communities and ecosystems.

FAS 6310C Fish & Limnology 3 Credits**Grading Scheme:** Letter Grade

A detailed examination of freshwater fish and habitats. Includes discussion of relevant fundamental concepts in ecology, chemistry, and geography. Practical skills in field sampling and data handling as well as skills (e.g. grant writing, science communication) and contemporary issues (e.g., ethical uses of AI tools) pertinent to fishery management and research will be applied.

Prerequisite: Graduate standing.**FAS 6337C Fish Population Dynamics 4 Credits****Grading Scheme:** Letter Grade

Analyzing fish populations for management purposes. Methods for estimating population parameters such as growth, recruitment, and mortality. Using population parameters and computer models to predict yield and catch composition, and bioenergetics approaches for fisheries management problems. Offered spring term in odd-numbered years.

Prerequisite: STA 6166 or STA 6093.**FAS 6339C Advanced Quantitative Fisheries Assessment 4 Credits****Grading Scheme:** Letter Grade

Covering topics related to fisheries stock assessment and management. Focusing on modern assessment techniques and their associated challenges.

Prerequisite: FAS 6337C Fish Population Dynamics**FAS 6355C Fisheries Management 4 Credits****Grading Scheme:** Letter Grade

Managing fisheries sustainably and restoring degraded fisheries. Students will acquire a skillset of key interdisciplinary competencies including but not limited to dimensions such as ecological, social, legal and economic factors and resource assessment through hands-on participation and case study evaluation.

FAS 6356 Fisheries Enhancement 2 Credits**Grading Scheme:** Letter Grade

Provides participants with knowledge and skills required for assessing where and when enhancements can contribute to fisheries management goals, and for developing and managing such initiatives effectively. Emphasizes integrative systems approaches and the key elements of population dynamics, aquaculture production, release strategies, genetic management, governance, and social/economic costs and benefits.

FAS 6357 Marine Protected Areas 3 Credits**Grading Scheme:** Letter Grade

Presents the history and logic of marine protected areas (MPAs) and their advantages and disadvantages. The science of MPAs will be explained as well as an overview of traditional approaches of fisheries management. The importance of ecological principles when creating an MPA will be emphasized. An overview of sampling theory and the need for empirical data to document the success or failure of MPAs will be presented.

Prerequisite: Graduate standing.**FAS 6360 Invasion Ecology of Aquatic Animals 3 Credits****Grading Scheme:** Letter Grade

A comprehensive overview of invasion ecology, highlighting aspects related to aquatic animals, including ecological concepts and debates underlying this developing field; biology and life history of nonnative aquatic animals, including characteristics of successful invaders; risk analysis methodology; and the conservation and regulatory implications of nonnative aquatic species.

FAS 6408 Aquaculture II 3 Credits**Grading Scheme:** Letter Grade

Aquaculture engineering and system design; broodstock management; live feeds and algae production; economics and marketing; biosecurity. Application of principles and concepts will be emphasized. At the conclusion of this course students should have a firm grasp of critical concepts in aquaculture.

Prerequisite: FAS 5015 Introduction to Aquaculture (Aquaculture I).**FAS 6416 Spatial Ecology and Modeling of Fish Populations 2 Credits****Grading Scheme:** Letter Grade

Theoretical models, GIS-based methods, spatially explicit matrix population models, movement models, statistical approaches, and stock assessment models to trace the effects of habitat quality, environmental restoration and spatial behavior of fish populations.

Prerequisite: FAS or WEC.**FAS 6426 Applied Aquaculture Genetics 3 Credits****Grading Scheme:** Letter Grade

Provides students with the background knowledge and practical methodologies for the current technologies used for the genetic improvement of fish and shellfish aquaculture and fishery resource management. This course will be a combination of online lectures, group discussions, and video demonstrations to prepare students with the most updated advancements in the field.

FAS 6705 Fisheries and aquaculture: An economics perspective 3 Credits**Grading Scheme:** Letter Grade

Introduces students to important issues in fisheries and aquaculture management from an economic perspective, exploring the incentives of various stakeholders in utilizing and conserving fisheries resources, as well as the impacts and effects of differing management systems on industry and ecosystems.

FAS 6905 Individual Study 1-6 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Contemporary problem or topic.

FAS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

FAS 6932 Special Topics in Fisheries and Aquatic Sciences 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Fisheries biology, aquaculture, and associated aquatic sciences.

FAS 6933 Graduate Symposium 1 Credit, Max 3 Credits**Grading Scheme:** S/U

Graduate Symposium

FAS 6935 Contemporary Problems in Fisheries and Aquatic Sciences 2 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Library research, oral reports, and discussions of scientific problems or topics announced in advance. Offered fall and spring terms.

Prerequisite: graduate student standing.

FAS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

FAS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

FAS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been admitted to a doctoral program. Not appropriate for students who have been admitted to candidacy.

FAS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Food and Resource Economics

AEB 5188 Economics of Agribusiness Decisions 3 Credits**Grading Scheme:** Letter Grade

Comprehensive treatment of microeconomic theory and its use in managerial decision making.

Prerequisite: AEB 3103 or ECO 2023.**AEB 5326 Agribusiness Financial Management 3 Credits****Grading Scheme:** Letter Grade

Integration of finance and management decision-making tools to solve advanced financial and other management problems faced by agricultural firms and agribusinesses.

Prerequisite: ACG 2021**AEB 5516 Quantitative Methods in Agribusiness Decisions 3 Credits****Grading Scheme:** Letter Grade

Introduction to variety of quantitative methods with application to business decision-making contexts.

Prerequisite: STA 2023.**AEB 5757 Strategic Agribusiness Human Resource Management 3 Credits****Grading Scheme:** Letter Grade

Issues involved in strategic and effective leadership and management in agribusiness sector of economy. Emphasis on human resource ideas and techniques that managers utilize to improve organizational teamwork, productivity, and performance.

AEB 6106 Microeconomic Principles and Analysis 3 Credits**Grading Scheme:** Letter Grade

Economics as a behavioral science describing actions of consumers and producers interacting in the market process; welfare economics; property rights; competition and equilibrium. Institutional backdrop for market process. Problem solving using economic principles.

Prerequisite: ECO 3101 and MAC 2311 or equivalents.**AEB 6145 Agricultural Finance 3 Credits****Grading Scheme:** Letter Grade

Principles of firm financial management, financial markets, financial institutions, capital markets, firm growth, and analysis. Emphasis on markets and application of financial principles.

Prerequisite: AEB 3144 or FIN 3403.**AEB 6183 Agribusiness Risk Management 3 Credits****Grading Scheme:** Letter Grade

Examine and develop the applied risk analysis skills useful for risk management decision-making by agricultural producers, agribusinesses, and researchers.

AEB 6225 Public Policy and the Agribusiness Firm 3 Credits**Grading Scheme:** Letter Grade

Economic policy process at national and international levels. Issues include structure of food system, food safety, and environmental impacts.

AEB 6301 Food Wholesale and Retail Marketing 3 Credits**Grading Scheme:** Letter Grade

Wholesale and retail issues that exist both in U.S. and world markets, such as brand management, supermarket management, and market research.

AEB 6385 Management Strategies for Agribusiness Firms 3 Credits**Grading Scheme:** Letter Grade

Planning, organizing, implementing, and evaluating the agribusiness management functions of strategic planning, finance, marketing, and personnel.

Prerequisite: ECO 3101.**AEB 6553 Elements of Econometrics 3 Credits****Grading Scheme:** Letter Grade

Econometric problem solving and determining quantitative relationships among economic variables in agriculture and related industries.

Prerequisite: AEB 3103, 4511; STA 3023.**AEB 6675 International Agribusiness Marketing 3 Credits****Grading Scheme:** Letter Grade

Principles, issues, barriers, policies, strategies, and decisions involved in global marketing and trade of perishable and storable agricultural commodities and food products.

Prerequisite: AEB 5188.**AEB 6817 Survey Research Methods for Economists 3 Credits****Grading Scheme:** Letter Grade

Process of creating, validating, implementing, coding, and interpreting results from economic surveys.

AEB 6905 Problems in Food and Resource Economics 1-3 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Individual study. Problems of interest to the student and agreeable to the instructor.

Prerequisite: consent of instructor.**AEB 6921 Workshop in Food and Resource Economics I 1 Credit****Grading Scheme:** Letter Grade

Empirical applications of concepts developed in the microeconomic core.

Prerequisite: AEB 6533.**AEB 6933 Special Topics 1-6 Credits, Max 15 Credits****Grading Scheme:** Letter Grade

Special Topics

AEB 6934 Workshop in Food and Resource Economics II 1 Credit**Grading Scheme:** Letter Grade

Developing and understanding how to apply food and resource economic concepts to agricultural and resource related problems.

AEB 6942 Advanced Applications in Agribusiness Experience 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Applications of marketing, management, and finance principles to workplace station. Applications developed from approved internship.

AEB 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

AEB 7108 Microeconomic Theory II 3 Credits**Grading Scheme:** Letter Grade

Continuation of Microeconomic Theory I. Theory of the firm, market theory, market failure (externalities, market power, and asymmetric information). Game theory and applications. General equilibrium theory, welfare trade theory, and agricultural trade policy.

Prerequisite: ECO 7115.**AEB 7182 Agricultural Risk Analysis and Decision Making 3 Credits****Grading Scheme:** Letter Grade

Review of conceptual framework and research methods for analysis of decision making by agricultural producers. Expected utility theory, risk programming, stochastic dominance, and dynamic decision models.

Prerequisite: AEB 6106 or equivalent.**AEB 7184 Production Economics 3 Credits****Grading Scheme:** Letter Grade

Producer decisions including theoretical and empirical problems of multi-factor, multi-product, and poly-period cases. Input demand and product supply functions at the commodity and industry levels.

Prerequisite: AEB 7182.**AEB 7220 Agricultural Trade Policy and Welfare Economics 3 Credits****Grading Scheme:** Letter Grade

Basics of applied welfare economics with applications to trade and agricultural policies in the United States and worldwide. Topics include the economics of biofuels, GMOs, international tariff retaliations, and the ratification of international agricultural trade policies.

Prerequisite: ECO 7115 or consent of instructor.**AEB 7240 Macroeconomic Theory in Open Economies II 3 Credits****Grading Scheme:** Letter Grade

Essential elements of macroeconomic theory and policy in world of interdependent nations.

AEB 7333 Applied Valuation Methods 3 Credits**Grading Scheme:** Letter Grade

Focus on the application of valuation methods that are frequently used for the valuation of market and non-market goods and services. We begin from the basic economic theory to derive the willingness to pay (WTP) measures, followed by learning empirical methods that can be used to elicit consumer WTP. Three key methods will be covered: choice experiments, contingent valuation, and experimental auctions. The pros and cons of each method will also be discussed.

Prerequisite: ECO 7115 & (AEB 7571 or ECO 7424).**AEB 7373 Consumer Demand and Applied Analysis 3 Credits****Grading Scheme:** Letter Grade

Theories of Consumer Behavior in Static and Dynamic Contexts; analysis of household expenditure and demand.

AEB 7453 Natural Resource Economics 3 Credits**Grading Scheme:** Letter Grade

Resource use, management, development, and conservation. Institutional and market performance in providing socially desired outcomes.

Prerequisite: ECO 3101 or AEB 6106 or ECO 7115.**AEB 7483 Seminar in Environmental Economics 3 Credits****Grading Scheme:** Letter Grade

Application of economic methods to problems of environmental and regional development; input-output models, cost-benefit analysis, economic valuation, and development planning.

Prerequisite: ECO 3101 or AEB 6106 or ECO 7115.**AEB 7504 Mathematical Statistics for Applied Econometrics 3 Credits****Grading Scheme:** Letter Grade

Develops statistical foundations used in agricultural economics, including microeconomic theory, econometrics, production economics, and financial economics.

Prerequisite: STA 6166**AEB 7571 Econometric Methods I 3 Credits****Grading Scheme:** Letter Grade

Linear and nonlinear econometric models, serial correlation, heteroscedasticity, errors in variables, qualitative variables, specification errors, and simultaneous equation models.

Prerequisite: MAS 2103, STA 4322.**AEB 7572 Econometric Methods II 3 Credits****Grading Scheme:** Letter Grade

Topics in econometrics including single equation and multiple equation linear and nonlinear models.

Prerequisite: AEB 7571.**AEB 7573 Applied Microeconometrics 3 Credits****Grading Scheme:** Letter Grade

This is an applied econometrics course focused on estimating treatment effects, that is, causal effects of changes in the economic environment on persons, communities, states, countries, or any other individual unit of analysis.

AEB 7645 Economic Development and Agriculture 3 Credits**Grading Scheme:** Letter Grade

Relation of human, capital, and natural resources, technology, and institutions to income growth and distribution. Development strategies in low-income countries.

Prerequisite: ECO 3101 or AEB 3103.**AEB 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

AEB 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Food Science and Human Nutrition

DIE 6241 Advanced Medical Nutrition Therapy 4 Credits**Grading Scheme:** Letter Grade

Opportunity to integrate theories and principles of medical nutrition therapy into clinical practice.

Prerequisite: admission to Master of Science-Dietetic Internship.**DIE 6242 Advanced Medical Nutrition Therapy II 3 Credits****Grading Scheme:** Letter Grade

Opportunity to integrate principles of medical nutrition therapy into clinical practice.

Prerequisite: admission to Master of Science-Dietetic Internship and DIE 6241.**DIE 6516 Professional Development in Dietetics 2 Credits****Grading Scheme:** Letter Grade

Professional development assessment, planning, and evaluation for future dietetics professionals.

Prerequisite: DIE 6938. ;**Corequisite:** DIE 6944.

DIE 6905 Problems in Dietetics 1-3 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Individual study and research carried out in community, hospital, or laboratory settings.

Prerequisite: consent of instructor. Not open to students on probation or conditional admission.**DIE 6938 Advanced Dietetic Seminar 1 Credit****Grading Scheme:** Letter Grade

Problem-solving, leadership, and analytical skills.

Prerequisite: admission to Master of Science-Dietetic Internship. ;**Corequisite:** DIE 6942.**DIE 6940 Community Nutrition Practicum 3 Credits****Grading Scheme:** Letter Grade

This is a practicum-based course designed to provide exposure and experiences in food service in a senior independent living facility and Women Infants and Children (WIC).

Prerequisite: DIE 6241.**DIE 6942 Dietetic Internship I 9 Credits, Max 12 Credits****Grading Scheme:** S/U

Internship in dietetics in affiliated institutions offering core rotations in community nutrition, food systems management, and clinical dietetics. Emphasizes applying theory to practice.

Prerequisite: DIE 6242.**DIE 6944 Dietetic Internship II 6 Credits****Grading Scheme:** S/U

Internship in affiliated institutions offering elective and/or specialty rotations (e.g., nutrition support, diabetes, pediatrics, sports nutrition, wellness, advanced food systems, and staff experience). Emphasizes skill development for entry-level practice.

Prerequisite: DIE 6942.**FOS 5126C Psychophysical Aspects of Foods 3 Credits****Grading Scheme:** Letter Grade

Physical and chemical stimuli controlling human sensory perception of texture, color, and flavor of foods.

Prerequisite: FOS 4311C and 4722C.**FOS 5205 Current Issues in Food Safety and Sanitation 3 Credits****Grading Scheme:** Letter Grade

Microbial, chemical, and biological safety of food; principles of sanitation for food processing and retail food industries.

FOS 5225C Principles in Food Microbiology 4 Credits**Grading Scheme:** Letter Grade

Fundamental aspects of biological contamination and its control during harvesting, processing, and storage of foods. Analysis of microbial food fermentation, microbial ecology of foods, selection of methods to examine foods for microbial content.

Prerequisite: MCB 3020 or consent of instructor.**FOS 5437C Food Product Development 3 Credits****Grading Scheme:** Letter Grade

Value-added food products. Technology, safety, health/nutrition, legal, quality, and economic/marketing considerations.

Prerequisite: 4000-level food science course, or consent of instructor.**FOS 5561C Citrus Processing Technology 3 Credits****Grading Scheme:** Letter Grade

Grading, inspection, sampling, extraction, and concentration of citrus products. Emphasizes manufacturing and quality assurance. Taught partly at Lake Alfred Citrus Research and Education Center.

Prerequisite: undergraduate course in food processing.**FOS 5645 Functional Foods and Nutraceuticals 3 Credits****Grading Scheme:** Letter Grade

Analysis, chemistry, processing, bioavailability, and health benefits of bioactive food components. Content will include both basic knowledge and the latest research trends.

Prerequisite: Graduate status**FOS 5732 Current Issues in Food Regulations 3 Credits****Grading Scheme:** Letter Grade

Governmental laws and regulations affecting the food industry.

Prerequisite: consent of instructor.**FOS 6125C Sensory Evaluation of Food 3 Credits****Grading Scheme:** Letter Grade

Principles and techniques of sensory evaluation of foods. Emphasizes basics of taste and olfactory perception; the basic psychology of common sensory tests; the proper use of discrimination testing, consumer acceptability and preference testing, and descriptive analysis; and statistical analysis of sensory data.

Prerequisite: STA 6166.**FOS 6215 Principles of Food Safety 3 Credits****Grading Scheme:** Letter Grade

A multidisciplinary approach to food safety that includes aspects of food chemistry, food toxicology, food biotechnology, food microbiology, food defense, and food processing. Enrollment restricted to students in the Food Safety Graduate Certificate Program.

Prerequisite: Bachelor's Degree**FOS 6216 Food Safety Systems 2 Credits****Grading Scheme:** Letter Grade

Analyzing the seven steps of Hazard Analysis Critical Control Point (HACCP) and prerequisite programs associated with food processing environments in seafood, meat, poultry, vegetable, grain, and beverage processing facilities. Enrollment restricted to students in the Food Safety Graduate Certificate Program.

Prerequisite: FOS 6215**FOS 6217 Food Safety, Sanitation, and Microbiology 2 Credits****Grading Scheme:** Letter Grade

Microbial, chemical, and biological safety of food and principles of sanitation for the food processing and retail food industries. Enrollment restricted to students in the Food Safety Graduate Certificate Program.

Prerequisite: FOS 6215**FOS 6218 Food Safety Systems 2 Credits****Grading Scheme:** Letter Grade

This course is designed to cover 1) current issues in food supply chain including security and safety in domestic and international food industry, 2) various food safety control systems, 3) principles of HACCP and FSMA Preventive controls. The course also provides hands-on practice in developing a food safety plan.

FOS 6224 Food and Environmental Virology 2 Credits**Grading Scheme:** Letter Grade

Food virology is an emerging topic in the field of microbial food safety. This course explores the role of viruses as human pathogens; their interactions with bacteria; transmission to food, water, and contact surfaces; detection; and prevention strategies. Through this course, students can develop a competency framework within their discipline.

Prerequisite: Basic familiarity with microbiology or biochemistry.

FOS 6226C Advanced Food Microbiology 4 Credits**Grading Scheme:** Letter Grade

Selection of laboratory methods, characterization of food-borne pathogens and spoilage organisms.

Prerequisite: FOS 4222/4222L, MCB 4303/4303L and BCH 6415.**FOS 6315C Advanced Food Chemistry 4 Credits****Grading Scheme:** Letter Grade

Functions of lipids, carbohydrates, proteins, enzymes and other components in foods and their reactions and interactions during food processing and storage.

Prerequisite: BCH 4024 or 3025 and FOS 4311C.**FOS 6317C Flavor Chemistry and Technology 3 Credits****Grading Scheme:** Letter Grade

Psychophysics of taste and aroma, sensory analysis, flavor extraction, measurement techniques, flavor precursors, off-flavors, Maillard flavors, bioflavors, flavoring materials, flavor safety and authenticity.

Prerequisite: basic and organic chemistry.**FOS 6355C Instrumental Analysis and Separations 5 Credits****Grading Scheme:** Letter Grade

Separation of food chemicals; gas, high performance liquid, thin-layer, ion-exchange and molecular size chromatography; characterization via UV-visible, IR, NMR, and mass spectrometry.

Prerequisite: CHM 3120, FOS 4311C.**FOS 6428C Advanced Food Processing 4 Credits****Grading Scheme:** Letter Grade

Reaction kinetics, heat transfer mechanics, and process design, optimization and economics.

Prerequisite: FOS 4427C.**FOS 6455C Industrial Food Fermentations 3 Credits****Grading Scheme:** Letter Grade

Microbiological, chemical, and physical principles and practices in fermentation of foods and constituents.

Prerequisite: FOS 4222/4222L.**FOS 6736 Food Regulations 2 Credits****Grading Scheme:** Letter Grade

Federal laws and regulations associated with the food industry related to food safety, adulteration, misbranding, standards of identity, ingredients, and additives. Structure and function of U.S. government agencies involved in food regulation. Enrollment restricted to students in the Food Safety Graduate Certificate Program.

Prerequisite: FOS 6215**FOS 6905 Problems in Food Science 1-3 Credits, Max 4 Credits****Grading Scheme:** Letter Grade

Individual study carried out in laboratory, library, pilot plant, or the food industry.

Prerequisite: consent of instructor. Not open to students on probation or conditional admission.**FOS 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

Prerequisite: consent of instructor.**FOS 6915 Research Planning 2 Credits****Grading Scheme:** Letter Grade

Required of first-year graduate students. Planning and initiating research, experimental techniques, analyzing data, reporting results.

Prerequisite: consent of instructor.**FOS 6936 Topics in Food Science 1-4 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Special aspects or current developments in food science.

Prerequisite: consent of instructor.**FOS 6938 Food Science Seminar 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

Preparing and presenting reports on specialized aspects of research and technology in food science.

Prerequisite: consent of instructor.**FOS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

Prerequisite: consent of instructor.**FOS 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

FOS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

FOS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

HUN 5441 Metabolic Response to Enteral and Parenteral Nutrition 2 Credits**Grading Scheme:** Letter Grade

Response of the body's organ systems to enteral and parenteral nutritional support, emphasizing physiological and biochemical adaptations.

Prerequisite: BCH 3025, HUN 2201, and PET 2350 or equivalents.**HUN 5447 Nutrition and Immunity 3 Credits****Grading Scheme:** Letter Grade

Role of nutrition in immunity. Effect of nutrients, foods, and dietary supplements on regulation of the immune system.

Prerequisite: PCB 4713C.**HUN 6235 Macronutrients in Human Nutrition 3 Credits****Grading Scheme:** Letter Grade

This course will discuss digestion, absorption, and metabolism of carbohydrates, proteins, lipids, and fiber in health and disease. The macronutrients will be discussed as individual dietary components as well as part of a dietary pattern.

Prerequisite: BCH 6206 or Food Science and Human Nutrition Master's student.**HUN 6245 Advanced Human Nutrition 3 Credits****Grading Scheme:** Letter Grade

Molecular and cellular aspects of nutrients and discussion of research techniques in genomics and proteomics.

Prerequisite: BCH 4024 or 3025, and a nutrition principles course.**HUN 6255 Clinical Nutrition 2-12 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Nutritional requirements and metabolism of nutrients in normal individual, altered nutritional requirements and metabolism of nutrients in different disease states, and practical aspects of nutritional and metabolic support of different types of patients.

HUN 6301 Nutritional Aspects of Lipid Metabolism 3 Credits**Grading Scheme:** Letter Grade

Role of lipids in nutrition, with emphasis on energy metabolism and derangements in chronic diseases.

HUN 6305 Nutritional Aspects of Carbohydrates 3 Credits**Grading Scheme:** Letter Grade

Characteristics, absorption, and metabolism of common carbohydrates in the food chain; carbohydrate metabolism and its regulation; carbohydrate metabolism in disease.

HUN 6321 Proteins and Amino Acids in Nutrition 3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Digestion, absorption, and degradation; emphasis on turnover, requirements, assessment of quality, and effects of deficiencies, toxicities, and physiological stresses.

Prerequisite: BCH 3025.**HUN 6331 Vitamins in Human Nutrition 3 Credits****Grading Scheme:** Letter Grade

Biochemical and physiological functions; nutrient requirements and interactions; response to deficiencies and excesses.

Prerequisite: BCH 4024 or 3025.**HUN 6356 Minerals in Nutrition 3 Credits****Grading Scheme:** Letter Grade

Biochemical and physiological aspects of mineral absorption, metabolism, and function.

Prerequisite: BCH 4024 or equivalent.**HUN 6548 Global Nutrition 3 Credits****Grading Scheme:** Letter Grade

Explore current nutritional problems influencing the health and livelihood of populations in low-income countries. Examine local and global dimensions of malnutrition, food and nutrition insecurity, and micronutrient deficiencies, along with the policies and interventions aimed at improving nutrition outcomes implemented at the household, community, national, and global levels to improve nutritional status.

HUN 6626 Nutrition Education 1 Credit**Grading Scheme:** Letter Grade

This class provides students with the tools necessary to provide nutrition education to the public. Students will learn how to conduct needs assessments, use learning theories when developing programs, write for the general public and health professionals, and develop nutrition education and materials.

HUN 6804 Nutrition Research Method: Systematic Review 3 Credits**Grading Scheme:** Letter Grade

Introduces students to methods for conducting systematic reviews in nutrition and other areas of health and wellness.

HUN 6812C Analytical Techniques in Nutritional Biochemistry 1 Credit**Grading Scheme:** Letter Grade

Biochemical analyses of tissues and fluids, radio-tracer methodology, metabolic studies, tissue handling, and formulation of experimental animal diets.

Prerequisite: BCH 4024 or 3025 and consent of instructor.**HUN 6835 Research Projects in Nutrition and Dietetics – part 2 2 Credits****Grading Scheme:** Letter Grade

This is part two of a two-part course. This course will carry out the study, analyze the data and interpret and present the results of the study that was planned and approved by the University Institutional Review Board in the previous semester as part of FOS6915 Research Planning (i.e., part 1).

Prerequisite: FOS 6915.**HUN 6905 Problems in Nutritional Sciences 1-3 Credits, Max 4 Credits****Grading Scheme:** Letter Grade

Individual study carried out in laboratory, library, pilot plant, or food industry.

Prerequisite: consent of instructor. Not open to students on probation or conditional admission.**HUN 6936 Topics in Nutritional Sciences 1-4 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Special aspects or current developments in nutritional sciences.

Prerequisite: consent of instructor.**HUN 6938 Nutritional Sciences Seminar 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

Presentation of reports on research in nutrition.

Prerequisite: consent of instructor.**HUN 6939 Advanced Clinical Nutrition 2-12 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Applying normal and therapeutic nutrition principles to specific clinical topics based on cases from the health center environment.

HUN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

Prerequisite: consent of instructor.**HUN 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: for thesis students only.**HUN 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HUN 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Forest Resources and Conservation

FAS 6306C Spatial Sciences for Marine Environmental Characterization 4 Credits**Grading Scheme:** Letter Grade

An introduction to the geospatial technologies, concepts and methods required to acquire, analyze and manage geographic data used in a context of marine habitat mapping. Emphasis is given to the understanding and appreciation of maps as a mean of communication between stakeholders with different backgrounds and expertise.

FAS 6356 Fisheries Enhancement 2 Credits**Grading Scheme:** Letter Grade

Provides participants with knowledge and skills required for assessing where and when enhancements can contribute to fisheries management goals, and for developing and managing such initiatives effectively. Emphasizes integrative systems approaches and the key elements of population dynamics, aquaculture production, release strategies, genetic management, governance, and social/economic costs and benefits.

FNR 5015 Ecosystem Restoration Principles and Practice 3 Credits**Grading Scheme:** Letter Grade

Application of ecological theory and economic and political constraints to restoration practice. Emphasizes regional, national, and international case studies.

FNR 5016 Ecology and Restoration of Longleaf Pine Ecosystems 3 Credits**Grading Scheme:** Letter Grade

History, structure, function and ecological and economic importance; regeneration ecology, stand dynamics, restoration techniques, ownership patterns, and socio-economic and political and policy aspects of restoration

FNR 5072C Environmental Education Program Development 3 Credits**Grading Scheme:** Letter Grade

Comprehensive approach, from needs assessment to evaluation, applied to youth-based, nonformal environmental education. Required field trip and group project.

FNR 5405 Forest Information Systems 3 Credits**Grading Scheme:** Letter Grade

Sampling methodology for natural resource inventories, involving remote sensing, geographic information systems (GIS), and global positioning system (GPS). Offered spring term of even-numbered years.

Prerequisite: Consent of instructor.**FNR 5608 Research Planning 3 Credits****Grading Scheme:** Letter Grade

History and philosophy of science, scientific method, development of a research proposal. Research facilities and programs are presented. Offered fall term.

Prerequisite: consent of instructor. Required for all new M.S. students.**FNR 5625 Managing Public Lands and Waters 3 Credits****Grading Scheme:** Letter Grade

Concepts, principles and practices of managing public lands and waters of the United States, and, to a lesser extent, other countries; the natural resources involved; and the roles and responsibilities of governing bodies, management organizations, constituents and the general public.

FNR 5626 Forest Resource Manag 3 Credits**Grading Scheme:** Letter Grade

Forest Resource Manag

FNR 6006 Silviculture: Concepts and Application 3 Credits**Grading Scheme:** Letter Grade

Principles governing establishment, treatment, and control of forest stands; regeneration systems; intermediate cuttings; intensive cultural practices; land use ethics; and management systems.

Prerequisite: Course in ecology.**FNR 6046C Lidar Remote Sensing for Forestry Applications 3 Credits****Grading Scheme:** Letter Grade

Lidar remote sensing is a state-of-the-art technology widely used in research and forestry applications. Learn how to visualize, process lidar point cloud data, build terrain and canopy height models and establish statistical models using open-source software including R-statistical language and FUSION/LDV. This face-to-face course includes a chance to develop your own lidar project in data visualization, aboveground biomass and fuel load estimations and more with the many datasets available.

FNR 6061 Conflict and Collaboration in Natural Resources 3 Credits**Grading Scheme:** Letter Grade

Overview of major issues, theories, and approaches related to conflict management and collaboration in natural resources. Topics include conflict management, collaborative processes, and negotiation; tools and frameworks for analyzing conflict; and evolving management approaches to natural resource conflict including co-management and community-based management.

FNR 6075 Science Communication & Public Education 3 Credits**Grading Scheme:** Letter Grade

Provides an introduction to science communication, environmental education, and public outreach. The course will focus on strategic message framing and how to convey scientific research to the public. The public outreach portion will focus on general audiences as well as K-12 specific outreach.

FNR 6085 Landscape Planning for Ecotourism 3 Credits**Grading Scheme:** Letter Grade

Planning frameworks and techniques of large natural areas. Offered fall term.

FNR 6134 Physiology of Forest Trees 3 Credits**Grading Scheme:** Letter Grade

Growth and development of woody perennial plants, with emphasis on understanding how environmental factors affect their physiology.

Prerequisite: Graduate status or consent of instructor.**FNR 6308 Urban Forestry 3 Credits****Grading Scheme:** Letter Grade

Explores the nature, scope and components of the urban forest, including biology, culture, protection and aspects of management, planning and policy.

Prerequisite: Graduate standing.**FNR 6314 Issues in Southeastern Forest Health 3 Credits****Grading Scheme:** Letter Grade

Instructs students how to understand and address invasive and native forest and tree health issues and their management in the southeastern U.S. Topics include threats from insects, pathogens, wildlife, climate change, invasive plants and more. For each forest health topic, students will learn the biology, ecology, and management strategies.

Prerequisite: Graduate standing.**FNR 6315 Tropical Forestry 3 Credits****Grading Scheme:** Letter Grade

Promise and pitfalls of production-oriented management as a conservation strategy for naturally regenerated tropical forests. Ecological constraints to sustainable forest management in the tropics; strategies, tools, and techniques for large- and small-scale management of old growth and secondary tropical forests for timber and non-timber forest products and services; future of forests and forestry in tropical landscapes. Offered spring term.

Prerequisite: Consent of instructor.**FNR 6406C Lidar Remote Sensing for Forestry Applications 3 Credits****Grading Scheme:** Letter Grade

Lidar remote sensing is a state-of-the-art technology widely used in research and forestry applications. Learn how to visualize, process lidar point cloud data, build terrain and canopy height models and establish statistical models using open-source software including R-statistical language and FUSION/LDV. This face-to-face course includes a chance to develop your own lidar project in data visualization, aboveground biomass and fuel load estimations and more with the many datasets available.

FNR 6462 Foundations of Geospatial AI for Natural Resource Management 3 Credits

Grading Scheme: Letter Grade

Focuses on practical applications of AI in geospatial analysis for fields like resource management, agriculture, forestry, and marine sectors. Students will gain hands-on experience with Python and GeoAI tools for tasks such as data preprocessing, spatial data mining, image processing, and pattern recognition. The course also covers the use of Generative AI for spatial data analysis and big data processing, alongside ethical and societal considerations

FNR 6504 Analysis of Forest Ecosystems 3 Credits

Grading Scheme: Letter Grade

Concepts of the forest ecosystem, the role of models for understanding ecosystem dynamics, disturbance regimes and stability theory, nutrient cycles, and ecosystem energetics.

Prerequisite: BSC 2010, or equivalent.

FNR 6505 Forest Ecosystem Health 3 Credits

Grading Scheme: Letter Grade

Forest Ecosystem Health is an integrated course dedicated to the study of forest health and how it relates to ecological restoration.

FNR 6506 Forest Ecosystem Resilience 3 Credits

Grading Scheme: Letter Grade

Offers an overview of the abiotic and biotic drivers, and management activities that can either stimulate or suppress alterations in forest structure and function. The course also covers the methods used to detect change and surveys the models used to estimate how a forest will change in the future.

FNR 6516 Management and Restoration of Invaded Ecosystems 3 Credits

Grading Scheme: Letter Grade

An overview of the ecological basis for plant invasions in terrestrial ecosystems, with emphasis on applications for restoration and management of invaded ecosystems. Methods and techniques for prediction, prevention, control, and restoration will be discussed, and plant invasions from Florida and around the U.S. will be used as case studies. This course focuses heavily on applying scientific theory and research to on-the-ground management.

FNR 6560 Intro to Bayesian Statistics for Life Sciences 3 Credits

Grading Scheme: Letter Grade

Introduces life scientists to Bayesian statistics. Will explore basic ideas regarding integration through simulation (Monte Carlo integration), the philosophy and strengths of Bayesian statistics, and the Markov Chain Monte Carlo (MCMC) algorithms needed to fit such models.

FNR 6564 Ecohydrology 3 Credits

Grading Scheme: Letter Grade

Introductory course on ecohydrology - the study of interactions between organisms, ecosystems, and the hydrologic cycle. Uses a blend of theory and case studies.

Prerequisite: permission of instructor

FNR 6565 Simulation Analysis of Forest Ecosystems 3 Credits

Grading Scheme: Letter Grade

Conceptual basis, evaluation, implementation, testing, and analysis of forest simulation models. Students develop and present modeling projects.

FNR 6607 Conservation Behavior 3 Credits

Grading Scheme: Letter Grade

Methods for changing behavior in various groups to improve environmental sustainability.

FNR 6615C Visualization of Ecological Data 3 Credits

Grading Scheme: Letter Grade

Equip students to work with big (ecological) data, with focus on data visualization as exploratory data analysis. Students will understand the importance and basics of data management and effective visualization and will be able to read data into R from external sources (csv, txt) and be able to check and manipulate data types. They will communicate their data and/or findings using R, Rstudio, and Rprojects, as well as make basic statistical summaries and plots of data.

Prerequisite: Graduate standing.

FNR 6620 Community Forest Management 3 Credits

Grading Scheme: Letter Grade

Integrates theory from the socio-economic and bio-physical sciences with on-the-ground realities in implementing community-based forest management and conservation.

FNR 6626 Fire Paradigms 3 Credits

Grading Scheme: Letter Grade

Reviewing dominant fire paradigms worldwide, including in-depth review of specific paradigm, its theoretical basis, and social/ecological/management implications.

FNR 6628 Watershed Management and Restoration 3 Credits

Grading Scheme: Letter Grade

Addresses science and policy of watershed management, focusing on biophysical factors, socioeconomic drivers, and the legal/policy context.

FNR 6665 Natural Resource Economics and Valuation 3 Credits

Grading Scheme: Letter Grade

Extending microeconomic principles to problems in forest production, supply behavior, forest valuation, and multiple use of forest lands. Offered spring term of odd-numbered years.

Prerequisite: Consent of instructor.

FNR 6668 Natural Resources in a Changing Climate 3 Credits

Grading Scheme: Letter Grade

This course takes a multidisciplinary and systems approach to address potential global climate change (GCC) effects to our natural resources and understand how adaptive strategies may sustain these resources in a changing climate.

FNR 6669 Policy and Economics of Natural Resources 3 Credits

Grading Scheme: Letter Grade

Factors in evolution of forest, range, wildlife and related natural resources administration and policies in the United States. Includes policy components, policy formation and implementation, change processes, and economic criteria for evaluating policy effectiveness.

FNR 6905 Research Problems in Forest Resources and Conservation 1-6 Credits, Max 10 Credits

Grading Scheme: Letter Grade

Research Problems in Forest Resources and Conservation

Prerequisite: Consent of instructor.

FNR 6910 Supervised Research 1-5 Credits, Max 5 Credits

Grading Scheme: S/U

Supervised Research

Prerequisite: Consent of instructor.

FNR 6933 Seminar 1 Credit, Max 2 Credits

Grading Scheme: Letter Grade

Seminar

FNR 6934 Topics in Forest Resources and Conservation 1-4 Credits, Max 12 Credits

Grading Scheme: Letter Grade

Selected topics in forestry and natural resources.

FNR 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

Prerequisite: Consent of instructor.**FNR 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

FNR 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

FNR 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

GIS 6116 Geographic Information Systems Analysis 3 Credits**Grading Scheme:** Letter Grade

Analytical tools such as software grid modules, database query, map algebra, and distance operators; analytical operations such as database query, derivative mapping, and process modeling; sources and nature of uncertainty and error, and project planning management.

Prerequisite: SUR 3393 and SUR 3393L**PCB 5530 Plant Molecular Biology and Genomics 3 Credits****Grading Scheme:** Letter Grade

Integrated overview of the fundamental mechanisms enabling plant growth, development, and function, and approaches to study these at molecular level. Topics include replication, repair, transcription, translation, cell cycle, transformation, gene tagging, structural genomics, proteomics, and metabolomics. Offered in fall term.

Prerequisite: undergraduate molecular biology or biochemistry.**PCB 6528 Plant Cell and Developmental Biology 3 Credits****Grading Scheme:** Letter Grade

Cellular and developmental biology of plants. Lecture format with frequent discussion of recent papers. Topics include signal transduction, organelles, protein trafficking, and developmental mechanisms. Offered in spring term.

Prerequisite: PCB 5530 and PCB 5065 or equivalent.**PCB 6555 Introduction to Quantitative Genetics 3 Credits****Grading Scheme:** Letter Grade

Intended for students of all disciplines who are interested in genetic principles and biometric evaluation of characters that exhibit continuous variation in natural populations or breeding programs.

Prerequisite: STA 6166.

French

FOL 6326 Technology in Foreign Language Education 3 Credits**Grading Scheme:** Letter Grade

Technology in classrooms. The interface between pedagogy and technology.

Prerequisite: FOL 6943, FRE 6943, or equivalent.**FRE 6060 Beginning French for Graduate Students I 3 Credits****Grading Scheme:** S/U

For students with no formal preparation who need a reading knowledge.

FRE 6061 Beginning French for Graduate Students II 3 Credits**Grading Scheme:** S/U

For students who need proficiency in reading.

Prerequisite: FRE 6060 or equivalent.**FRE 6466 Advanced Translation and Stylistics 3 Credits****Grading Scheme:** Letter Grade

Translation from English to French and French to English. Texts selected from modern authors. Various genres and styles.

FRE 6735 Special Studies in French Linguistics 3 Credits**Grading Scheme:** Letter Grade

Rotating topics relevant to second language acquisition, sociolinguistics, and/or theoretical linguistics.

FRE 6736 The French language in the Americas 3 Credits**Grading Scheme:** Letter Grade

Examining of the presence of French in the Americas. Topics we will be covering are origin of French in the Americas, language practices of Francophone communities, linguistic characteristics of the varieties of French, effect of language contact on language behavior and representations, identity issues. Focus varies from year to year.

Prerequisite: None, but FRE 6785 or FRE 6855 recommended.**FRE 6785 French Phonetics and Phonology 3 Credits****Grading Scheme:** Letter Grade

Introduction to French phonological processes. Explanatory evidence: production of speech sounds, classification of sounds, and their interrelationships (gliding, nasalization, assimilation). Morphological and syllable structure. Specifically French phenomena: liaison, elision, final consonant drop, schwa drop. Relationship of morphology to phonology, especially verb system.

FRE 6827 Sociolinguistics of French 3 Credits**Grading Scheme:** Letter Grade

Sociolinguistic issues in the French-speaking world: language variation, discourse analysis, attitudes toward varieties of French, and contact with speakers of other languages.

FRE 6845 History of the French Language 3 Credits**Grading Scheme:** Letter Grade

Phonological, morphological, syntactic, and lexical evolution of French language.

FRE 6855 Structure of French 3 Credits**Grading Scheme:** Letter Grade

Explores the French language as a system of communication and mental representation. Analyzes morphological, syntactic, and semantic aspects of contemporary French. Emphasizes historical, psychological, and sociological dimensions of linguistic investigation.

FRE 6856 French in the 21st Century 3 Credits**Grading Scheme:** Letter Grade

Examining of how the French language is changing in the 21st century, from phonological, morphological, syntactic, lexical and semantic points of view. Addressing such topics as phonological assimilation; the negative; interrogative structures; the future tense; and borrowings, calques and semantic shifts, in different varieties of French.

Prerequisite: None, but FRE 6785 or FRE 6855 recommended.**FRE 6945 Practicum in Advanced College Teaching 2 Credits, Max 6 Credits****Grading Scheme:** S/U

Practical training and orientation for advanced doctoral students in teaching upper-division courses. Gain upper-level teaching experience by working closely with a mentor in all areas of the teaching process.

FRE 6956 Overseas Studies in French 1-5 Credits**Grading Scheme:** Letter Grade

Course work in French as part of approved study-abroad program.

Prerequisite: permission of graduate coordinator (French).**FRW 6217 Seventeenth-Century French Prose 3 Credits****Grading Scheme:** Letter Grade

Major prose works of the classical period. Fermentation in philosophical and moral thought that characterized early modern period France.

Cartesian thought, new science, Jansenism, libertines, and moralistes.

Also includes texts by La Fayette and Sevigne.

FRW 6276 Readings in Eighteenth-Century Literature 3 Credits**Grading Scheme:** Letter Grade

Rotating topics: theater, novel, image of the Orient, Anglo-French connection, women writers of the Old Regime.

FRW 6288 Twentieth-Century French Novel 3 Credits**Grading Scheme:** Letter Grade

Analyzes representative novels. Emphasizes literary modernism, surrealism, and the new novel in light of pertinent cultural discourses and literary history.

FRW 6315 Seventeenth-Century French Drama 3 Credits**Grading Scheme:** Letter Grade

Theory and practice of dramaturgy in classical period as reflected in plays of Corneille, Molière, and Racine. Close textual analysis to disengage aesthetic and ideological problematics posed by each play.

FRW 6328 20th & 21st Century French and Francophone Theater 3 Credits**Grading Scheme:** Letter Grade

A study of selected plays (by Anouilh, Beckett, Césaire, Duras, Genet, Ionesco, Jarry, Réza, Sarraute, Sartre, etc.), dramatic techniques and stage performances in 20th and 21st century French and Francophone theater.

FRW 6346 French Poetry of the Renaissance 3 Credits**Grading Scheme:** Letter Grade

French Poetry of the Renaissance

FRW 6355 Modern French Poetry 3 Credits**Grading Scheme:** Letter Grade

Historical approach combined with close readings of poetic texts. Introduction to numerous theoretical and critical writings. In addition to poetic texts taken from traditional cannon, less frequently taught poets are presented.

FRW 6396 French Cinema 3 Credits**Grading Scheme:** Letter Grade

Critical and historical study of representation of gender and ethnicity in French films.

FRW 6536 The Romantic Period 3 Credits**Grading Scheme:** Letter Grade

Development and main tenets of 19th-century French Romanticism. Various themes and genres (novel, poetry, theater, etc.) exploited by "romantic" artists. Socioeconomics and cultural matrices fostering movement. Relationship between literature and visual arts. Constructions of gendered, cultural, and artistic subjectivities. Exoticism (spatial, temporal, and mystic voyages). Representations of Paris and French society.

FRW 6556 French Realism and Naturalism 3 Credits**Grading Scheme:** Letter Grade

French Realism and Naturalism

FRW 6715 The Philosophic Movement 3 Credits**Grading Scheme:** Letter Grade

Readings from major figures such as Voltaire, Montesquieu, Diderot, and Rousseau. Historiography of the period. Key issues of Enlightenment (religious tolerance, slavery, women's rights, etc.). Key institutions of the 18th century (encyclopedia, newspaper, salon).

FRW 6780 Studies in Francophone Literature and Culture (Excluding the Caribbean and Sub-Saharan Africa) 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Literature and cultures of the Francophone world. Quebec, North Africa, Vietnam, the Middle East, Belgium and Switzerland, or regions of France.

FRW 6805 Introduction to Graduate Study and Research 3 Credits**Grading Scheme:** Letter Grade

Tools, problems, and methods of literary and linguistic research.

FRW 6825 French Critical Theory 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Review and comparative analysis of approaches to literature from Romanticism to Deconstruction. Act of reading and writing examined through eyes of Sainte-Beuve, Taine, Lanson, Bachelard, Geneva School, Ricoeur, Bataille, Blanchot, Barthes, Foucault, Genette, Lacan, Kristeva, Todorov, Derrida, and others. Rotating topics.

FRW 6900 Special Study in French Literature 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Selected topic or problem (varied each semester).

FRW 6905 Individual Work 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Available only by special arrangement with graduate adviser.

FRW 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

FRW 6938 Seminar in French Literature 3 Credits**Grading Scheme:** Letter Grade

Intensive research study of an author or topic.

FRW 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

FRW 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

FRW 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Genetics and Genomics

AGR 6322 Advanced Plant Breeding 3 Credits**Grading Scheme:** Letter Grade

Theory and use of biometrical genetic models for analytical evaluation of qualitative and quantitative characteristics, with procedures applicable to various types of plant species. Offered spring term in even-numbered years.

Prerequisite: AGR 3303, 4231, AGR 6311, and STA 6167.

ANG 6532 Molecular Genetics of Disease 3 Credits**Grading Scheme:** Letter Grade

Examines the molecular genetics of human disease. Discusses a range of diseases from single-gene recessive defects (such as cystic fibrosis) to complex diseases (such as alcoholism and diabetes). Also discusses detection and treatment.

ANG 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ANG 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

BCH 6415 Advanced Molecular and Cell Biology 3 Credits**Grading Scheme:** Letter Grade

Molecular biology of pro- and eukaryotic organisms. Emphasizes understanding the experimental approaches that led to recent developments. Chromosome structure and organization, advances in recombinant DNA technology, DNA replication, RNA transcription and protein synthesis, and selected aspects of molecular regulation of gene expression.

Prerequisite: BCH 4024, CHM 4207, MCB 4303, or consent of instructor. PCB 3063 or a similar course in genetics recommended. One of three core biochemistry courses.

BCH 7410 Advanced Gene Regulation 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Literature-based assessment of the most recent advances in factors governing eukaryotic gene regulation.

Prerequisite: GMS 6001 or consent of instructor.

CAP 5510 Bioinformatics 3 Credits**Grading Scheme:** Letter Grade

Basic concepts of molecular biology and computer science. Sequence comparison and assembly, physical mapping of DNA, phylogenetic trees, genome rearrangements, gene identification, biomolecular cryptology, and molecular structure prediction.

Prerequisite: CIS 3020 or equivalent.

CIS 6930 Special Topics in CIS 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Special Topics in CIS

Prerequisite: vary depending on topics.

COT 5405 Analysis of Algorithms 3 Credits**Grading Scheme:** Letter Grade

Introduction and illustration of basic techniques for designing efficient algorithms and analyzing algorithm complexity.

Prerequisite: COP 3530.

GMS 6012 Human Genetics 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Theoretical framework for understanding the fundamentals of human genetics. Advanced technical tools used for research.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6013 Developmental Genetics 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Theoretical framework for understanding the fundamentals of developmental genetics. Advantages and limitations of several model systems and their application to the study of development.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6014 Applications of Bioinformatics to Genetics 1 Credit**Grading Scheme:** Letter Grade

Storage, retrieval, and analysis of information related to genetics.

Prerequisite: GMS 6001; consent of instructor.

GMS 6920 Genetics Journal Colloquy 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Critical presentations and discussions of recent original articles.

Prerequisite: consent of instructor.

GMS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HOS 6201 Breeding Perennial Cultivars 3 Credits**Grading Scheme:** Letter Grade

Methods of breeding perennial fruit and ornamental cultivars using mutations, cell and tissue culture, polyploidy, recurrent selection, and wide hybridization. Conservation and domestication of wild plants. Offered odd-numbered years in fall.

Prerequisite: AGR 3303.

PCB 5065 Advanced Genetics 4 Credits**Grading Scheme:** Letter Grade

Examines genetic principles including gene and gene function; recombination and linkage; molecular markers, multipoint linkage analysis, and positional cloning; and quantitative, population, developmental, and non-Medalian genetics. Offered in fall term.

Prerequisite: AGR 3303 or PCB 3063 and BCH 4024 or BCH 5045. For graduate students in any life science discipline.

PCB 5615 Molecular Evolution and Systematics 4 Credits**Grading Scheme:** Letter Grade

Patterns and processes of change at the molecular level in populations, species, and higher taxonomic groups, and their systematic implications.

Prerequisite: PCB 3063, graduate standing, or consent of instructor.

PCB 6528 Plant Cell and Developmental Biology 3 Credits**Grading Scheme:** Letter Grade

Cellular and developmental biology of plants. Lecture format with frequent discussion of recent papers. Topics include signal transduction, organelles, protein trafficking, and developmental mechanisms. Offered in spring term.

Prerequisite: PCB 5530 and PCB 5065 or equivalent.

PCB 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PCB 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

STA 5325 Fundamentals of Probability 3 Credits**Grading Scheme:** Letter Grade

Topics in probability and statistics, particularly discrete and continuous random variables, sampling distributions, estimation, and hypothesis testing. Applications to engineering and natural science.

Prerequisite: grade of C or better in MAC 2313 and STA 3032 or equivalent.

STA 5328 Fundamentals of Statistical Theory 3 Credits**Grading Scheme:** Letter Grade

Direct continuation of STA 4321/STA 5325. Basic material for distribution theory, sampling distributions, properties of estimators, hypothesis testing, linear regression analysis, and analysis of variance. A good knowledge of calculus is helpful.

Prerequisite: STA 4321 or equivalent.**STA 6166 Statistical Methods in Research I 3 Credits****Grading Scheme:** Letter Grade

Statistical methods based on t, F, and Chi2 tests. Analysis of variance for basic experimental designs. Factorial experiments. Regression analysis and analysis of covariance.

Prerequisite: STA 2023 or equivalent.**STA 6167 Statistical Methods in Research II 3 Credits****Grading Scheme:** Letter Grade

Analysis of covariance and general linear model. Factorial, nested, split-plot, and incomplete block designs. Analysis of count data.

Prerequisite: STA 6166.**STA 6208 Basic Design and Analysis of Experiments 3 Credits****Grading Scheme:** Letter Grade

Focusing on the principles of experimental design, completely randomized design (analysis, contrasts, diagnostics), random effects models, factorial experiments (fixed, random, and mixed effect), block designs, Latin squares, split plots, and full and fractional factorial experiments.

Prerequisite: STA 6207**STA 6329 Matrix Algebra and Statistical Computing 3 Credits****Grading Scheme:** Letter Grade

Basic theory of determinants, inverses and generalized inverses, eigenvalues and eigenvectors; applications of partitioned matrices; diagonalization and decomposition theorems; applications in least squares.

Prerequisite: MAC 3313.**STA 6934 Special Topics in Statistics 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Special Topics in Statistics

Prerequisite: permission of graduate adviser.**STA 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

STA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ZOO 6927 Special Topics in Zoology 1-4 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Special Topics in Zoology

ZOO 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been admitted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ZOO 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Geography

GEA 6419 Seminar: South America 3 Credits**Grading Scheme:** Letter Grade

Cultural, economic, political, and resource characteristics and development of representative areas.

GEA 6466 Seminar on Geography of Amazonia 3 Credits**Grading Scheme:** Letter Grade

Exploration of biophysical basis of natural resource management, cultural diversity, and economic development in Amazonia.

GEO 5305 Environmental Biogeography 3 Credits**Grading Scheme:** Letter Grade

Description and explanation of spatial patterns of biodiversity, and underlying biophysical factors of human-environment interactions. Past and present distributions of organisms and how patterns of environmental variation influence the organisms. Biogeography is useful for designing nature reserves, forecasting how climate change may affect organisms, and explaining human adaptations to environmental variability. This class takes a mostly ecological approach to understanding biogeography.

Prerequisite: Graduate standing.**GEO 5349 Weather, Climate, and Society 3 Credits****Grading Scheme:** Letter Grade

Investigates social vulnerability to hazards, disasters, and climate change through perspectives and experiences of vulnerable population segments who often bear brunt of losses, yet exhibit remarkable flexibility and creativity in coping and adapting to environmental risks. Introduces students to census data and spatial analysis to understand geographies of social vulnerability.

GEO 5920 Geography Colloquium 1 Credit, Max 6 Credits**Grading Scheme:** S/U

Presentation and discussion of contemporary geographic research.

GEO 6065C Terrorism and Space Seminar 3 Credits**Grading Scheme:** Letter Grade

Critically discusses the dual concerns for geography as an influence on and a source of terrorism. Presents the origins of contemporary terrorism as well as the various motivations of ideologically oriented, ethno-nationalist, and religious Organizations. Examines how a spatial approach can contribute to better understand the diffusion of terrorist organizations across the world, with a particular focus on Africa.

GEO 6118 Contemporary Geographic Thought and Research 3 Credits**Grading Scheme:** Letter Grade

Summary of major currents of intellectual thought and research orientations in contemporary geography.

Prerequisite: admission to graduate program in geography.**GEO 6119 Proposal Writing in Geography 3 Credits****Grading Scheme:** Letter Grade

Research design, proposal writing and proposal evaluation for geographic studies.

Prerequisite: Graduate standing in Geography or consent of instructor

GEO 6160 Introduction to Quantitative Methods for Geographers 3 Credits**Grading Scheme:** Letter Grade

Working knowledge of statistical and quantitative techniques used by geographers. Focuses on spatial analysis.

Prerequisite: statistics.**GEO 6161 Intermediate Quantitative Methods for Geographers 3 Credits****Grading Scheme:** Letter Grade

Statistical techniques used in the spatial and social sciences. Regression analysis for cross-sectional, qualitative, time-series, and geocoded data.

Prerequisite: GEO 6160.**GEO 6166 Advanced Quantitative Methods for Spatial Analysis 3 Credits****Grading Scheme:** Letter Grade

Critical examination and analysis of spatial data and point patterns, trend-surface modeling and interpolation, count data modeling, cluster and hot-spot detection, process change statistics in space and time, and spatial regression models.

Prerequisite: GEO 6160 and GEO 6161 or equivalent or permission of instructor**GEO 6168 Spatial Econometrics and Modeling 3 Credits****Grading Scheme:** Letter Grade

Introduces regression models capable of dealing with spatial autocorrelation. Students develop statistical models and estimate with computer software.

Prerequisite: GEO 6161 or equivalent.**GEO 6255 Climatology 3 Credits****Grading Scheme:** Letter Grade

Climatology in a global context. Emphasizes energy budgets, weather systems in the tropics and extratropics, and atmospheric teleconnections such as El Niño.

Prerequisite: Introductory weather and climate course taken as an undergrad.**GEO 6282 Fluvial Morphology 3 Credits****Grading Scheme:** Letter Grade

Study of fluvial processes, landforms and deposits and their changes due to environmental factors and human activities.

Prerequisite: Graduate standing, a basic physical geography or geology course and an introductory statistics course. Other interested individuals should consult instructor.**GEO 6325 Wildlife Economy and Policy The Governance and Economics of Wildlife on Working Landscapes 3 Credits****Grading Scheme:** Letter Grade

Compares exclusionary and inclusive conservation models from an historical, institutional, and economic perspective. Juxtaposes wildlife recovery through inclusive model (southern African policy outlier) against global policy norms and wildlife decline. Discusses wildlife economy on public versus working lands (private, community). Focus is wildlife economic and governance concepts and policy.

GEO 6335 Managing for a Changing Climate 3 Credits**Grading Scheme:** Letter Grade

An interdisciplinary survey of climate variability and change. Topics include the physical science basis for climate change, followed by sectoral analysis of climate impacts, adaptation, and mitigation options. Active learning, discussions, and roleplaying facilitate understanding of critical issues facing the human and natural world.

GEO 6346 Climate Change and Health 3 Credits**Grading Scheme:** Letter Grade

Presents the science of climate change and impacts on health.

Discussion builds on core concepts of climate change science to examine a variety of topics from acute impacts such as heat waves and other weather extremes to chronic conditions like degraded air quality. Mitigation and adaptation strategies are also discussed.

GEO 6348 Floods Seminar 3 Credits**Grading Scheme:** Letter Grade

Analysis of the world's most extreme floods from the Pleistocene through present due to various causes. Emphasizes physical and human aspects of flood warning, preparedness, response and recovery throughout the world.

GEO 6374 Community Conservation Governance: Theory and Practice 3 Credits**Grading Scheme:** Letter Grade

Provides advanced theoretical knowledge and empirical lessons on the governance of community wildlife conservation. Introduces theories of property and property rights, collective action, scale, participation, democracy, participatory technology development, and so on. Makes extensive use of on-going case studies, focusing on pioneering sites in Africa.

GEO 6375 Land Change Science Seminar 3 Credits**Grading Scheme:** Letter Grade

Interdisciplinary study of land use and land cover change dynamics and their relationship with global environmental change.

GEO 6408 Parks and People 3 Credits**Grading Scheme:** Letter Grade

Introduces students to the multiple dimensions of protected areas and people; discusses the history of parks on several continents, and their more well-known biodiversity dimensions; emphasizes the economic attributes of parks and their governance, and moves beyond public conservation to consider private and community approaches.

GEO 6451 Medical Geography 3 Credits**Grading Scheme:** Letter Grade

Studying human-environment interactions and the influence of these interactions on public health. This course provides a broad-based, comprehensive survey of geographic approaches in medical studies.

Prerequisite: None.**GEO 6455 Advanced Study Design in Medical Geography 3 Credits****Grading Scheme:** Letter Grade

Examines problem solving with a focus on the assumptions that underlie methods and strategies to analyze health outcomes. Integrates health with environmental conditions in a spatially explicit manner. Evaluates alternative methods of detection, analyses, data and study design.

Examines the implicit and explicit limitations.

Prerequisite: (GIS 3420C or 6425C) and (GEO 3452 or 6421) or consent of instructor**GEO 6706 Transportation and Urban Accessibility 3 Credits****Grading Scheme:** Letter Grade

Investigates the relationship between transportation and urban accessibility from a geographic perspective, through the examination of the impacts of transportation systems and accessibility on human health, social equity, and the environment, as well as the methods and tools for modeling and analyzing transportation systems and accessibility.

GEO 6905 Individual Work 1-5 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual Work

GEO 6921 How to Survive and Thrive in Academia 1 Credit**Grading Scheme:** Letter Grade

Strategies and approaches, from preparation in graduate school, to success on the academic job market, to getting tenure.

GEO 6931 Seminar in Cultural and Political Ecology 3 Credits**Grading Scheme:** Letter Grade

Human-environment relationships from the perspective of cultural and political ecology.

GEO 6938 Selected Topics in Geography 1-5 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Selected Topics in Geography

Prerequisite: graduate standing in geography or a related field.

GEO 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

GEO 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GEO 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

GEY 6341 Shelter and Care Options for U.S. Elderly 3 Credits**Grading Scheme:** Letter Grade

Examining how the housing and long-term care arrangements of older adults in the United States influence their ability to age successfully, that is, to be fully engaged in life and to effectively cope with their chronic health conditions and disabilities.

GIS 5008C Maps and Graphs 4 Credits**Grading Scheme:** Letter Grade

General introduction to principles and techniques of thematic cartography and cartographic applications.

Prerequisite: graduate standing.

GIS 5028C Advanced Aerial Photo Interpretation 3 Credits**Grading Scheme:** Letter Grade

Uses of aerial photographs in geographical research.

Prerequisite: GEO 2200 or consent of instructor.

GIS 5038C Remote Sensing 4 Credits**Grading Scheme:** Letter Grade

Uses of remote sensing imagery in geographical research.

Prerequisite: GEO 4120C.

GIS 5107C Geographic Information Systems in Research 4 Credits**Grading Scheme:** Letter Grade

Geographic technology for creating, modifying, displaying, and analyzing spatial information. Geographic analysis and reasoning, computer software and hardware technology, and research applications of GIS. Geographic databases.

GIS 5505 Population GIS 3 Credits**Grading Scheme:** Letter Grade

Instruction on geographic and cartographic techniques for geospatial analysis of population, demographic, and socioeconomic data using ArcGIS Pro. Students identify and utilize current and historical secondary population data sources for GIS analysis of population changes, and for mapping of segregation, inequality, and well-being indicators.

Corequisite: GIS 5107C with minimum grade of C or equivalent.

GIS 6104 Spatial Networks 3 Credits**Grading Scheme:** Letter Grade

Many phenomena of interest in physical, social, and cyber environments can be thought of as networks within geographic context. This course teaches methods for analyzing these spacial networks, and introduces their applications in geography, urban studies, transportation, hydrology, epidemiology, social science, etc.

Prerequisite: Entry level knowledge of statistics (GEO6160, or equivalent) or the consent of the instructor. Prior experiences with ArcGIS is preferred, but not required.

GIS 6106C GeoAI - Geographic Artificial Intelligence 3 Credits**Grading Scheme:** Letter Grade

Geography and AI integration, or GeoAI (a subfield of spatial data science), provides novel approaches for addressing a variety of geospatial problems in the natural environment and our human society. Will involve lectures, discussions hands-on computing labs using real-world geospatial data to address such AI topics as: image classification, object detection, scene segmentation, simulation and interpolation, retrieval and question answering, on-the-fly data integration, and geo-enrichment.

Prerequisite: Any GIS4XXX, GIS5XXX, GIS6XXX or permission of instructor.

GIS 6117 Applied Geostats 3 Credits**Grading Scheme:** Letter Grade

Introduces fundamentals and GIS practices of geostatistical analysis (or the kriging), which addresses optimal spatial interpolation. Geostatistics are currently applied in diverse disciplines such as geography, geology, engineering, hydrology, urban studies, and epidemiology.

Prerequisite: Entry level knowledge of both statistics (STA2023, GEO3162C/6160, or equivalent) and GIS (GIS3043/5107C or equivalent), or the consent of the instructor.

GIS 6125C Geocomputation using R Programming 3 Credits**Grading Scheme:** Letter Grade

Introduction to geodata analysis using programming. Broad introduction to the programming language as well as applied spatial data analysis. Primary outcome is to facilitate students' use of programming to analyze data of their own choosing on a final project. Code sharing and re-use is highly emphasized, as is collaboration.

GIS 6325 GIS Analysis of Hazard Vulnerability 3 Credits**Grading Scheme:** Letter Grade

Instruction on geographic and cartographic techniques for geospatial analysis of risk, vulnerability, and resilience using ArcGIS. Students learn to utilize physical and human geographic datasets for multiple hazard contexts including hydrometeorological, climatological, and geophysical hazards.

Prerequisite: GIS 3043 or URP 4273 or GIS 5107 with minimum grade of C.

GIS 6425C GIS Models for Public Health 3 Credits**Grading Scheme:** Letter Grade

Focusing on the design of GIS-based models to address health and health care issues. Major topics include: a conceptual framework, landscape epidemiology models, disease diffusion models, health accessibility, human health behavior, and location-allocation of health services. Lab section helps students gain hands-on experience applying these models with GIS tools.

Prerequisite: (GEO4167C/GEO 6160 , or equivalent) and GIS (GIS3043/ GIS 5107C , or equivalent), or the consent of the instructor

GIS 6456C Applications in GIS for Zoonoses and Disease Ecology 3 Credits**Grading Scheme:** Letter Grade

An advanced-level course for medical geography, and sister disciplines (epidemiology, public health, ecology). It can serve as an undergraduate level major or minor requirement. Focus is on GIS applications in spatial analysis and ecology to address common research issues related to zoonotic diseases (those affecting animals and humans).

Prerequisite: GIS 3043 and Geography 6161C or equivalents or consent of instructor. Students from public health backgrounds may inquire about course equivalents.

MET 5504 Weather and Forecasting 3 Credits**Grading Scheme:** Letter Grade

Skill development in predicting and discussing daily weather patterns using meteorological instruments to collect data and analyze weather events.

Prerequisite: familiarity with basic meteorology.

MET 6530 Hurricanes 3 Credits**Grading Scheme:** Letter Grade

Meteorological and climatological concepts related to hurricanes. Forecasting current activity; researching past storms; and analyzing storm structure, damage, and future trends.

Prerequisite: familiarity with basic meteorology.

MET 6565 Seminar in Atmospheric Teleconnections 3 Credits**Grading Scheme:** Letter Grade

Atmospheric teleconnections are recurring large-scale patterns of pressure and circulation anomalies. They can influence temperature, rainfall, storm tracks, and jet stream location/ intensity. We will examine how these patterns were discovered, how the index that characterizes the phase of each teleconnection is calculated, and the weather associated with different phases.

MET 6752 Spatial Analysis of Atmospheric Data using GIS 3 Credits**Grading Scheme:** Letter Grade

How atmospheric data are collected and analyzed both for meteorologic and climatologic-scale research. Learn where to obtain various types of data and how to analyze data to answer specific research questions.

Geology

BOT 5305 Paleobotany 3 Credits**Grading Scheme:** Letter Grade

Comparative study of plants through geologic time with attention to morphology and evolution of major groups of land plants, based on the fossil record. Offered spring term in odd-numbered years.

Prerequisite: upper-level course in botany or geology; or consent of instructor.

GLY 5044 Cosmochemistry 3 Credits**Grading Scheme:** Letter Grade

Chemistry of early Solar System and planetary processes. Emphasizes planetary materials, and the accretion, differentiation, and magmatic evolution of the terrestrial planets and asteroids.

Prerequisite: Graduate standing.

GLY 5062C Analytical Methods in Earth and Environmental Sciences 1-3 Credits**Grading Scheme:** Letter Grade

Provides background knowledge of various analytical methods used in Earth and Environmental Sciences. Teaches practical skills necessary to prepare and analyze research samples.

GLY 5156 Geologic Evolution of North America 3 Credits**Grading Scheme:** Letter Grade

Key geological features of North American plate and important aspects of their geological evolution through time. Current and past plate tectonic setting, major geological and geomorphologic provinces, geophysical aspects of North American lithosphere, and natural resources.

Prerequisite: GLY 2010 or 2026; 4400C recommended.

GLY 5245 Hydrogeochemistry 3 Credits**Grading Scheme:** Letter Grade

Geological controls on chemical and isotopic composition of natural waters, including meteoric ground water, brines, and sea water; emphasizing thermodynamic and kinetic aspects of fluid-solid reactions.

Prerequisite: inorganic chemistry, calculus, or consent of instructor.

GLY 5246 Geochemistry 3 Credits**Grading Scheme:** Letter Grade

The abundance and distribution of the elements and their behavior during various geological processes.

Prerequisite: CHM 2046, GLY 2010C.

GLY 5247 Surface and Ground Water Interactions 3 Credits**Grading Scheme:** Letter Grade

Classic and new literature that deals with interactions between surface and ground water. Emphasizes submarine ground water discharge in estuary and coastal zones, hyporheic zones of streams, and karst aquifers.

Prerequisite: geology/hydroecology and undergraduate chemistry and physics.

GLY 5255 Organic Geochemistry and Geobiology 3 Credits**Grading Scheme:** Letter Grade

Theory, practice, and methods of organic geochemistry, organic biogeochemistry, and geomicrobiology.

Prerequisite: one year introductory chemistry, one year introductory geology.

GLY 5328 Advanced Igneous Petrology 3 Credits**Grading Scheme:** Letter Grade

Compositional variability, phase relations, and petrogenetic history of igneous rocks, volcanic regions, and mantle. Theories of petrologic associations and magmagenesis.

Prerequisite: GLY 4310C or equivalent.

GLY 5455 Introduction to Geophysics and Tectonics 3 Credits**Grading Scheme:** Letter Grade

Physics of the Earth. Study of gravity and magnetic fields, seismic waves, thermal history, orogenic belts, and plate tectonic theory.

Prerequisite: GLY 2010C, 2026C, or 4400C and 1 year of college physics or consent of instructor.

GLY 5466 Seismology and Earth Structure 3 Credits**Grading Scheme:** Letter Grade

Introduces basic theory of elastic wave propagation in the Earth. Applies seismology as a tool for determining Earth structure and explains relationships between earthquakes and plate tectonics.

Prerequisite: MAP 2302 or GLY 5455 or PHY 2048 or PHY 2060 or consent of instructor.

GLY 5468 Terrestrial Gravity and Magnetism 3 Credits**Grading Scheme:** Letter Grade

Survey of potential field theory with applications to gravity and magnetism of the Earth.

Prerequisite: MAP 2302 or PHY 2060, and GLY 5455, or by consent of instructor.

GLY 5558C Sedimentology 3 Credits**Grading Scheme:** Letter Grade

Lecture and discussion of major sedimentary processes active in coastal and continental margin settings, focus on relating processes with sedimentary facies. Class work augmented with frequent field trips.

Prerequisite: GLY 2010 or 2026; 4552.**GLY 5576 Continental Margin Stratigraphy 3 Credits****Grading Scheme:** Letter Grade

Basic concepts of sequence stratigraphy and to illustrate their application in the study of tectonics, sediment supply, and sea-level change. Emphasizes exploration tools, such as advanced well logging techniques and seismic stratigraphy, used to relate lithology with stratigraphy.

Prerequisite: GLY4552 or equivalent**GLY 5705 Geomorphology 3 Credits****Grading Scheme:** Letter Grade

Application of principles of geomorphology to origin and evolution of landscapes.

Prerequisite: GLY 4400C.**GLY 5736 Marine Geology 3 Credits****Grading Scheme:** Letter Grade

Detailed introduction to the origin and evolution of ocean basins, ocean margins, and oceanic sediments and microfossils, including a paleoceanographic history of the marine realm.

Prerequisite: GLY 2010C, or 2026C, or OCE 1001.**GLY 5786L Topics in Field Geology 2 Credits****Grading Scheme:** Letter Grade

Visits to selected sites and regions of outstanding geologic value and interest.

Prerequisite: graduate standing and consent of instructor.**GLY 5827 Ground Water Geology 3 Credits****Grading Scheme:** Letter Grade

Principles of ground water geology, with special reference to the Coastal Plain and Florida.

Prerequisite: GLY 2010C, or 2026C.**GLY 6046 Survey of Geobiology and Astrobiology 3 Credits****Grading Scheme:** Letter Grade

Survey of the parallel evolution of life and the environment. Covers how chemical and physical processes in the atmosphere, hydrosphere, cryosphere and the solid earth influence life processes. In turn, addresses how life can influence chemical and physical processes on our planet. Explores the concept of life as a geological agent and examines the interaction between biology and the earth system during the roughly 4 billion years since life first appeared.

Prerequisite: Enrollment in a graduate program.**GLY 6075 Global Climate Change: Past, Present, and Future 3 Credits****Grading Scheme:** Letter Grade

Evolution of the Earth's climate through geologic time, including discussion of modern climatology and methods of paleoclimate interpretations.

Prerequisite: GLY 4552C.**GLY 6095 Survival Skills for Academic Careers in Earth and Planetary Sciences 3 Credits****Grading Scheme:** Letter Grade

Introduces skills needed to find, be competitive for, and survive in academic jobs. Topics include finding and securing post-doc positions, skills and tactics for writing academic job applications, interview and negotiation approaches and tips, writing and reviewing proposals, methods for effective course design, and others.

Prerequisite: Consent of the instructor and an undergraduate degree in Geological Sciences, Geology, Earth and Planetary Science, or a related field.**GLY 6256 Chemical Biomarkers in Aquatic Ecosystems 3 Credits****Grading Scheme:** Letter Grade

Examines the origins, fates, and distribution of organic compounds in contemporary aquatic waters as well as in recent and ancient sediments.

Prerequisite: Introduction to Oceanography for undergraduates.**GLY 6297 Topics in Geochemistry 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Applications of geochemical (elemental and isotopic) methods and data to tectonics and petrology).

Prerequisite: GLY 5246.**GLY 6425 Tectonics 3 Credits****Grading Scheme:** Letter Grade

Evolution and formation of mid-ocean ridges, seamounts, hot spots, island arcs, back-arc basins, passive margins, and mountain chains.

Prerequisite: GLY 4400C.**GLY 6519 Stratigraphy and Timescales 3 Credits****Grading Scheme:** Letter Grade

Methods in stratigraphy including biostratigraphy, chemostratigraphy, manetostratigraphy, and cyclostratigraphy and how these tools are integrated to generate geologic timescales in absolute time.

Prerequisite: consent of instructor, or undergraduate degree in geology.**GLY 6738 Estuarine Systems 3 Credits****Grading Scheme:** Letter Grade

Examines estuarine ecosystems around the world, with particular emphasis on the impact of global change on these highly productive systems.

Prerequisite: For undergraduates OCE 1001**GLY 6826 Hydrogeologic Modeling 3 Credits****Grading Scheme:** Letter Grade

Application of computer modeling to hydrogeologic problems through use of analytical and numerical solutions.

GLY 6862 Quantitative Methods in Earth Sciences 3 Credits**Grading Scheme:** Letter Grade

Providing graduate students with a solid introduction to the quantitative methods that are increasingly utilized in the Earth sciences.

Prerequisite: College level Calculus and Physics, or permission of instructor.**GLY 6905 Individual Work 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

For work beyond that offered in regular courses.

GLY 6931 Seminar 1 Credit, Max 6 Credits**Grading Scheme:** Letter Grade

Reading in special topics.

GLY 6932 Special Topics in Geology 1-3 Credits, Max 21 Credits**Grading Scheme:** Letter Grade

Lectures, conferences, or laboratory sessions covering selected topics of current interest in modern geology.

GLY 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

GLY 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GLY 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PCB 5307C Limnology 4 Credits**Grading Scheme:** Letter Grade

Biological, chemical, and physical dynamics of inland waters.

Prerequisite: PCB 4044C, CHM 2046.

Geomatics

GIS 6103 GIS Programming and Customization 3 Credits**Grading Scheme:** Letter Grade

Hands-on introduction to the capabilities of a Geographic Information System (GIS) to be expanded through programming.

Prerequisite: No pre-requisites.**GIS 6116 Geographic Information Systems Analysis 3 Credits****Grading Scheme:** Letter Grade

Analytical tools such as software grid modules, database query, map algebra, and distance operators; analytical operations such as database query, derivative mapping, and process modeling; sources and nature of uncertainty and error, and project planning management.

Prerequisite: SUR 3393 and SUR 3393L**SUR 5365 Digital Mapping 3 Credits****Grading Scheme:** Letter Grade

Methods of digital representation of maps, coordinate development, digitizing, stereocompilation, scanning, remote sensing, hardware and software systems, file conversion, integration into GIS systems, and attribute development.

Prerequisite: consent of instructor.**SUR 5385 Remote Sensing Applications 3 Credits****Grading Scheme:** Letter Grade

Review of remote sensing systems, image classification methods, mapping applications, integration of remotely sensed data into GIS systems, application of data for variety of land information systems.

Prerequisite: consent of instructor.**SUR 5386 Image Processing for Remote Sensing 3 Credits****Grading Scheme:** Letter Grade

Analyzing remote sensing imagery with natural resource applications: image formation and radiometric/atmospheric correction models; hyperspectral image formation; dimensionality reduction and classification; machine learning classification algorithms; and analysis of Light Detection and Ranging (LiDAR) data.

SUR 5525 Least Squares Adjustment Computations 3 Credits**Grading Scheme:** Letter Grade

Implementation of least squares solutions for survey-mapping and GIS applications, time and storage optimization; error analysis; initial approximation generation; robust estimations; and computer programming.

Prerequisite: proficiency in computer language and consent of instructor.**SUR 6346 Marine Geomatics 3 Credits****Grading Scheme:** Letter Grade

An exploration of the technologies, concepts, and methods required to acquire, analyze, and manage geographic data used in seafloor mapping and imaging. Background on the capabilities and limitations of different data collection systems will be provided, as well as for the other types of sensors necessary to collect accurate information. Topics will include marine positioning, underwater acoustics, sonars, hydrographic standards, multibeam echosounder systems and hydrographic survey design.

SUR 6355 Analytical Photogrammetry 3 Credits**Grading Scheme:** Letter Grade

This course relates the principles of precise measurement and proper data reduction through measurements of photographs followed by calculations to determine spatial information.

SUR 6377 Geospatial Application of UASs 3 Credits**Grading Scheme:** Letter Grade

Covers contemporary issues and common applications associated with small UASs (Unmanned Aerial Systems).

SUR 6395 Topics in Geographic Information Systems 3 Credits**Grading Scheme:** Letter Grade

Database development, economic impact of GIS, development of standards, integration of data sets, hardware and software developments, and advances in GIS technology.

Prerequisite: consent of instructor.**SUR 6502C Foundations of UAS Mapping 3 Credits****Grading Scheme:** Letter Grade

Covers the fundamental components of small unmanned aerial systems (UASs) and how they are used to produce high resolution, spatially accurate, planimetric maps and 3-D models of the terrain.

SUR 6535 GPS-INS Integration 3 Credits**Grading Scheme:** Letter Grade

Principles of inertial navigation and its integration with GPS; coordinate frames, modeling linear motion and rotational motion, mechanization of inertial navigation sensor measurements, space state representation of system errors and linear state equations.

Prerequisite: Background in vector calculus and matrix algebra**SUR 6536 Geodesy and Geodetic Positioning 3 Credits****Grading Scheme:** Letter Grade

Introduction to geometric and physical geodesy, ellipsoids, geodetic lines, computation of position, gravity and coordinate systems.

Prerequisite: SUR 3103C or instructor consent.**SUR 6905 Special Problems in Geomatics 1-6 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Individual study of a selected topic in Geomatics as contracted with the instructor at the start of the term.

SUR 6934 Topics in Geomatics 1-4 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Rotating Topic.

SUR 6940C Practicum in UAS Mapping 3 Credits**Grading Scheme:** Letter Grade

Provides students hands-on experience with flight planning and safe deployment of small UASs (Unmanned Aerial Systems), and the subsequent processing of the imagery acquired on these flights.

Prerequisite: SUR6502C Foundations of UAS Mapping

German

GER 6060 Beginning German for Graduate Students I 3 Credits

Grading Scheme: S/U

For graduate students from other departments who need to acquire a reading knowledge of German. Not open to graduate students in German.

GER 6061 Beginning German for Graduate Students II 3 Credits

Grading Scheme: Letter Grade

For graduate students from other departments who need to acquire a reading knowledge of German. Not open to graduate students in German.

Prerequisite: GER 6060 or its equivalent.

GER 6505 German Culture 3 Credits

Grading Scheme: Letter Grade

Interdisciplinary study of periods and major aspects of German culture from the Middle Ages to the present.

GER 6940 Supervised Teaching 1-5 Credits, Max 3 Credits

Grading Scheme: S/U

Supervised Teaching

Prerequisite: departmental approval.

GET 6526 Weimar Cinema 3 Credits

Grading Scheme: Letter Grade

Weimar cinema, and theory and criticism that surround it. Examination of intersection between formal-aesthetic and ideological-political aspects as manifest in film text.

GET 6529 New German Cinema and its Legacy 3 Credits

Grading Scheme: Letter Grade

New German cinema as response to Hollywood cinema, Germany's Nazi past and problems posed to society, and cinema by other mass media and new imaging technologies. Analytical texts draw from new historicism, cultural studies, psychoanalysis, and postmodernism.

GEW 6205 Foundations of Literary Study 3 Credits

Grading Scheme: Letter Grade

Required for M.A. and Ph.D. candidates in German. Focus on literary criticism and methodology. Different theoretical approaches to literature and research techniques. Recent developments.

GEW 6266 History of the German Novel 3 Credits

Grading Scheme: Letter Grade

Development of novel from its beginning in 17th century to its rise in late 18th, 19th, and 20th centuries as well as history of theories about novels.

GEW 6305 Studies in German Drama and Theater 3 Credits

Grading Scheme: Letter Grade

Main trends in the development of German drama during different literary periods. Analysis of individual plays and theoretical texts.

GEW 6405 Medieval and Renaissance Literature 3 Credits

Grading Scheme: Letter Grade

Courtly and heroic epic, Volksbücher, and major genres and trends from the Medieval and Renaissance period.

GEW 6425 From Luther to Lessing: Early Modern German Literature 3 Credits

Grading Scheme: Letter Grade

Analysis of major trends, authors, and texts from Reformation to Enlightenment.

GEW 6535 German Classical and Romantic Literature 3 Credits

Grading Scheme: Letter Grade

Analysis of major authors and texts. Special attention to developments in culture, aesthetics, and society.

GEW 6725 Culture and Society in the Weimar Republic 3 Credits

Grading Scheme: Letter Grade

Intellectual and cultural life between 1918 and 1933. Analysis of literary works from theater, cabaret, and cinema within context of social and political life of the Weimar Republic.

GEW 6735 Modern German Literature 3 Credits

Grading Scheme: Letter Grade

Literary trends and major works of early twentieth century. Authors may include Mann, Rilke, Kafka, and Hesse. Relation to contemporary cultural and aesthetic developments.

GEW 6736 Contemporary German Literature 3 Credits

Grading Scheme: Letter Grade

Literary trends from 1945 to present. Relation to contemporary cultural and aesthetic developments. Current developments.

GEW 6745 Literature and Culture in the Third Reich 3 Credits

Grading Scheme: Letter Grade

Analysis of major literary and nonliterary works of Nazi period. Appropriation of German literary tradition. Examination of Nazi theater and film. Literature of the so-called inner emigration.

GEW 6826 German Literary Theory 3 Credits

Grading Scheme: Letter Grade

Major figures in field from nineteenth century to present. Emphasis on question of hermeneutics and different responses developed by literary theoreticians. Special focus on most recent developments in field.

GEW 6900 Seminar in Germanic Languages and Literatures 3 Credits

Grading Scheme: Letter Grade

Seminar in Germanic Languages and Literatures

GEW 6901 Special Study in Germanic Languages and Literatures 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Intensive study of a selected topic.

GEW 6905 Independent Study 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Available by special arrangement. May be taken only once for M.A. credit.

GEW 6910 Supervised Research 1-5 Credits, Max 5 Credits

Grading Scheme: S/U

Supervised Research

GEW 6971 Research for Master's Thesis 1-9 Credits

Grading Scheme: S/U

Research for Master's Thesis

GEW 7979 Advanced Research 1-12 Credits

Grading Scheme: S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GEW 7980 Research for Doctoral Dissertation 1-15 Credits

Grading Scheme: S/U

For students admitted to candidacy.

Greek Studies

GRE 6425 Greek Prose Composition 3 Credits

Grading Scheme: Letter Grade

Construction of advanced sentences and complex prose in Classical Greek.

Prerequisite: GRD 1131.

GRE 6755 Epigraphy 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Reading and interpretation of selected inscriptions in Greek and/or Latin.

Prerequisite: reading knowledge of ancient Greek and Latin at advanced level; basic reading knowledge of French and German.**GRK 6905 Individual Work in Modern Greek 3-5 Credits, Max 10 Credits****Grading Scheme:** S/U

Directed independent study.

Prerequisite: graduate standing or consent of instructor.**GRW 6105 The Greek Tradition 3 Credits****Grading Scheme:** Letter Grade

Synoptic survey of Greek literature.

GRW 6216 Greek Novel 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Selections from ancient Greek novels.

GRW 6316 Greek Tragedy 3 Credits**Grading Scheme:** Letter Grade

Reading and analysis of Greek tragedies by Aeschylus, Sophocles, or Euripides, whose dramas form cornerstone of western theater. Text selection varies over 3-year cycle.

Prerequisite: advanced reading ability in Greek.**GRW 6317 Ancient Greek Comedy 3 Credits****Grading Scheme:** Letter Grade

Reading and study of ancient Greek comedy, with selected plays by Aristophanes and Menander.

Prerequisite: advanced reading ability in Greek.**GRW 6345 Greek Lyric Poetry 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Variety and peculiarities of lyric content, style, grammar, structure, dialect, and meter shown through selected poems.

GRW 6346 Pindar 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Selected poems.

GRW 6347 Homer 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Readings from Iliad and Odyssey.

GRW 6386 Greek Historians 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Readings and analysis of Herodotus, Thucydides, or other major Greek historians.

Prerequisite: graduate status or consent of instructor.**GRW 6506 Plato 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Reading of Symposium and selected books of the Republic .

GRW 6705 Attic Orators 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Examines Attic oratory, focusing on rhetorical methods of persuasion; social dynamics of the disputing process; and political, social, and cultural impact of law on the Athenian democracy.

Prerequisite: Graduate student status or consent of instructor.**GRW 6905 Individual Work 2-4 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Readings and reports in Greek language and literature.

Prerequisite: graduate standing or consent of instructor.**GRW 6930 Special Topics in Greek Literature 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Intensive study of a particular author, genre, period, or subject.

Prerequisite: graduate status or consent of instructor.**GRW 6931 Comparative Study of Greek and Latin Literature 3 Credits****Grading Scheme:** Letter Grade

Study of genre types.

GRW 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: reading knowledge of ancient Greek at an advanced level.**GRW 7979 Advanced Research 1-15 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GRW 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Health Education and Behavior

HLP 6515 Evaluation Procedures in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Evaluation and interpretation of tests and analysis of research data.

HLP 6535 Research Methods in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Introduction to research methodology and design.

HLP 6911 Research Seminar 1 Credit**Grading Scheme:** S/U

Research presentations by graduate students and faculty in the College.

HLP 6935 Variable International Topics 1-6 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Opportunity to study in a wide range of cultural settings.

Prerequisite: adviser's approval.**HLP 7939 HHP PhD Professional Development Seminar 3 Credits****Grading Scheme:** Letter Grade

Designed to complement the scholarly emphases of the HHP PhD program by providing insight into key considerations for professional development and personal growth. Best practices will be shared for developing professional aptitude and the skills necessary for successful matriculation through graduate studies and future professional careers.

HLP 7979 Advanced Research in Health and Human Performance 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field, or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HLP 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

HSC 5135 Emotional Health Education 3 Credits**Grading Scheme:** Letter Grade

Importance of emotional health in achieving optimal health. Health educator's role in program development, supportive listening, and referral strategies for counseling. Development of communication skills. Common emotional health problems and concerns. Not open to students who have completed HSC 3134.

HSC 5138 Human Sexuality 3 Credits**Grading Scheme:** Letter Grade

Theory and practice, including psychosexual development, human reproduction, sexual relationships, dysfunction, therapy, legal and ethical issues, as well as teaching and facilitative techniques. Not open to students who have completed HSC 3133.

HSC 5142 Drug Education and Behavior 3 Credits**Grading Scheme:** Letter Grade

Social, behavioral, environmental, and historical perspectives on substance abuse; content, issues, and instructional strategies appropriate for health education regarding alcohol, tobacco, and other drugs in school and community settings. Not open to students who have completed HSC 3140.

HSC 5536C Medical Terminology for the Health Professions 3 Credits**Grading Scheme:** Letter Grade

Literal and "actual" meanings of medical and scientific terms. Anatomy, physiology, diagnostic, clinical, therapeutic, and pathology pictures presented with compound medical terms. Writings and pronunciation exercises augment the visual format to provide an interactive working knowledge of medical language.

HSC 5576 Nutrition Education for Special Populations 3 Credits**Grading Scheme:** Letter Grade

Assessing nutrition information needs for selected population groups. Planning, implementing, and evaluating nutrition education programs for school and community settings. Not open to students who have completed HSC 3574.

HSC 5606 Spirituality and Health 3 Credits**Grading Scheme:** Letter Grade

Exploring current research and theory about the relationship of spirituality and health/disease.

HSC 5618 Advanced Exercise Therapy, Adapted Physical Activity, & Health 3 Credits**Grading Scheme:** Letter Grade

Art and science of effectively teaching exercise therapy, adapted physical activities, and healthy living strategies. Medical and health characteristics of common disabilities and methods for prescribing appropriate exercise therapy programs are presented. Multiple adapted equipment ideas will be presented to facilitate teaching in inclusive settings for all ages. Clinical experiences with individuals with disabilities are provided.

HSC 5626 Minority Health Issues 3 Credits**Grading Scheme:** Letter Grade

Current health problems confronting socioeconomically disadvantaged groups and ethnic minority groups.

HSC 5657 Health and End-of-Life Issues 3 Credits**Grading Scheme:** Letter Grade

Cultural, spiritual, and psychological traditions that affect health decisions, behavior, and medical care. Emphasizes developing professional and personal skills for coping with end-of-life issues for oneself and for assisting others.

HSC 5925 Seminar in Health Education 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Seminar in Health Education

HSC 5956 Writing for Professional Publications 3 Credits**Grading Scheme:** Letter Grade

Procedures and practices in scholarly writing for health-related professional publications including topic selection, literature searches, internet applications, documentation, manuscript preparation, reasons for rejection, and legal and ethical considerations.

HSC 6037 Philosophy and Principles of Health Education 3 Credits**Grading Scheme:** Letter Grade

History, philosophy, and ethics; theories of health behavior and principles of learning; areas of professional specialization; roles and functions of professional health educators; certification and continuing education; trends.

HSC 6235 Patient Health Education 3 Credits**Grading Scheme:** Letter Grade

Health education theory and principles applied to the primary health care setting. Overview of agents and processes of disease, emphasizing program development for teaching protocols for specific diseases. Recent developments in patient education (e.g., outpatient programs and wellness centers).

HSC 6318 Planning Health Education Programs 3 Credits**Grading Scheme:** Letter Grade

Basic principles of health education for various community settings, and using communication media in joint planning for comprehensive health education.

HSC 6506 Epidemiology 3 Credits**Grading Scheme:** Letter Grade

Procedures used in studying the origin, distribution, and control of chronic and communicable diseases. Emphasizes the role of health education interventions in disease control.

HSC 6567 Health Promotion and Programming in Gerontology 3 Credits**Grading Scheme:** Letter Grade

Planning, implementing, and evaluating health maintenance and promotion programs for adult populations, emphasizing the aging process.

HSC 6571 Contemporary Issues in Health Promotion 3 Credits**Grading Scheme:** Letter Grade

Emotional health, value systems, stress and depression, aging and death, drug abuse, physical fitness, weight control, consumer health, and chronic and communicable diseases.

HSC 6575 Women's Health Issues 3 Credits**Grading Scheme:** Letter Grade

Relevance for health promotion, prevention, education, and counseling.

HSC 6595 HIV/AIDS Education 3 Credits**Grading Scheme:** Letter Grade

Examine the medical, social, legal and educational implications of HIV/AIDS on individuals and society.

HSC 6603 Theories of Health Behavior and Practice in Health Education 3 Credits**Grading Scheme:** Letter Grade

Selected health behavior theories and applying these theories to the practice of health education and health promotion.

HSC 6605 Scientific Foundations of Holistic Health 3 Credits**Grading Scheme:** Letter Grade

Examining and interpreting the holistic principles that influence and modify the health potential of the individual and the community.

HSC 6625 Trends in International Health 3 Credits**Grading Scheme:** Letter Grade

Disease patterns and prevalence, contributing factors, organizational and governmental initiatives, and model programs; emphasizes problems amenable to health education interventions. Not open to students who have completed HSC 4650.

HSC 6629 Health Promotion for Priority Populations 3 Credits**Grading Scheme:** Letter Grade

Health issues confronting politically and socioeconomically disadvantaged groups and ethnic minority groups.

Prerequisite: graduate standing.**HSC 6637 Social Marketing and Health 3 Credits****Grading Scheme:** Letter Grade

Current theory and knowledge in field of social marketing. Analysis of components and applications of marketing within context of health behavior.

HSC 6646 Community Health Methods in Injury Prevention & Control 3 Credits**Grading Scheme:** Letter Grade

Research-based concepts and theories related to unintentional injury prevention and control. Epidemiology and mechanisms of injury, community health injury surveillance systems, incidence and prevalence rates by category of injury, and role of law in injury prevention. Methods for planning, implementing, and evaluating injury prevention programs. Trends and future directions for research.

Prerequisite: HSC 3032**HSC 6665 Health Communication 3 Credits****Grading Scheme:** Letter Grade

Survey of theory and research relevant to the role of communication processes in health behavior, health care, and health promotion.

HSC 6695 Worksite Health Promotion 3 Credits**Grading Scheme:** Letter Grade

Procedures involved in planning, implementing, and evaluating comprehensive health promotion programs; factors in risk assessment and reduction; strategies and resources for employee health education; ethical issues in client relations. Not open to students who have completed HSC 4694.

HSC 6712 Evaluating Health Education Programs 3 Credits**Grading Scheme:** Letter Grade

Models and strategies for conducting formative and summative evaluations of health education programs.

HSC 6735 Research Methods in Health Education 3 Credits**Grading Scheme:** Letter Grade

Introduction to methods of health education research.

HSC 6850 Internship in Health Education 1-12 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Internship in Health Education

HSC 6904 Readings in Health Education 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Readings in Health Education

HSC 6905 Independent Study 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Independent Study

HSC 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

HSC 6935 Current Topics in Health Education 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Current Topics in Health Education

HSC 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

HSC 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

HSC 6973 Project in Lieu of Thesis 1-9 Credits**Grading Scheme:** S/U

Planning, implementing, and evaluating a health education program intervention.

HSC 7904 Advanced Readings in Health Education 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Advanced Readings in Health Education

HSC 7905 Advanced Independent Study in Health Education 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Advanced Independent Study in Health Education

HSC 7937 Advanced Seminar in Health Education 1-3 Credits**Grading Scheme:** Letter Grade

Advanced Seminar in Health Education

History

AFH 5934 Topics in African History 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Topics in African History

AFH 6259 Seminar in Modern Africa 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

In-depth reading and discussion of aspects of modern African history. Seminar focuses on specific themes, such as ethnicity, colonialism, violence, warfare, gender, religion, and nationalism.

AFH 6805 Theo/Met African Hist 3 Credits**Grading Scheme:** Letter Grade

Theories and methods that underlie the study of African history and change as the field has evolved over the last four or more decades. Attention to changing frameworks for viewing the African past, with a focus on the historians' research methods and techniques.

AFH 6934 Africa 3 Credits**Grading Scheme:** Letter Grade

Africa

AFH 6936 Readings in African History 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Readings in African History

AMH 5405 The South to 1860 3 Credits**Grading Scheme:** Letter Grade

History of the South from the Civil War to present, emphasizing the South as an integral region and its relationship to the rest of the nation. Not open to students who have taken AMH 4403 or equivalent.

Prerequisite: consent of instructor.

AMH 5930 Topics in United States History 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Topics in United States History

AMH 6198 Early American Society 3 Credits**Grading Scheme:** Letter Grade

Readings seminar focusing on a selected topic or topics in American history through the War of 1812.

AMH 6199 Nineteenth Century America 3 Credits**Grading Scheme:** Letter Grade

Readings seminar focusing on a topic or topics in nineteenth century American history.

AMH 6290 Modern America 3 Credits**Grading Scheme:** Letter Grade

Readings seminar focusing on topics in American history in the twentieth century.

AMH 6465 Seminar in U.S. Urban History 3 Credits**Grading Scheme:** Letter Grade

Historical development of American cities and ways in which the urbanization process has reshaped social life.

AMH 6516 Seminar in American Foreign Relations and Expansion 3 Credits**Grading Scheme:** Letter Grade

American foreign policy since 1945, the United States response to Third World nationalism, the changing historiographical debate over the nature of U.S. diplomacy, and other selected topics.

AMH 6557 Seminar in Constitutional or Legal History of the United States 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Chronological and thematic analysis of the evolution of American law, legal institutions, and constitutionalism from their English origins to present.

EUH 5195 The Archaeology of the Middle Ages 3 Credits**Grading Scheme:** Letter Grade

Examining key issues in the theory and practice of medieval archaeology. Major themes include the relation between history and archaeology, nationalism in archaeology, urban centers, rural settlements, church and monastic archaeology, wetland archaeology, mortuary archaeology, crafts, social relations, power in the Middle Ages, gender, ethnicity, and state formation.

EUH 5934 Topics in European History 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Topics in European History

EUH 6126 Readings in Medieval History 3 Credits**Grading Scheme:** Letter Grade

Major themes; readings combine classic studies that shaped the field with current work exploring issues like gender, textuality and historical memory, and popular religion.

EUH 6174 Conversion in the Middle Ages 3 Credits**Grading Scheme:** Letter Grade

Examines the religious experience of the middle ages through reading and discussion of concepts such as conversion, martyrdom, sainthood, gender, and power.

EUH 6289 Readings, Modern Europe 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Major themes; readings combine classic studies that shaped the field with current works exploring a wide range of topics.

EUH 6469 Modern German History 3 Credits**Grading Scheme:** Letter Grade

Interpretations of and approaches to German history, and introduction to advanced research in the area.

HIS 5485 Special Studies in the History of Science 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Special Studies in the History of Science

HIS 5939 Second-Year Research Seminar 3 Credits**Grading Scheme:** Letter Grade

Students in the seminar will produce a research paper of approximately 10,000 words. The paper should be based on research into primary materials, placed in the context of a larger historiographical conversation. The paper may be a preliminary investigation into a dissertation topic or may be on an unrelated subject.

Prerequisite: Second year status in MA or Ph.D. program**HIS 6061 Introduction to Historiography 3 Credits****Grading Scheme:** Letter Grade

Introduction to the schools, theories, and philosophies of the discipline of history.

HIS 6416 Problems in Comparative Legal History 3 Credits**Grading Scheme:** Letter Grade

Seminar begins with the question of what comparative legal history is and considers a series of case studies to explore approaches to comparative legal history.

HIS 6488 Readings in the History of Science 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Inquiry into the development of western scientific thought and institutions. Specific historical topics having intellectual coherence and substantial historiography.

HIS 6905 Individual Study 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual Study

HIS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

HIS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

HIS 6943 Internship in Historical Applications 2-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Internship in Historical Applications

HIS 6957 Nonthesis Project in History 1-3 Credits, Max 9 Credits**Grading Scheme:** S/U

Nonthesis research.

HIS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

HIS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HIS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

LAH 5438 Modern Mexico 3 Credits**Grading Scheme:** Letter Grade

Topics in Mexican history from independence in 1821 to the present. Emphasizes the Diaz dictatorship and the Mexican Revolution. Not open to students who have taken LAH 4433 or equivalent.

Prerequisite: consent of instructor.**LAH 5476 Caribbean History to 1800: Slavery, Colonization, and International Conflict 3 Credits****Grading Scheme:** Letter Grade

Social, economic, and political history of the West Indies and the Circumcaribbean region to around 1800. Emphasizes slave societies. Not open to students who have taken LAH 4471.

Prerequisite: consent of instructor.**LAH 5607 History of Amazonia 3 Credits****Grading Scheme:** Letter Grade

Introduction to the history of the Amazon region. Places the region in the wider context of Latin American history and Atlantic history from the pre-colonial era to the 1980s.

LAH 5637 Brazil Since 1750 3 Credits**Grading Scheme:** Letter Grade

History of Brazil from the Portuguese era of reform to the military regime of 1964-85.

Prerequisite: consent of instructor.**LAH 5933 Topics in Caribbean History 3 Credits****Grading Scheme:** Letter Grade

Introduction to historiography of the Caribbean. Pre-Columbian times to the present.

LAH 5934 Topics in Latin American History 3 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Topics in Latin American History

LAH 6934 Seminar in Colonial Spanish America 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Seminar in Colonial Spanish America

LAH 6936 Seminar in History of Brazil 3 Credits**Grading Scheme:** Letter Grade

Seminar in History of Brazil

LAH 6938 Seminar in Modern Spanish America 3 Credits**Grading Scheme:** Letter Grade

Seminar in Modern Spanish America

WOH 5932 Topics in World History 3 Credits**Grading Scheme:** Letter Grade

Examines major themes and topics in world history.

Horticultural Sciences

ALS 5932 Special Topics 1-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Special Topics

HOS 5085C Principles of Postharvest Horticulture 3 Credits**Grading Scheme:** Letter Grade

Biological principles involved in harvesting, grading, packaging, transportation, and marketing horticultural crops, and their effects on quality maintenance. Offered even-numbered years in fall.

Prerequisite: BOT 3503 and BCH 3023 or equivalent.**HOS 5242 Genetics & Breeding of Vegetable Crops 3 Credits****Grading Scheme:** Letter Grade

Traditional and molecular breeding methods for vegetable crops and the influence of scientific research, government policies, and consumer preferences on vegetable crop improvement.

Prerequisite: AGR 3303 or equivalent.**HOS 5330 Postharvest Technologies for Horticultural Crops 2 Credits****Grading Scheme:** Letter Grade

Intensive study of current technologies and procedures for harvesting and handling fresh fruit, vegetable, and ornamental crops grown in Florida. Requires field trip during spring break. Offered in spring.

Prerequisite: HOS 5085C suggested. Open to graduate students and to upper-division undergraduate students with consent of instructor.**HOS 5505 Getting Published Horticulture 3 Credits****Grading Scheme:** Letter Grade

Presents techniques for writing journal manuscripts to submit to horticulture, plant related, and agricultural journals. Topics covered include selecting a journal, writing the introduction, materials and methods, results, discussion as well as how to present data in addition to responding to rejection letters, manuscript revisions, and providing constructive reviews.

HOS 5555 Tropical Fruit Production and Research in Florida 3 Credits**Grading Scheme:** Letter Grade

A comprehensive study at the Tropical Research and Education Center at Homestead and field locations in South Florida. (Students will be in residence for 4 weeks at the Center.) Offered even-numbered years in summer.

HOS 5711 Phytochemicals in Food & Health 3 Credits**Grading Scheme:** Letter Grade

This course examines phytochemicals in fruits and vegetables including their distribution, roles in human health promotion, biosynthesis and degradation, enzymes, genes and case studies of crop breeding and engineering.

Prerequisite: BCH 4024 or equivalent or consent of instructor.**HOS 6201 Breeding Perennial Cultivars 3 Credits****Grading Scheme:** Letter Grade

Methods of breeding perennial fruit and ornamental cultivars using mutations, cell and tissue culture, polyploidy, recurrent selection, and wide hybridization. Conservation and domestication of wild plants. Offered odd-numbered years in fall.

Prerequisite: AGR 3303.**HOS 6236 Molecular Marker Assisted Plant Breeding 3 Credits****Grading Scheme:** Letter Grade

Providing an overview of terminology, methodology, and applied examples of utilizing molecular markers in a plant breeding program.

HOS 6307 Horticultural Physiology 3 Credits**Grading Scheme:** Letter Grade

Covers basic plant physiology concepts in fruit and vegetable crops emphasizing horticultural applications. Topics include water uptake and transport, ion uptake, photosynthesis, respiration, and source-sink relations.

Prerequisite: Graduate status.**HOS 6331 Postharvest Biology 3 Credits****Grading Scheme:** Letter Grade

Physiological, biochemical, and molecular aspects of senescence and ripening of harvested fruit, vegetative, and floral organs with attention to the storage and quality maintenance of harvested plant organs.

Prerequisite: BOT 3503 and BOT 5505C or equivalents.

HOS 6345 Environmental Physiology 4 Credits**Grading Scheme:** Letter Grade

Physiology from molecular to whole-plant level. The basis for responses to environmental factors such as light, temperature, water, atmosphere, and stress extremes. Offered even-numbered years in fall.

Prerequisite: BOT 3503 or consent of instructor.**HOS 6355 Root and Rhizosphere Ecology 3 Credits****Grading Scheme:** Letter Grade

The course provides a complete view of the rhizosphere and its unique functioning that implies numerous, strong and complex interactions between plant roots, soil constituents and microorganisms.

HOS 6412 Nutrition of Horticultural Crops 3 Credits**Grading Scheme:** Letter Grade

Physiological, biochemical and environmental factors influencing nutritional status of horticultural plants and the resulting effects on growth, yield, and quality. Offered odd-numbered years in spring.

Prerequisite: BOT 3503 and HOS 4304 or equivalent.**HOS 6545 Advanced Citriculture I 3 Credits****Grading Scheme:** Letter Grade

Regulation of citrus vegetative growth including climactic, physiological, and cultural factors. Offered odd-numbered years in the fall at Lake Alfred CREC.

Prerequisite: FRC 3212 and 4223 or equivalent.**HOS 6905 Problems in Horticultural Science 1-4 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Independent study.

HOS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

HOS 6931 Horticultural Science Seminar 1 Credit, Max 3 Credits**Grading Scheme:** S/U

Oral presentation of material in one of the following areas: literature review, related to student's research; research results; or published paper, of relevance to horticulture. Subject matter determined by instructor. Offered in spring.

HOS 6932 Special Topics 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Study of contemporary research in horticultural science.

HOS 6934 Professional Seminar Preparation 1 Credit**Grading Scheme:** Letter Grade

Preparation and oral presentation of proposal and research seminars emphasizing presentation design and mechanics.

HOS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** Letter Grade

Supervised Teaching

HOS 6941 Practicum in Horticultural Science 2-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Supervised and individual work in professional areas of horticulture.

Prerequisite: admission is limited to graduate students majoring in horticultural science.**HOS 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

HOS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HOS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PCB 5065 Advanced Genetics 4 Credits**Grading Scheme:** Letter Grade

Examines genetic principles including gene and gene function; recombination and linkage; molecular markers, multipoint linkage analysis, and positional cloning; and quantitative, population, developmental, and non-Medalian genetics. Offered in fall term.

Prerequisite: AGR 3303 or PCB 3063 and BCH 4024 or BCH 5045. For graduate students in any life science discipline.**PCB 5530 Plant Molecular Biology and Genomics 3 Credits****Grading Scheme:** Letter Grade

Integrated overview of the fundamental mechanisms enabling plant growth, development, and function, and approaches to study these at molecular level. Topics include replication, repair, transcription, translation, cell cycle, transformation, gene tagging, structural genomics, proteomics, and metabolomics. Offered in fall term.

Prerequisite: undergraduate molecular biology or biochemistry.**PCB 6528 Plant Cell and Developmental Biology 3 Credits****Grading Scheme:** Letter Grade

Cellular and developmental biology of plants. Lecture format with frequent discussion of recent papers. Topics include signal transduction, organelles, protein trafficking, and developmental mechanisms. Offered in spring term.

Prerequisite: PCB 5530 and PCB 5065 or equivalent.**PCB 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

PCB 6937 Special Topics in Plant Molecular and Cellular Biology 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Contemporary research.

Prerequisite: graduate course work in genetics, biochemistry, or molecular biology areas.**PCB 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

PCB 7922 Journal Colloquy in Plant Molecular and Cellular Biology 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

Critical discussion and presentation of recent journal articles in the area of plant molecular and cellular biology.

Prerequisite: Required for PCMB majors.**PCB 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PCB 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PLS 6635 Weed Management for Organic and Sustainable Cropping Systems 3 Credits**Grading Scheme:** Letter Grade

Ecological principles can be applied in agroecosystems to manage weeds sustainably. Alternative weed management approaches that are less dependent on herbicides and utilize ecological processes detrimental to weeds and their propagules will be emphasized. Students will learn actively by critically analyzing pertinent literature and participating in discussions of supplemental reading.

Prerequisite: HOS 3020C or ALS 3153.**PLS 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PLS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation.

Prerequisite: Student must be admitted to candidacy.

Industrial and Systems Engineering

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.**EGN 6640 Entrepreneurship for Engineers 3 Credits****Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

EIN 5249 Human Factors in System Design 3 Credits**Grading Scheme:** Letter Grade

This course will provide an understanding of concepts and methods in human factors and applications to human-machine system design. We will consider the system design implications of human cognitive and physical capabilities and limitations in perception, memory, decision-making and motor-control.

EIN 5501 Health Systems Engineering Models and Methods 3 Credits**Grading Scheme:** Letter Grade

Introduction to the application of systems engineering and data analytics methods to healthcare systems. Exploration of common problems of decision-making and optimization in healthcare including scheduling and capacity planning. Examination of health policy, data analysis, and information technology unique to healthcare. Investigation of lean, six sigma and continuous improvement.

Prerequisite: Knowledge of object-oriented programming, statistics, simulation and linear programming at the undergraduate level.**EIN 6176 Advanced Quality Management and Engineering for Business Processes 3 Credits****Grading Scheme:** Letter Grade

Philosophy of continuous improvement and methodology for applying team problem solving to manufacturing and service industries. Hands-on application of basic statistical quality tools; introduction to quality function deployment; concurrent engineering; business process reengineering; process analysis; benchmarking. Team project.

Prerequisite: introductory statistics or consent of instructor.**EIN 6212 Loss Assessment and Control 3 Credits****Grading Scheme:** Letter Grade

This course will provide advanced coverage of risk assessment and management methods in the context of systems safety engineering. It will cover different types of hazard exposure, (chemical, fire, radiation, asbestos, lead, hazardous waste). Risk measurement and mitigation strategies will be identified for each hazard along with emergency response operations.

Prerequisite: EIN 6215 with a minimum grade of C.**EIN 6215 System Safety Engineering 3 Credits****Grading Scheme:** Letter Grade

This course will focus on identification and recognition of potential safety hazards as well as the concept of risk assessment. Various systems safety methodologies will be explored together with applications to hazard analysis and control. Industrial case studies will be referenced to illustrate the usefulness of system safety techniques.

Prerequisite: EIN 6216, or instructor approval for undergraduate students.**EIN 6216 Occupational Safety Engineering 3 Credits****Grading Scheme:** Letter Grade

Topics covered include safety history and litigation, accident causation, safety organizations and agencies, approaches to occupational safety and risk management, product defects and safety program development; product liability; consumer product safety commission, hazard communication standard, workers' compensation, OSHA safety standards and codes and OSHA record keeping, common occupational hazards.

Prerequisite: Basic probability and Electricity at the undergraduate level.**EIN 6357 Advanced Engineering Economy 3 Credits****Grading Scheme:** Letter Grade

Economic analysis of capital expenditure decisions. Financial mathematics and microeconomics. Decision under risk and uncertainty. Game theory and utility theory.

Prerequisite: STA 4321.**EIN 6422 Manufacturing Management 3 Credits****Grading Scheme:** Letter Grade

Variety and importance of management decisions. Total quality management, just-in time manufacturing, concurrent engineering, material requirements planning, production scheduling, and inventory control.

Prerequisite: ESI 6314 and undergraduate probability and statistics.**EIN 6510 Principles of Manufacturing Systems Engineering 3 Credits****Grading Scheme:** Letter Grade

Introduction to modern manufacturing systems. Components of product and process design, computer-integrated manufacturing and automation. Current areas of development and research.

Prerequisite: calculus through differential equations.**EIN 6905 Special Problems 1-6 Credits, Max 15 Credits****Grading Scheme:** Letter Grade

Laboratory, lecture, field work, or conferences.

EIN 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

EIN 6918 Graduate Seminar 1 Credit, Max 15 Credits**Grading Scheme:** S/U

Graduate Seminar

EIN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

EIN 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

EIN 7933 Special Problems 1-6 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Laboratory, lecture, field work, or conferences.

EIN 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EIN 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ESI 5471 Optimization for Financial Engineering 3 Credits**Grading Scheme:** Letter Grade

Introduces optimization theories and methods to support the practice of financial engineering. The course will cover the use methodologies from mathematical programming in financial decision-making and their applications to portfolio and asset management. It will also involve building optimization models based on financial market data and risk assessment using optimization modeling languages.

ESI 5613 Data Analytics for ISE 3 Credits**Grading Scheme:** Letter Grade

Provides an understanding of the skills necessary for managing and analyzing data. The concepts that will be covered in this class include python basics, exploratory data analysis, data manipulation, data cleaning, data wrangling, and machine learning. All the technical skills will be motivated by different examples involving data.

ESI 5687 Machine Learning for Financial Risk Management 4 Credits**Grading Scheme:** Letter Grade

Explores how machine learning changes the practice of risk management and financial engineering. Covers the best practices for model selection and construction for big financial data, including regression and classification techniques, and deep learning with applications to forecasting financial time series.

ESI 6314 Deterministic Methods in Operations Research 4 Credits**Grading Scheme:** Letter Grade

Introduction to basic models and their solution with modern computer packages. Emphasis on modeling, computer solution, and sensitivity analysis with minimal reference to model theory and development of algorithmic methods.

Prerequisite: calculus through differential equations, knowledge of linear algebra, and experience using mainframes or PCs.

ESI 6323 Models for Supply Chain Management 3 Credits**Grading Scheme:** Letter Grade

Essential elements including controlling and coordinating activities such as order processing, purchasing, material storage and handling, production scheduling, packaging, transportation, and setting customer service standards.

Prerequisite: prior course work in linear programming, probability, and stochastic processes.

ESI 6325 Applied Probability Methods in Engineering 3 Credits**Grading Scheme:** Letter Grade

Applied probability theory and statistics, reliability engineering, quality control, robust design, forecasting, Markov processes, and queuing theory.

Prerequisite: calculus, differential equations, undergraduate probability, and statistics.

ESI 6341 Intro to Stochastic Optimization 3 Credits**Grading Scheme:** Letter Grade

Introduction to Stochastic Optimization is intended as a first introductory course for graduate students in such fields as engineering, operations research, statistics, mathematics, and business administration (in particular, finance or management science). 3 credits.

Prerequisite: Basic knowledge of calculus, statistics and linear programming.

ESI 6346 Decision Making under Uncertainty 3 Credits**Grading Scheme:** Letter Grade

Introduction to the use of quantitative models for decision-making in environments where uncertainty is present. Focuses on fundamentals of probability simulation, Markov chains, queuing analysis, decision trees and dynamic programming.

Prerequisite: ESI6314 Deterministic Methods for Operations Research, and Students should have had a course in probability/statistics at the undergraduate level.

ESI 6352 Financial Optimization Case Studies 3 Credits**Grading Scheme:** Letter Grade

Quantitative analysis of financial systems. Optimization case studies in finance and risk management. Statistical analysis of risk management and financial systems. Portfolio optimization: Value-at-Risk (quantile), Conditional Value-at-Risk (Expected Shortfall), Drawdown, Hedging. Calibration of distribution and application to CDO pricing.

Prerequisite: There are no formal prerequisites for the course. The course requires knowledge of basic statistical concepts (probability distributions, linear regression). Familiarity with optimization (linear programming). Familiarity with high level programming languages, which can be used for data analysis (e.g., with MATLAB or R).

ESI 6417 Linear Programming and Network Optimization 3 Credits**Grading Scheme:** Letter Grade

Formulation and solution techniques for network flow and linear programming problems. Algorithms for network optimization. The simplex method, theory and computation. Duality theory, sensitivity analysis.

Prerequisite: Linear algebra and basic theory of optimization.

ESI 6420 Fundamentals of Mathematical Programming 3 Credits**Grading Scheme:** Letter Grade

Introducing mathematical programming with an emphasis on classical optimization concepts, models and solution techniques. Focus on convex analysis (convex sets, separation theorems, convex functions), optimality conditions (Fritz-John Karush-Kuhn-Tucker), Lagrangian duality and iterative solution methods 9gradient, conjugate gradients barrier methods.

Prerequisite: Mathematical background, ability to proof mathematical statements and ability to write simple codes with Matlab or C.

ESI 6448 Discrete Optimization Theory 3 Credits**Grading Scheme:** Letter Grade

Modeling with integer variables; enumeration and cutting plane methods; decomposition algorithms; branch and bound methods; computational complexity and software issues; special combinatorial optimization problems; parallel algorithms for integer programming.

Prerequisite: linear programming and nonlinear optimization or equivalent.

ESI 6492 Global Optimization 3 Credits**Grading Scheme:** Letter Grade

Properties of nonconvex functions, convex envelopes, and duality. Complexity issues, applications of global optimization and software issues. Algorithms for quadratic programming. Concave minimization, Lipschitz optimization, and nonconvex network flow problems.

Prerequisite: linear and nonlinear programming.

ESI 6529 Digital Simulation Techniques 3 Credits**Grading Scheme:** Letter Grade

Computer programming aspects of digital simulation. Deterministic simulation; stochastic simulation. Use of simulation languages.

Prerequisite: computer programming and probability theory.

ESI 6546 Stochastic Modeling and Analysis 3 Credits**Grading Scheme:** Letter Grade

Stochastic processes, with emphasis on model building and probabilistic reasoning. Review of elementary probability theory. Poisson process and renewal theory. Discrete and continuous time Markov chains. Brownian motions, random walks, and martingales. Applications in queuing, reliability, inventory theory, logistics, and finance.

Prerequisite: STA 6326.

ESI 6552 Systems Architecture 3 Credits**Grading Scheme:** Letter Grade

Foundations for developing and evaluating architectures for systems of systems. Process for generating functional, physical, and operational architecture from a top-level operations concept.

Prerequisite: calculus, linear algebra, basic statistics.

ESI 6553 Systems Design 3 Credits**Grading Scheme:** Letter Grade

Broad introduction to systems engineering and the structured approaches needed to design complex systems. Emphasizes formulation of systems problems and approaches to their solution. Introduces basic mathematical techniques for dealing with systems design.

Prerequisite: calculus, linear algebra, basics of statistics.

ESI 6555 Systems Management 3 Credits**Grading Scheme:** Letter Grade

Introduction to the concepts of systems and the role of systems engineering in their development. Basic framework for planning and assessing system development, and how systems analysis methods and techniques are integrated into systems engineering processes.

Prerequisite: calculus, linear algebra, basics of statistics.

ESI 6616 Data Analytics for System Monitoring 3 Credits**Grading Scheme:** Letter Grade

Focuses on advanced data analytics techniques for modeling, monitoring, diagnosis, and quality improvement of industrial processes. The techniques introduced have wide applications in manufacturing, health care, service industry applications, and human factors.

Prerequisite: Basic probability and statistics.

ESI 6617 High-Dimensional Data Analytics 3 Credits**Grading Scheme:** Letter Grade

Covers techniques in high-dimensional data analytics that are particularly beneficial to industrial applications, including manufacturing, agricultural, and healthcare systems. It focuses on the analysis of functional data (e.g., spatial or temporal data), multi-channel data, and structured images and point clouds.

Prerequisite: ESI 6325 with a minimum grade of C or ESI 6420 with a minimum grade of C.

FIN 5490 Stochastic Calculus in Financial Engineering 4 Credits**Grading Scheme:** Letter Grade

Introduces students to the basic ideas and methods of stochastic calculus and its applications in finance, which are essential for the practice of quantitative finance and risk management. Covers arbitrage and risk-neutral pricing in a discrete-time setting, continuous-time models using Brownian motion, Markov processes, stochastic integral, stochastic differential equations, Ito's formula, change of measure, martingales, and applications to option pricing.

Prerequisite: FIN 6537.

FIN 5776 Numerical Methods in Financial Engineering 4 Credits**Grading Scheme:** Letter Grade

Presents the basic numerical and simulation techniques for the pricing of derivative securities. The material includes numerical methods commonly used in financial engineering, including random number generation, stochastic processes, statistics, and differential equations. Applications of each topic will be presented along the course through case studies with real market data.

Prerequisite: FIN 5778. In addition, basic knowledge of differential equations, probability and statistics, computer programming (any language) and exposure to the topics of stocks, bonds, and options is a prerequisite.

FIN 5778 Introduction to Financial Technology 3 Credits**Grading Scheme:** Letter Grade

Explores the impacts of financial technology in our day to day lives. Students will learn the technology behind payments, credit, lending and asset management, as well as applications of blockchain technology for investments and financial transactions. The course will provide an overview of the FinTech industry, decentralized finance and major applications of the blockchain. Topics on privacy, security and regulation of FinTech will be covered.

FIN 6951 Master's Project in Financial Engineering 3 Credits**Grading Scheme:** Letter Grade

Capstone event in the Financial Engineering curriculum. Students develop an indepth analysis on a financial engineering topic under the supervision of the course instructor. The effort culminates in a written project report and a presentation to the class.

Prerequisite: ESI 6352, FIN 5776, and ESI 5471.

Information Systems

ISM 5021 Information Systems in Organizations 3 Credits

Grading Scheme: Letter Grade

Introduction for graduate students with minimal microcomputer operation skills. Topics include the range of computer information technology available, language types and procedural languages, applications in organizations, management of resources, and trends. Students use microcomputers in the College's computing laboratories.
Prerequisite: consent of instructor. Designed for MBA students.

ISM 6022 Management Information Systems 2 Credits

Grading Scheme: Letter Grade

Policy and management issues surrounding information systems in today's enterprises. Strategic use, organizational impact, project management, human resource issues, and other topics important to understanding information systems in business.

ISM 6128 Advanced Business Systems Design and Development I 2 Credits

Grading Scheme: Letter Grade

Object-oriented analysis and model specification for business software systems. Articulation of key requirements (data, processes, physical components, deployment) using logical modeling methodologies.

ISM 6129 Advanced Business Systems Design and Development II 2 Credits

Grading Scheme: Letter Grade

Continuation of ISM 6128. Focuses on object-oriented design of systems. How to translate business requirements into specific task and component requirements.

Prerequisite: ISM 6128, admission to the Master of Accounting program, or consent of instructor.

ISM 6215 Business Database Systems I 2 Credits

Grading Scheme: Letter Grade

Fundamentals of data storage and retrieval models for business applications. Data modeling and database design principles. Theoretical foundations and exercises presented for relational data model and SQL.

Prerequisite: ISM 6128.

ISM 6216 Business Database Systems II 2 Credits

Grading Scheme: Letter Grade

Continuation of ISM 6215. Focuses on implementation and programming issues.

Prerequisite: ISM 6215.

ISM 6222 Business Telecom Strategy and Applications I 2 Credits

Grading Scheme: Letter Grade

Survey of networking technologies used in WWW and e-commerce. TCP/IP networks and related security, networking hardware, and Internet software standards.

ISM 6223 Business Telecom Strategy and Applications II 2 Credits

Grading Scheme: Letter Grade

Introduces traditional telephony. Discusses issues companies face on consolidation of voice and data networks. Technological developments, product announcements, and market activity. Ultimate focus is on strategy of voice/data integration.

Prerequisite: ISM 6222 or consent of instructor.

ISM 6224 Business Telecom Strategy and Applications III 2 Credits

Grading Scheme: Letter Grade

Telecommunications analysis and design. Both tactical and strategic issues concerning integration.

Prerequisite: ISM 6223 and ISM 6129.

ISM 6226 Business Telecom Strategy and Applications 3 Credits

Grading Scheme: Letter Grade

Introduction and overview of the field of business communications. Understanding telecommunications components and terminology applied to business in this age of electronic communication.

ISM 6236 Business Objects I 2 Credits

Grading Scheme: Letter Grade

Overview of main tools for business objects in enterprise programming, with hands-on experience. Distributed object models, component architectures, design methodologies and patterns, languages and development environments, and databases and repositories.

Prerequisite: ISM 6215, ISM 6222, and ISM 6258.

ISM 6239 Business Objects II 2 Credits

Grading Scheme: Letter Grade

Extends concepts and tools of ISM 6236 to include practical aspects of using business objects in enterprise systems. Focus on overview of ERP systems, proxies, proxy repositories, and wrapping legacy systems with objects.

Prerequisite: ISM 6236.

ISM 6251 Programming for Business Analytics 2 Credits

Grading Scheme: Letter Grade

Programming as a tool to create business analytics applications. Covers object-oriented concepts for systems development and language specific libraries to develop business analytics applications.

Prerequisite: ISM 6257

ISM 6257 Intermediate Business Programming 2 Credits

Grading Scheme: Letter Grade

Application in business systems. Classes, inheritance, polymorphism, interfaces, error handling, multi-threading, database connectivity, and their use in business information systems.

Prerequisite: Student must be a Graduate student in Business Administration or Accounting in order to register

ISM 6258 Advanced Business Programming 2 Credits

Grading Scheme: Letter Grade

Event-driven, component-based programming. GUI components, and client end system design and implementation in distributed systems, as well as database development, networking, security, and object-oriented concepts.

Prerequisite: ISM 6257.

ISM 6259 Business Programming 2 Credits

Grading Scheme: Letter Grade

An advanced system-implementation course to teach client end system design and implementation. Topics include object-oriented systems development, databases, networking, security, and web application development.

Prerequisite: ISM 6258.

ISM 6405 Business Intelligence 2 Credits

Grading Scheme: Letter Grade

Mastering emerging business intelligence technologies such as data warehousing, online analytic processing (OLAP), data mining and text mining in generating valuable control and decision-support business intelligence for many organizations in adjusting to their competitive business environment.

Prerequisite: ISM 6215(C) & QMB 6358(C).

ISM 6413 Introduction to Python 2 Credits**Grading Scheme:** Letter Grade

The course is designed to teach Python as a tool to create business analytics and visualization applications. The emphasis of the course is on programming constructs for analytics. A thorough introduction to Object-Oriented programming concepts with Python will be given. Python libraries designed for data preparation, transformation and wrangling will be reviewed with sample applications.

ISM 6423 Data Analysis for Decision Support 2 Credits**Grading Scheme:** Letter Grade

Overview of various solution methods for data analysis programs such as clustering, classification, and regression that occur in business decision making. How methods support decision making.

Prerequisite: ISM 6405**ISM 6485 Electronic Commerce and Logistics 2 Credits****Grading Scheme:** Letter Grade

Underlying technologies that herald innovations. How to capitalize on new electronic commerce and logistics in business.

ISM 6486 eCommerce Technologies 2 Credits**Grading Scheme:** Letter Grade

Database management systems, systems design and Web-page design, human computer interface issues, artificial intelligence methods (such as data mining and expert systems), and intelligent software agents.

ISM 6487 Risks and Controls in eCommerce 2 Credits**Grading Scheme:** Letter Grade

Strategic IT planning, policies and control; risk assessment, reliability, benchmarking and monitoring; privacy and security models and technologies; availability, continuity and compliance testing; and threat monitoring.

ISM 6562 Business Data Presentation and Visualization 2 Credits**Grading Scheme:** Letter Grade

Business Data Presentation and Visualization

Prerequisite: ISM 6215**ISM 6942 Electronic Commerce Practicum 2 Credits****Grading Scheme:** Letter Grade

Projects such as developing e-commerce business plans, constructing e-commerce sites, etc.

MAN 5501 Management 3 Credits**Grading Scheme:** Letter Grade

Introduction to the general class of problems associated with managing production facilities.

Prerequisite: QMB 5305. Designed for MBA students.**MAN 5502 Production and Operations Management 2 Credits****Grading Scheme:** Letter Grade

Introduction to POM, which focuses on design and control of productive systems within organizations.

Prerequisite: QMB 5304 or QMB 5305 or QMB 6358.**MAN 6508 Management of Service Operations 2 Credits****Grading Scheme:** Letter Grade

Case studies and problems, including systems design, operation, and control. Emphasizes waiting-line systems.

MAN 6511 Contemporary Issues in Supply Chain Analytics 2 Credits**Grading Scheme:** Letter Grade

In this course, the focus is on using analytics to address supply chain decision making. More specifically, students are exposed to analytical approaches for addressing decisions on multi-echelon supply chain inventories, revenue management, supply chain contracts, supply chain sustainability, and risk pooling.

MAN 6528 Principles of Logistics/Transportation Systems 2 Credits**Grading Scheme:** Letter Grade

Logistics management in current business environment.

Prerequisite: QMB 6755.**MAN 6573 Purchasing and Materials Management 2 Credits****Grading Scheme:** Letter Grade

Industrial/institutional purchasing cycle for operating supplies, raw materials, components, and capital equipment in the context of materials management organizational concepts. Basic principles, policies, and procedures for requirement determination; procurement decision process; purchasing function; and materials management concept, organization, and philosophy.

MAN 6575 Purchasing and Supplier Relationship Management 3 Credits**Grading Scheme:** Letter Grade

Basic concepts and tools for purchasing and supply-chain management. Procurement cycle, information flow, supplier selection, and internet procurement.

MAN 6581 Project Management 2 Credits**Grading Scheme:** Letter Grade

Organizational role of the manager. Ways of structuring project organizations. Fundamentals of scheduling. Time and cost tradeoffs. Budgeting and cost estimation. Monitoring.

MAN 6598 Logistics and Distribution Management 3 Credits**Grading Scheme:** Letter Grade

Activities that make products available to consumers at convenient locations, in the required quantities, and at minimum cost to the company.

MAN 6617 International Operations/Logistics 2 Credits**Grading Scheme:** Letter Grade

Global delivery/distribution channels, coordinating production/delivery operations in international markets, optimizing use of transportation networks, and designing information/communications systems that span supply chain.

MAN 6619 International Logistics 3 Credits**Grading Scheme:** Letter Grade

Strategic issues in managing international supply chains, managing the exchange rate, and the operating risks in global supply chains.

QMB 5303 Managerial Statistics 3 Credits**Grading Scheme:** Letter Grade

Basic concepts and methods of probability and statistics, stressing applications in analyzing and solving business problems.

Prerequisite: Basic statistics, calculus. Designed for M.B.A. students.**QMB 5304 Introduction to Managerial Statistics 2 Credits****Grading Scheme:** Letter Grade

Basics of modeling and analyzing problems that involve business decision making under uncertainty. Techniques for organizing and formulating decision problems. Probability theory and some basic statistical concepts and procedures.

QMB 5305 Advanced Managerial Statistics 2 Credits**Grading Scheme:** Letter Grade

Builds on QMB 5304. Basic concepts in collection, analysis, and interpretation of data, emphasizing the capabilities of different statistical methods and business applications. Focuses on how business decisions can be informed by statistical analysis and how to apply computer software tools to business decisions.

Prerequisite: Designed for M.B.A. students.

QMB 6317 Artificial Intelligence Methods in Business 2 Credits**Grading Scheme:** Letter Grade

This course is designed to engage you building artificial intelligence (AI) models for business using modern tools.

QMB 6358 Statistical Analysis for Managerial Decisions I 2 Credits**Grading Scheme:** Letter Grade

Data-application techniques for managerial problems; difficulties that can arise in applying the techniques and interpreting results. Experience using computerized procedures; may require substantial amount of case analysis.

QMB 6359 Statistical Analysis for Managerial Decisions II 2 Credits**Grading Scheme:** Letter Grade

Data application techniques with emphasis placed on relationships that occur over time. Substantial amount of case analysis, as well as applications programming using industry standard software products.

Prerequisite: QMB 6358 or consent of instructor.**QMB 6616 Business Process Analysis 3 Credits****Grading Scheme:** Letter Grade

Critical business analytical approaches, including linear programming, project scheduling, waiting-line theory, and time-series analysis.

QMB 6693 Quality Management and Control Systems 2 Credits**Grading Scheme:** Letter Grade

Philosophy of total quality management and technical aspects of quality design and measurement systems.

Prerequisite: QMB 5305 or equivalent or consent of instructor.**QMB 6755 Managerial Quantitative Analysis I 2 Credits****Grading Scheme:** Letter Grade

Survey of deterministic models for managerial decision making. Emphasizes mathematical programming.

QMB 6756 Managerial Quantitative Analysis II 2 Credits**Grading Scheme:** Letter Grade

Using deterministic and stochastic models for decision making. Integer and nonlinear programming, goal programming, multiple-objective linear programming, and decision theory. Applied problem solving and case studies, using appropriate software.

Prerequisite: QMB 6755.**QMB 6845 Supply Chain Analytics: Gaming the Supply Chain 2 Credits****Grading Scheme:** Letter Grade

Effective supply chain coordination using analytical tools. The course uses a simulation/gaming format. After a brief description of the analytical tools relevant to a topic, students will be required to use these tools in simulations/games.

Prerequisite: QMB 6755.**QMB 6905 Individual Work in Information Systems and Operations Management 1-5 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Reading and/or research.

Prerequisite: consent of department.**QMB 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

QMB 6930 Special Topics in Information Systems and Operations Management 1-4 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Variable content. In-depth study of topics not offered in other courses or topics of special current significance.

QMB 6938 Analytics Processes for Business – Bootcamp 1 Credit**Grading Scheme:** Letter Grade

The ultimate objective of the course is to prepare you to use one of the most comprehensive business analytics tools effectively within a standard analytics process framework. This tool and framework can be applied to almost all business analytics and modeling efforts, including Artificial Intelligence.

QMB 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

QMB 6941 Internship 1-4 Credits, Max 6 Credits**Grading Scheme:** S/U

Career-related experience that is not attainable in a classroom situation. Participation in such an internship will give employers an opportunity to identify earlier those students they may wish to employ upon graduation.

QMB 6942 Analytics Projects Practicum 1 1 Credit**Grading Scheme:** Letter Grade

This course is designed to engage you in solving “real world” business analytics problems. You will be a part of a small team of students that work with a business or organization. In this first practicum module, the focus will be on the first key steps of the analytics process.

Prerequisite: Analytics Processes for Business- Bootcamp.**QMB 6943 Analytics Practicum 2 1 Credit****Grading Scheme:** Letter Grade

This course is designed to engage you in solving “real world” business analytics problems. You will be a part of a small team of students that work with a business or organization. In this second practicum module, the focus will be on the modeling steps of the analytics process.

Prerequisite: Analytics Practicum 1.**QMB 6944 Analytics Practicum 3 1 Credit****Grading Scheme:** Letter Grade

This course is designed to engage you in solving “real world” business analytics problems. You will be a part of a small team of students that work with a business or organization. In this third module, the focus will be on the Evaluation and Deployment steps of the analytics process.

Prerequisite: Analytics Practicum 2.**QMB 6945 ISOM Department Business Practicum 2 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Students will solve “real world” business problems in business analytics, data science, information technology, or supply chain management. Small student groups will work with a business or organization to analytically solve a real-world problem. This permits each team to include students with skills to complete the projects. University partners will provide the business problems to be solved and the datasets that students use to develop models and recommendations.

Prerequisite: Programming skills are recommended.**QMB 6957 International Studies in Quantitative Methods 1-4 Credits, Max 12 Credits****Grading Scheme:** S/U

International Studies in Quantitative Methods

Prerequisite: admission to an approved study abroad program and permission of department.

QMB 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

QMB 7565 Stat Research Methods 3 Credits

Grading Scheme: Letter Grade
Stat Research Methods

QMB 7931 Special Topics in Information Systems and Operations Management 1-4 Credits, Max 9 Credits

Grading Scheme: Letter Grade
Recent literature and state-of-the-art theory and methods in both the decision and the information sciences.
Prerequisite: consent of instructor.

QMB 7933 Seminar in Information Systems and Operations Management 1-4 Credits, Max 50 Credits

Grading Scheme: Letter Grade
Historical foundations and evolutionary development of concepts in decision and information sciences, emerging problems and future trends.
Prerequisite: consent of instructor.

QMB 7979 Advanced Research 1-12 Credits

Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

QMB 7980 Research for Doctoral Dissertation 1-15 Credits

Grading Scheme: S/U
Research for Doctoral Dissertation

Interior Design

IND 5106 History of Interior Design I 3 Credits

Grading Scheme: Letter Grade
Design philosophy and interior elements in an architectural and sociological context. Record of human achievements expressed in built environment. Foundation for contemporary design and interior preservation practice. Slides, lecture, and discussion.
Prerequisite: consent of graduate coordinator.

IND 5136 History of Interior Design II 3 Credits

Grading Scheme: Letter Grade
Continuation of IND 5106. Evolution of contemporary design philosophy. Foundation for contemporary design and interior presentation practice. Nineteenth-century revivals through current developments.
Prerequisite: IND 5106 or equivalent.

IND 5212C Architectural Interiors I 5 Credits

Grading Scheme: Letter Grade
Developing interior spaces from conceptual phases to final design resolution, based on the needs of people, interior considerations, and exterior influences. Emphasizes three-dimensional design development, process, and detailed graphic representation of designed spaces.
Prerequisite: consent of graduate coordinator. ;
Corequisite: IND 5427C and IND 5638.

IND 5227C Advanced Architectural Interiors I 6 Credits

Grading Scheme: Letter Grade
Advanced problems with respect to sophisticated clients in urban settings. Ranges from the infrastructure of large urban spaces to the details of individual spaces, including corporate office planning and design of both public and private spaces.
Prerequisite: consent of instructor or graduate coordinator. ;
Corequisite: IND 5454C.

IND 5231C Architectural Interiors II 5 Credits

Grading Scheme: Letter Grade
The conceptual design process, design theory, and programmatic concerns included in residential, commercial, and institutional interior design. Emphasizes professional applications and the interior designer as team player, programmer, and problem solver.
Prerequisite: IND 5212C or consent of instructor or graduate coordinator. ;
Corequisite: IND 5434C and IND 5508.

IND 5326 Color Theory Planning and Practice 3 Credits

Grading Scheme: Letter Grade
Explores color through a review of focused research and experiential learning. Examines the art and science of color theory in the context on interior design and allied fields.

IND 5427C Interior Design Construction Documents 4 Credits

Grading Scheme: Letter Grade
Systematic overview of construction systems, technologies, and materials. Emphasizes the design of interior systems, and detailing of systems, as an extension of the overall design concept.
Prerequisite: consent of graduate coordinator.

IND 5434C Interior Lighting 3 Credits

Grading Scheme: Letter Grade
Introduction to lighting design based on critical awareness of luminous environment and principles and perception of light and color. Graphic exercises in lighting design, documentation, and lighting calculations based on student design project solutions.
Prerequisite: consent of graduate coordinator.

IND 5454C Advanced Interior Design Detailing and Construction Documents 4 Credits

Grading Scheme: Letter Grade
Advanced problems in interior finish systems, such as interior architecture and cabinetry exploration, and production of interior mechanical and millwork drawings and construction documents. Integration of building codes and life safety issues.
Prerequisite: consent of graduate coordinator.

IND 5466 Interior Environmental Technology 3 Credits

Grading Scheme: Letter Grade
Relation to human sensory reactions, psychological factors, health safety, and satisfaction. Vocabulary and concepts of interior environmental technology related to the process of design.
Prerequisite: consent of graduate coordinator.

IND 5508 Business and Professional Practices for Interior Designers 3 Credits

Grading Scheme: Letter Grade
The profession of interior design as practiced today. Considers office practices and design project management. Contract documents, legal concerns, management and marketing strategies, personnel practices, and career planning. Ethics/contracting for design services via case studies.
Prerequisite: consent of instructor or graduate coordinator.

IND 5632 Interior Finishes and Materials 3 Credits

Grading Scheme: Letter Grade
This course introduces the building materials and finishes used in interior applications regarding their potential contribution to the functionality of the built environment, contextual relevance of application, operational and environmental sustainability, and their potential impact on the continuum of human health, safety, and wellbeing. In this course, students will explore and evaluate the diversity, applicability, and lifecycle of interior building materials.

IND 5633 Readings in Design Studies 3 Credits**Grading Scheme:** Letter Grade

Students write a systematic literature review that is appropriate for a thesis or dissertation proposal. In order to create a systematic literature review, substantial time will be devoted to critiquing previously written journal articles in the field of interior design.

IND 5641 Environment and Behavior 3 Credits**Grading Scheme:** Letter Grade

Explores the complex relationships between the environment (built or natural) and occupants. Examines theories and procedures for understanding environment and behavior interactions. Covers a wide variety of related topics and types of designed environments.

Prerequisite: Permission of instructor**IND 5937 Current Topics in Interior Design 1-3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Framework to support theory, research, and application of interior design processes. Programming and post-occupancy phases through exploration of environment and behavior research and gaming simulation.

IND 6639 Methods of Interior Design Research 3 Credits**Grading Scheme:** Letter Grade

Theory and methods related to research in interior design, environment and behavior, and history. Reciprocal interactions between people and the built environment.

Prerequisite: graduate standing.**IND 6906 Independent Studies and Readings 1-3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Independent Studies and Readings

IND 6939 Creativity Applied 3 Credits**Grading Scheme:** Letter Grade

Examines creativity theory and research applied to interior design and allied fields by considering what constitutes an innovative organizational culture, product and process breakthroughs including the role of failure in the discovery process.

Prerequisite: IND 5633 Readings in Design Studies, IND 6639 Methods of Research or by instructor approval.**IND 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

IND 6941 Interior Design Internship 2-4 Credits**Grading Scheme:** S/U

Opportunities to work in an architectural and interior design office gaining hands-on professional experience working up to 12 weeks.

Prerequisite: IND 5427C, IND 5232C, IND 5508.**IND 6951 Project in Lieu of Thesis 6 Credits****Grading Scheme:** S/U

Completion of an original research-informed design project that addresses an identified issue or need with the field of Interior Design that satisfies departmental requirements for a Project in Lieu of Thesis (PILOT). A PILOT is based on a specific design-focused topic that results in a written description of the problem identified and its significance, a synthesis of relevant literature, a description of programmatic considerations, proposed design solutions, and implications.

Prerequisite: Permission of department.**IND 6971 Research for Master's Thesis 1-12 Credits****Grading Scheme:** S/U

Research for Master's Thesis

Japanese Languages and Literatures

JPN 1130 Beginning Japanese 1 5 Credits**Grading Scheme:** Letter Grade

Beginning study covering four skills: listening, speaking, reading, and writing. JPN 1130 has a strict attendance policy: if registered students miss two or more class meetings during drop/add, they may be dropped from the class upon notification by the instructor.

JPN 1131 Beginning Japanese 2 5 Credits**Grading Scheme:** Letter Grade

Continued study of the four skills with additional vocabulary and grammar. JPN 1131 has a strict attendance policy: if registered students miss two or more class meetings during drop/add, they may be dropped from the class upon notification by the instructor.

Prerequisite: JPN 1130 with minimum grade of C, or S, or the equivalent as proven by placement test.**JPN 2230 Intermediate Japanese 1 5 Credits****Grading Scheme:** Letter Grade

Intermediate study of the four skills with new vocabulary and grammar. JPN 2230 has a strict attendance policy: if registered students miss two or more class meetings during drop/add, they may be dropped from the class upon notification by the instructor.

Prerequisite: JPN 1131 with minimum grade of C or S or the equivalent as proven by placement test.**JPN 2231 Intermediate Japanese 2 5 Credits****Grading Scheme:** Letter Grade

Continuation of intermediate study. JPN 2231 has a strict attendance policy: if registered students miss two or more class meetings during drop/add, they may be dropped from the class upon notification by the instructor.

Prerequisite: JPN 2230 with minimum grade of C or S or the equivalent as proven by placement test.**JPN 3410 Advanced Japanese 1 3 Credits****Grading Scheme:** Letter Grade

Advanced study of the four skills with attention to more complex structures. JPN 3410 has a strict attendance policy: if registered students miss two or more class meetings during drop/add, they may be dropped from the class upon notification by the instructor. (H and N)

Prerequisite: JPN 2231 with minimum grade of C or S or the equivalent as proven by placement test.**JPN 3411 Advanced Japanese 2 3 Credits****Grading Scheme:** Letter Grade

Continuation of advanced study. JPN 3411 has a strict attendance policy. If registered students miss two or more class meetings during drop/add, they may be dropped from the class upon notification by the instructor. (H and N)

Prerequisite: JPN 3410 with minimum grade of C, or S, or the equivalent as proven by placement test.**JPN 3440 Business Japanese 3 Credits****Grading Scheme:** Letter Grade

Provides grammatical structures and essential business vocabulary, develops conversation strategies and presentation skills, and raises awareness of the customs and cultural differences in Japanese business interactions.

Prerequisite: JPN 2231 with minimum grade of C or S, or the equivalent.

JPN 3730 Language in Japanese Society 3 Credits**Grading Scheme:** Letter Grade

Analysis of variation in regional dialects: gender-based differences, pragmatics of interpersonal communication, language acquisition and discourse structure. (S and N)

Prerequisite: JPN 1130 or LIN 3010.**JPN 4415 Japanese Translation: Theory and Practice 3 Credits****Grading Scheme:** Letter Grade

Key concepts and approaches of translation studies applied to the translation of Japanese to English, and English to Japanese, in a variety of media, genre, and text types.

Prerequisite: JPN 3410 or equivalent with a minimum grade of C or instructor permission.**JPN 4850 Structure of Japanese 3 Credits****Grading Scheme:** Letter Grade

Linguistic analysis of modern standard Japanese. Topics include phonology, morphology, syntax, semantics and writing. Readings and discussions in English. (S and N)

Prerequisite: JPN 1131 or instructor permission.**Attributes:** General Education - International**JPN 4905 Individual Study 1-5 Credits****Grading Scheme:** Letter Grade

For those who seek independent work not offered in another course. Available only by special arrangement.

JPN 4911 Undergraduate Research in Language or Linguistics 0-3 Credits**Grading Scheme:** S/U

Provides firsthand, supervised research in Language or Linguistics. Projects may involve inquiry, design, investigation, scholarship, discovery or application in Language or Linguistics.

JPN 4930 Special Topics in Japanese Studies 3 Credits**Grading Scheme:** Letter Grade

Variable topics dealing with specific issues in and in-depth study of special topics in Japanese studies.

Prerequisite: Critical Tracking semester 2 or greater.**JPN 4935 Senior Honors Thesis 3 Credits****Grading Scheme:** Letter Grade

Select a Japanese faculty member to act as director for an independent research project that culminates in an honors thesis.

Prerequisite: Minimum 3.5 GPA and instructor permission.**JPN 4940 Internship 3 Credits****Grading Scheme:** Letter Grade

Faculty (or delegated authority) supervised internship. Requires a written post-internship report.

Prerequisite: instructor and department permission.**JPN 4956 Overseas Studies 1 1-15 Credits****Grading Scheme:** Letter Grade

Provides a mechanism by which coursework taken as part of an approved study abroad program can be recorded on the UF transcript and counted toward graduation.

Prerequisite: undergraduate advisor permission.**JPN 4957 Overseas Studies 2 1-15 Credits****Grading Scheme:** Letter Grade

Revolving topics provide a mechanism for coursework taken at a foreign university as part of an approved study abroad program to be transferred to UF. Credits taken will be entered in the student's transcript and may or may not count toward graduation, at the discretion of major's advisors.

Prerequisite: undergraduate advisor permission.**JPT 3100 Tales of Kyoto 3 Credits****Grading Scheme:** Letter Grade

An investigation of literary texts from the 8th through the 17th centuries presented within the framework of Western literary and feminist criticism. (H and N)

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**Attributes:** General Education - International**JPT 3120 Modern Japanese Fiction in Translation 3 Credits****Grading Scheme:** Letter Grade

A critical examination of stories, autobiographies and secondary criticism from the 19th century to the present. Become familiar with the forms and topics of criticism through Japanese and Western sources. (H and N) (WR)

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**Attributes:** General Education - International, Satisfies 6000 Words of Writing Requirement**JPT 3121 Contemporary Japanese Literature: Postwar to Postmodern 3 Credits****Grading Scheme:** Letter Grade

Companion to JPT 3120 that reflects the increasing clarity with which contemporary Japanese literature (1945 to present) is emerging as a separate field with its own set of issues, major texts and significance for the American student of Japan. Writers range from Dazai and Oe Kenzaburo to Murakami Haruki, and issues range from subjectivity to cybernetics.

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**JPT 3140 Modern Women Writers 3 Credits****Grading Scheme:** Letter Grade

Examination of narratives written by women who published during the Taisho (1912-25), Showa (1925-89) and Heisei (1989 to present) periods. (H and N)

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**Attributes:** General Education - International, Satisfies 6000 Words of Writing Requirement**JPT 3150 Classical Japanese Poetry 3 Credits****Grading Scheme:** Letter Grade

Historical survey of traditional Japanese poetry (waka) from the 8th to the 16th century. (H and N)

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**JPT 3300 Samurai War Tales 3 Credits****Grading Scheme:** Letter Grade

Explores the historical and cultural stimuli that led to war, recorded later as war narratives. Supported by images of architecture, narrative picture scrolls, and extant military accoutrements. (H and N)

Corequisite: JPT 3500 recommended.**Attributes:** General Education - International

JPT 3330 Early Modern Japanese Literature 3 Credits**Grading Scheme:** Letter Grade

Surveys Japanese literature of the Early Modern period (also called the Edo period), 1600-1868. Introduces and analyzes historically significant, foundational works of Early Modern Japanese literature and theater. Explores the history of the period and the development of print technologies and new genres, and introduces critical aesthetic and cultural concepts.

Prerequisite: Sophomore standing.**Attributes:** General Education - International, Satisfies 4000 Words of Writing Requirement**JPT 3391 Introduction to Japanese Film 4 Credits****Grading Scheme:** Letter Grade

Introduces the formal and historical features of Japanese film that have given it a unique position in film history. Emphasizes formal and critical analysis as well as the intellectual stakes of studying non-western film.

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**JPT 3500 Japanese Culture 3 Credits****Grading Scheme:** Letter Grade

Introduction to Japanese culture with emphasis on tracing the origin and development of important aspects of Japanese literature, art, religion and society. All readings in English. (H and N) (WR)

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**Attributes:** General Education - International, Satisfies 6000 Words of Writing Requirement**JPT 3702 Japanese Visual Culture 3 Credits****Grading Scheme:** Letter Grade

Explores issues within Japanese visual culture, and uses visual-cultural products to explore Japanese political, cultural, social, and historical issues. Introduces and analyzes historically significant, foundational works of Japanese visual culture, unpacks genre and genre tropes in contemporary works, and analyzes several visual-cultural works that tackle significant social issues.

Prerequisite: Sophomore standing or above.**Attributes:** General Education - International, Satisfies 4000 Words of Writing Requirement**JPT 4130 The Tale of Genji 3 Credits****Grading Scheme:** Letter Grade

Investigation of the 11th-century masterpiece and its pervasive influence on Japanese literature, past and present. (H and N)

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**Attributes:** General Education - International**JPT 4502 Japanese Folklore 3 Credits****Grading Scheme:** Letter Grade

Study of native belief systems and the supernatural as reflected in the folk practice of ritual observance and in tales, myths, songs and proverbs. (H and N)

Prerequisite: Minimum 15 credits earned in enrollment, test, or transfer credit.**Attributes:** General Education - International**JPT 4510 Representations of Japan's Modern Empire 3 Credits****Grading Scheme:** Letter Grade

Examines a variety of literary, historical, anthropological, and theoretical texts to explore racial and social issues related to Japan's imperial past. (H and N)

Corequisite: JPT 3500 recommended.**Attributes:** General Education - International**JPT 4911 Undergraduate Research in English Translation 0-3 Credits****Grading Scheme:** S/U

Provides firsthand, supervised research. Projects may involve inquiry, design, investigation, scholarship, discovery, or application.

JPT 4956 Overseas Studies 1 1-15 Credits**Grading Scheme:** Letter Grade

Provides a mechanism by which coursework taken as part of an approved study abroad program can be recorded on the UF transcript and counted toward graduation.

Prerequisite: undergraduate advisor permission.**JPT 4957 Overseas Studies 2 1-15 Credits****Grading Scheme:** Letter Grade

Revolving topics provide a mechanism for coursework taken at a foreign university as part of an approved study abroad program to be transferred to UF. Credits taken will be entered in the student's transcript and may or may not count toward graduation, at the discretion of major's advisors.

Prerequisite: undergraduate advisor permission.**JPW 3143 Classical Japanese 1 3 Credits****Grading Scheme:** Letter Grade

Introduction to classical Japanese texts with emphasis on reading comprehension, grammar analysis and translation.

Prerequisite: JPN 2231 with minimum grade of C, or the equivalent.**JPW 3144 Classical Japanese 2 3 Credits****Grading Scheme:** Letter Grade

Complex texts in classical Japanese with focus on comprehension, grammar, literature and culture.

Prerequisite: JPN 3143 with minimum grade of C, or the equivalent.**JPW 4130 Readings in Japanese Literature 3 Credits****Grading Scheme:** Letter Grade

A fourth-year language course based on literary texts, incorporating advanced reading skills and the analysis of literature in the original. (H and N)

Prerequisite: JPN 3411 with minimum grade of C or S, or the equivalent as proven by placement test.**Attributes:** General Education - International**JPW 4131 Japanese Texts and Contexts 3 Credits****Grading Scheme:** Letter Grade

Complements JPW 4130, Readings in Japanese Literature, and focuses on contemporary issues as encountered in a variety of Japanese media.

Prerequisite: JPN 3411 with minimum grade of C or S, or the equivalent as proven by placement test.**JPW 4911 Undergraduate Research in Target Language 0-3 Credits****Grading Scheme:** S/U

Provides firsthand, supervised research in Target Language. Projects may involve inquiry, design, investigation, scholarship, discovery or application in Target Language.

Journalism

MMC 5306 International Communication 3 Credits

Grading Scheme: Letter Grade

Analysis and comparison of print and electronic communication systems among nations and cultures; barriers and stimuli to international communications; mass media in national development.

RTV 6973 Project in Lieu of Thesis 1-9 Credits

Grading Scheme: S/U

Development, testing, and evaluation of an original electronic media product, audience research, or management analysis.

Prerequisite: consent of instructor.

Landscape Architecture

LAA 5331 Site Design Methodologies 3 Credits

Grading Scheme: Letter Grade

Learn, develop, and refine methodologies to effectively evaluate relevant natural, social, and cultural characteristics of a site and its context as an integral part of the planning and design process.

LAA 6231 Landscape Architecture Theory 3 Credits

Grading Scheme: Letter Grade

Explores theories pertinent to the practice and study of landscape architecture. Aesthetic and cultural principles and values and related ecological aspects. Designated core course.

Prerequisite: consent of instructor. ;

Corequisite: LAA 6656C.

LAA 6236 Landscape Architecture Research Methods 3 Credits

Grading Scheme: Letter Grade

multi-faceted exploration of various types and practices of research in landscape architecture, emphasizing methods in scholarship, practice, criticism, and decision-making.

Prerequisite: LAA 6231.

LAA 6322 Landscape Architecture Professional Practice 3 Credits

Grading Scheme: Letter Grade

This course is designed to prepare students for professional practice and to provide an understanding of the business of landscape architecture in private and public arenas, and of the basic concepts in leadership and organizational management.

LAA 6342 Landscape Architecture Criticism 1 Credit

Grading Scheme: Letter Grade

A critical exploration of contemporary and historical landscape architecture, examining design theories, methods, and built works through analysis, discussion, and writing.

LAA 6382 Ecological and Environmental Policy 3 Credits

Grading Scheme: Letter Grade

Survey of major environmental policy and law with particular reference to Florida case studies. Designated core course.

LAA 6383 Landscape Ecology and Management 3 Credits

Grading Scheme: Letter Grade

This course explores the relationship between planning, design decision-making, and landscape management practices, which are based on the fundamental principles of ecology and landscape ecology.

LAA 6525L Advanced Landscape Construction Design 4 Credits

Grading Scheme: Letter Grade

Development of current communication and production techniques related to professional landscape architectural construction documentation.

LAA 6656C Advanced Landscape Architectural Design 1-6 Credits

Grading Scheme: Letter Grade

Complex project design. Emphasizes user issues, ecological concerns, and regional and cultural issues; and determination of form for sustainable environments.

LAA 6713 Cultural Landscapes 3 Credits

Grading Scheme: Letter Grade

Explores the intersection of human and cultural systems as expressed in physical form, with multi-disciplinary explorations of why a landscape looks the way it does, what landscapes "mean", and how they are active agents/indicators in ongoing changes in cultural products, built environments, and society.

LAA 6905 Directed Study 1-3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Directed Study

LAA 6931 Water Conservation through Site Design and Green Roofs 3 Credits

Grading Scheme: Letter Grade

Exploration of the impacts of development on the natural systems of a site, particularly water resources. Mitigation of these impacts through sustainable site planning and design methodologies.

LAA 6935 Gardens of the World 3 Credits

Grading Scheme: Letter Grade

Explores the garden as a complex expression of human relationships with each other and the larger environment, both physical and cultural.

LAA 6941 Supervised Internship 3 Credits

Grading Scheme: S/U

Work is to be supervised by a registered landscape architect. Internship is to be accomplished in summer between first and second years or second and third years. Students, after completion, register in the next fall term for credit.

Prerequisite: required for all students who do not document a landscape architectural experience.

LAA 6971 Research for Master's Thesis 2-6 Credits

Grading Scheme: S/U

Research for Master's Thesis

LAA 6979 Terminal Project 1-6 Credits

Grading Scheme: S/U

This option, in lieu of thesis, is available for a design project that because of magnitude or design complexity does not adapt to thesis format.

Latin

LAT 6425 Latin Prose Composition 3 Credits

Grading Scheme: Letter Grade

Translating English into Latin and imitation of various Latin prose styles.

LNW 5325 Roman Elegiac Poetry 3 Credits

Grading Scheme: Letter Grade

Readings in Latin from one or all of the following: Catullus, Tibullus, Propertius, Ovid, or other Latin elegiac poetry.

Prerequisite: graduate student status or consent of instructor.

LNW 5655 Roman Poets: Horace 3 Credits, Max 6 Credits

Grading Scheme: Letter Grade

Horace's poetry and metrics.

LNW 5665 Roman Poets: Vergil 3 Credits, Max 6 Credits

Grading Scheme: Letter Grade

The poetic art of Vergil and its literary, historical, and political background.

LNW 5675 Roman Poets: Ovid 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Ovid's poetic art against its literary, historical, and political background.

LNW 6105 The Roman Tradition 3 Credits**Grading Scheme:** Letter Grade

Synoptic survey of Roman literature.

LNW 6225 The Ancient Roman Novel 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Readings from Petronius and/or Apuleius.

LNW 6315 Plautus and Terence 3 Credits**Grading Scheme:** Letter Grade

Reading in Latin selections from the twenty extant plays of Plautus and six extant plays of Terence, with an introduction to the genre of comedy.

Prerequisite: Advanced reading proficiency**LNW 6335 Roman Oratory and Rhetoric 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Theory and practice of Roman oratory and rhetoric through Latin readings in Cicero, Seneca, and Quintilian, and other sources.

LNW 6365 Studies in Roman Satire 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Readings from Horace, Persius, Petronius, Juvenal, Martial.

LNW 6385 Roman Historians 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Readings from major historians: Sallust, Caesar, Livy, Tacitus, Suetonius, and others.

LNW 6495 Late Latin Literature 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Readings from one or more of the following: Vulgate, Christian Church Fathers, Historia Apollonii, Peregrinatio Aetheriae, Harrington's Medieval Latin.

LNW 6905 Independent Study 1-4 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Readings and reports in language and literature.

LNW 6933 Special Topics in Latin Literature 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Intensive study of particular author, genre, period, or subject.

Prerequisite: graduate standing or consent of instructor.**LNW 6935 Proseminar in Classics 3 Credits****Grading Scheme:** Letter Grade

Introduction to the study of classical literature, history of scholarship, bibliographies, areas of the discipline.

LNW 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

LNW 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

LNW 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

LNW 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Linguistics

EAP 5835 Academic Spoken English I 3 Credits**Grading Scheme:** S/U

Intensive training in English, particularly English used in formal speaking and pedagogy.

Prerequisite: for international graduate students, especially those who expect to become teaching assistants. No credit toward any graduate degree.**EAP 5836 Academic Spoken English II 2-3 Credits****Grading Scheme:** S/U

TAs are videotaped biweekly in their classrooms. Weekly instruction addresses language, cultural, and pedagogical problems encountered in the classroom.

LIN 5075 Intro to Corpus Linguistics 3 Credits**Grading Scheme:** Letter Grade

Key methods of corpus linguistics for research and teaching.

LIN 5741 Applied English Grammar 3 Credits**Grading Scheme:** Letter Grade

Survey of English grammar based on the principles of second language acquisition and social interaction, with implications for teachers.

LIN 5770 Introduction to Computational Linguistics 3 Credits**Grading Scheme:** Letter Grade

Introduces the study of natural language from a computational perspective. Discusses both applied (engineering) and theoretical (cognitive) issues, ranging from speech and language technology to formal aspects of theoretical linguistic models. Covers a brief introduction to programming in Python, and the basics of Natural Language Processing and their applications.

LIN 6007 Statistics for Linguists 3 Credits**Grading Scheme:** Letter Grade

An introduction to concepts of probability and statistics, with examples chosen mainly from linguistics.

LIN 6084 Introduction to Graduate Research 3 Credits**Grading Scheme:** Letter Grade

Scholarly and scientific approaches to study of linguistics. Scientific method, theory development, data processing, scholarly writing, and structure of research proposals.

LIN 6138 Introduction to Data-driven Learning 3 Credits**Grading Scheme:** Letter Grade

An overview of how data-driven learning is defined and what disciplines and theories it draws from, discussion of the way data-driven learning has been applied in actual classroom research, and hands-on training using software and corpus data to develop instructional materials and student activities.

LIN 6165 Field Methods 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Developing the basic linguistic skills of discovering the structure of a language previously unknown to the investigator, starting with paper and pencil. Students learn to listen and interact with a native speaker, to construct questions, to organize and analyze data, to construct and test hypotheses, and to write up discoveries. Emphasizes ethics as a requisite of good science.

Prerequisite: LIN 3201.

LIN 6208 Phonetics for Linguists 3 Credits**Grading Scheme:** Letter Grade

Understanding of issues in experimental phonetics and appreciation of research techniques in the acoustic, physiological, and perceptual study in speech.

LIN 6226 Advanced Phonetics 3 Credits**Grading Scheme:** Letter Grade

Exposes students to advanced issues in linguistic phonetics, and to experimental phonetic methods and designs.

Prerequisite: LIN 4205 or LIN 6208 or SPA 3011.**LIN 6323 Phonology 1 3 Credits****Grading Scheme:** Letter Grade

Phonemics, syllabic and prosodic phenomena, neutralization, distinctive features, morphophonemic alternation, phonological systems and processes. Terminology and notational conventions of generative phonology. Problems from a variety of languages.

Prerequisite: LIN 3201.**LIN 6341 Phonology 2 3 Credits****Grading Scheme:** Letter Grade

Theoretical approaches to major problems of phonological theory and/or its relationship to areas such as morphology and SLA. Emphasis on linguistic argumentation and independent research.

Prerequisite: LIN 6323.**LIN 6402 Morphology 1 3 Credits****Grading Scheme:** Letter Grade

Theory of word structure, derivation, and inflection. The position of morphology in a grammar, the relationship between morphology and the rest of the grammar, predictions of various theories of morphology. Examples and problems from a wide variety of the world's languages.

Prerequisite: LIN 3460.**LIN 6410 Morphology 2 3 Credits****Grading Scheme:** Letter Grade

Technical articles from a variety of twentieth-century schools. Prominent inquiries include the place of morphology in grammar, its relationship with other components, and whether a unified theory of morphology can be constructed.

Prerequisite: LIN 6402.**LIN 6501 Syntax 1 3 Credits****Grading Scheme:** Letter Grade

The generative-transformational model of syntax: phrase structure, lexicon, case and agreement, movement, government, and anaphora. Emphasizes problem solving and linguistic argumentation.

Prerequisite: LIN 3460.**LIN 6520 Syntax 2 3 Credits****Grading Scheme:** Letter Grade

Further investigation of the generative-transformational model of syntax: advanced clause structure, binding theory, constraints on movement, and logical form.

Prerequisite: LIN 6501.**LIN 6571 Structure of Specific Language 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Linguistic examination of Aymara, Cakchiquel, Eskimo, Armenian, Bulgarian, Polish, Turkish, Quechua, Sanskrit, Tamil, or another rarely taught language.

Prerequisite: introductory linguistics course.**LIN 6601 Sociolinguistics 3 Credits****Grading Scheme:** Letter Grade

Major approaches to language in context: ethnographic, sociological, linguistic. Applications of sociolinguistics to applied linguistics, social sciences, and education. Collection and analysis of data.

Prerequisite: LIN 6323, LIN 6501.**LIN 6707 Psycholinguistics 3 Credits****Grading Scheme:** Letter Grade

Explores basic issues in psycholinguistic research, including language production, comprehension, acquisition, and development.

LIN 6708C Methods in Psycholinguistics 3 Credits**Grading Scheme:** Letter Grade

Hands-on experience designing and conducting psycholinguistic experiments and analyzing experimental data.

Prerequisite: LIN 6702; STA 2023 or consent of instructor.**LIN 6720 Second Language Acquisition 3 Credits****Grading Scheme:** Letter Grade

Neurolinguistic, psycholinguistic, and sociolinguistic bases of second language acquisition in childhood and adulthood.

LIN 6765 Methods in Language Documentation 3 Credits**Grading Scheme:** Letter Grade

Exploration of digital methods used in contemporary language documentation.

LIN 6796 Cognitive Neuroscience of Language 3 Credits**Grading Scheme:** Letter Grade

Overview and critical evaluation of brain imaging techniques and issues in language and brain research, covering speech perception, word recognition, reading syntax, discourse processing, production, language acquisition, and bilingualism.

LIN 6804 Semantics I 3 Credits**Grading Scheme:** Letter Grade

Truth conditional semantics as opposed to pragmatics. Basic notions in classical logic since logic is assumed in truth conditional semantics.

LIN 6826 Introduction to Formal Pragmatics 3 Credits**Grading Scheme:** Letter Grade

Introduces Pragmatics, the study of utterance meanings determined by situated uses of language and linguistic communication as a social activity. Explores the role of linguistic and extra-linguistic contexts in the production and interpretation of utterances. Topics include deictic and anaphoric expressions, sense and reference, presupposition, implicature, speech acts and coherence.

Prerequisite: consent of instructor.**LIN 6856 Semantics II 3 Credits****Grading Scheme:** Letter Grade

Introduction to doing formal semantics for linguists, based on the theory of Richard Montague and theories developed within his approach.

Prerequisite: LIN 6804**LIN 6905 Individual Study 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual Study

LIN 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

LIN 6932 Special Topics 3 Credits, Max 27 Credits**Grading Scheme:** Letter Grade

Special Topics

LIN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

LIN 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

LIN 7725 Topics in Second Language Acquisition 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Focused topic in the area of second language acquisition.

Prerequisite: LIN 6720.**LIN 7885 Discourse Analysis and Pragmatics 3 Credits****Grading Scheme:** Letter Grade

Methods of discourse analysis research and face-to-face discourse and pragmatics.

Prerequisite: LIN 6601.**LIN 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

LIN 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Management

BUL 5810 Legal Environment of Business 3 Credits**Grading Scheme:** Letter Grade

American legal system, sources of law, adjudication, legal nature of corporation, major areas of state and federal corporate law, state and federal regulation of business, legal aspects of ethical and social responsibility of business; intellectual property, employment law, torts and contracts.

BUL 5811 Law, Ethics, and Organizations 2 Credits**Grading Scheme:** Letter Grade

Designed for M.B.A. students. Law governing relationships with corporation and between corporation and social, political, and ethical environment. Business and the Constitution, litigation and dispute resolution, agency and forms of business organization, state and federal regulation of corporations and securities.

BUL 5832 Commercial Law for Accountants 2 Credits**Grading Scheme:** Letter Grade

Legal ramifications of business transactions. Basic transactional areas to be studied include contracts, sales, and secured transactions. Brief review of accountants' legal liability.

Prerequisite: level 5–M.Acc.**BUL 6441 Business Ethics and Corporate Social Responsibility 2 Credits****Grading Scheme:** Letter Grade

Designed for advanced master's students in business administration. Ethical issues managers face in business organizations.

BUL 6516 Law of Real Estate Transactions 2 Credits**Grading Scheme:** Letter Grade

Introduction to legal aspects, including basic concepts of real estate law, landlord-tenant relations, commercial leasing, multi-unit real estate interests, real estate finance, and sale of real estate. Analysis of legal aspects of real estate development, including impact of zoning and environmental laws, land improvement, and real estate syndication.

BUL 6841 Employment Law 2 Credits**Grading Scheme:** Letter Grade

Designed for master's students in business. Law related to employment and employees in business organizations.

BUL 6852 International Business Law 2 Credits**Grading Scheme:** Letter Grade

Designed for M.B.A. students. Legal aspects of managing the international business environment.

BUL 6905 Individual Work 1-5 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Reading and/or research in business law.

Prerequisite: consent of instructor.**BUL 6930 Special Topics 1-3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Topics not offered in other courses and of special current significance.

Prerequisite: consent of instructor.**ENT 6006 Entrepreneurship 2 Credits****Grading Scheme:** Letter Grade

Practical, hands-on understanding of the stages of the entrepreneurial process. Focuses on the decision-making process in a start-up company.

ENT 6008 Entrepreneurial Opportunity 2 Credits**Grading Scheme:** Letter Grade

Introduces non-business graduate students to entrepreneurship and the entrepreneurial process.

ENT 6116 Business Plan Formation 2 Credits**Grading Scheme:** Letter Grade

Professional development and preparation of a company business plan. Full analysis of the plan and outside evaluation and ranking.

Prerequisite: None.**ENT 6416 Venture Finance 2 Credits****Grading Scheme:** Letter Grade

Capital structure and financing needs of start-up companies. Valuation of nonpublicly traded companies. Intellectual property.

ENT 6506 Social Entrepreneurship 2 Credits**Grading Scheme:** Letter Grade

Process of starting, financing, assessing and managing succession of mission-based for-profit and not-for-profit ventures.

ENT 6616 Creativity in Entrepreneurship 2 Credits**Grading Scheme:** Letter Grade

Explores the fundamental tools used to make both individuals and organizations more creative and innovative.

ENT 6621 Strategy and Disruption in Technology Industries 2 Credits**Grading Scheme:** Letter Grade

Explores the strategic issues related to the management of new technologies and business systems. Considers how firms successfully enter existing industries, how they can manage technological innovations, and the market failures that the technology can address. Defines technology broadly to include not only "high tech" industries but also technical and managerial innovations in traditional manufacturing and service industries.

ENT 6905 Individual Work in Entrepreneurship 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Individual work in an Entrepreneurship related topic.

ENT 6930 Special Topics 1-4 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Rotating topics in special topics in entrepreneurship-related fields of study.

ENT 6933 Entrepreneurship Lecture Series 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Explores opportunity recognition, business planning, capital sourcing, growth and harvest. Provides a background necessary for students interested in careers in start-up ventures, high-growth firms, business consulting or venture capital. Introduces students to resources in the entrepreneurial arena and provide a forum for networking and career development.

ENT 6946 Entrepreneurial Consulting Project 2 Credits**Grading Scheme:** Letter Grade

To teach entrepreneurship by working the through real problems of real companies. To teach team dynamics, goal setting, and project management in an unscripted environment. To aid the economy by producing value-adding solutions to business problems.

ENT 6950 Integrated Technology Ventures 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Teams of engineering, business, and law students work together to commercialize UF developed technology. Objectives include commercialization of University of Florida technology through teaching entrepreneurship while attempting to commercialize a real technology, teaching team dynamics, goal setting, and project management.

ENT 7932 Entrepreneurship 3 Credits**Grading Scheme:** Letter Grade

Entrepreneurship

GEB 5114 Entrepreneurship and Venture Finance 3 Credits**Grading Scheme:** Letter Grade

Entrepreneurial processes. Exploration of boom in world economies. Participation in entrepreneurial culture.

GEB 6366 Fundamentals of International Business 2 Credits**Grading Scheme:** Letter Grade

Complexities of extending the market to more than a single nation/state. Impact on multinational corporation of different cultures and languages, multiple legal systems, national and global capital markets, foreign exchange, and political issues.

Prerequisite: designed for M.B.A. students.**MAN 5245 Organizational Behavior 3 Credits****Grading Scheme:** Letter Grade

Relationships among the individual administrator and supervisors, the employees supervised, and associates at a comparable level in the organization.

Prerequisite: designed for M.B.A. students.**MAN 5246 Organizational Behavior 2 Credits****Grading Scheme:** Letter Grade

Designed for M.B.A. students. Behavior of individuals, groups, and organizations. Understanding organizations, how they work, and the people in them. Concepts presented in relation to core managerial competencies.

MAN 6149 Developing Leadership Skills 2 Credits**Grading Scheme:** Letter Grade

Designed for master's students in business administration. Concepts of leadership theory and methods to improve skills.

MAN 6266 Managing Groups and Teams in Organizations 2 Credits**Grading Scheme:** Letter Grade

Composing, developing, and motivating teams. Inter- and intra-team processes. Assessing barriers to effectiveness. Interventions to overcome team problems.

Prerequisite: MAN 5246 or equivalent.**MAN 6331 Compensation in Organizations 2 Credits****Grading Scheme:** Letter Grade

Designed for M.B.A. students. Relevant practical and theoretical information regarding design of reward systems that support organizational strategies.

MAN 6365 Organizational Staffing 3 Credits**Grading Scheme:** Letter Grade

Overview of human resource selection. Recruitment, job analysis, psychometrics, criterion measurement, development and evaluation of selection devices, and practical applications.

Prerequisite: MAN 5245.**MAN 6366 Organizational Staffing 2 Credits****Grading Scheme:** Letter Grade

Designed for M.B.A. students. Personnel selection. Foundations of job analysis, measurement, and selection techniques. Psychometric principles, analyzing job requirements, and assessing relevant human characteristics. Assessing individual contributions to organizational effectiveness.

MAN 6375 Human Capital Analytics 2 Credits**Grading Scheme:** Letter Grade

Covers statistical concepts, strategies, and examples for analyzing people-related data. HR metrics and organizational people-related data are useful information for identifying trends and patterns to make effective business decisions.

Prerequisite: QMB 3250 or QMB 5304 or QMB 5305 or QMB 6358 or undergraduate managerial statistics.**MAN 6446 Negotiations 3 Credits****Grading Scheme:** Letter Grade

Theory and skills of negotiation and conflict resolution.

Prerequisite: designed for M.B.A. students.**MAN 6447 Art and Science of Negotiation 2 Credits****Grading Scheme:** Letter Grade

Designed for advanced master's students in business administration. Theory and processes of negotiation as practiced in variety of settings. Understanding behavior of individuals, groups, and organizations in competitive situations.

MAN 6635 International Aspects of Human Resource Management 2 Credits**Grading Scheme:** Letter Grade

Designed for master's students in business administration. Perspectives of a multinational firm.

MAN 6636 Global Strategic Management 2 Credits**Grading Scheme:** Letter Grade

Designed for master's students in business administration. Strategic issues facing global and multinational organizations.

MAN 6637 Global Strategic Management 3 Credits**Grading Scheme:** Letter Grade

Analyzes how firms compete in the multinational and global environment.

Prerequisite: designed for master's students in business administration.**MAN 6721 Business Policy 3 Credits****Grading Scheme:** Letter Grade

Integrating and applying the various functional and support areas of business administration. Business policy making and administration from the general manager's perspective.

Prerequisite: all MBA required courses. Designed for M.B.A. students. Taken the last semester before graduation.

MAN 6724 Strategic Management 2 Credits**Grading Scheme:** Letter Grade

Designed for M.B.A. students and taken the last semester before graduation. Complex strategic questions that confront general managers. Approaches learned in other courses combined with material particular to strategic management. Approaches used to formulate and implement overall strategies that allow firms to obtain and sustain competitive advantages while creating shareholder wealth.

MAN 6900 Capstone Project 2 Credits**Grading Scheme:** Letter Grade

Analyzing a global company using a series of questions in three strategic module assignments. Explicit questions in the assignments are designed to help students define the company, analyze the industry in which it operate, perform an internal analysis of the company/division, and define the strategies and company organization.

Prerequisite: MIB student**MAN 6905 Individual Work in Management 1-5 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Reading and/or research in management.

Prerequisite: departmental approval.**MAN 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

MAN 6930 Special Topics 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Topics not offered in other courses and of special current significance.

Prerequisite: consent of instructor/department.**MAN 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

MAN 6973 Project in Lieu of Thesis 1-4 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Project in Lieu of Thesis

MAN 7058 Affect, Cognition, and Organizational Decision Making 1-4 Credits**Grading Scheme:** Letter Grade

This course is about human cognition and emotions, and specifically about the scientific study of human cognition and emotions as they are related to organizational studies. The main topic of this course is the mental events and knowledge encountered in the workplace and used in activities such as forming impressions of others, explaining their behavior, and understanding how our attitudes relate to our decision making and behaviors.

Prerequisite: Department only & instructor consent.**MAN 7108 Seminar in Research Concepts and Methods in Management 1-4 Credits****Grading Scheme:** Letter Grade

Design, execution, and evaluation of research in organizational behavior, human resource management, strategic management, and organization theory.

Prerequisite: consent of instructor.**MAN 7109 Seminar in Motivation, Attitudes and Leadership 1-4 Credits****Grading Scheme:** Letter Grade

Various motivation theories, including expectancy and equity theories. Job satisfaction and other work attitudes, and their effects on individuals and organizations.

MAN 7208 Seminar in Contemporary Approaches to Entrepreneurship and Organizations 1-2 Credits**Grading Scheme:** Letter Grade

This course addresses contemporary views of organizations including topics associated with market entry and exit, and industry dynamics.

MAN 7249 Org Behavior 3 Credits**Grading Scheme:** Letter Grade

Org Behavior

MAN 7267 Seminar on Groups and Teams Research 1-2 Credits**Grading Scheme:** Letter Grade

Emerging research on groups and teams in organizations. Classic and contemporary theories and research on team composition and team performance.

MAN 7328 Seminar on Staffing and Selection 1-3 Credits**Grading Scheme:** Letter Grade

Theory and methods that organizations use to staff their positions.

MAN 7778 Seminar in Behavioral Approaches to Strategy 1-2 Credits**Grading Scheme:** Letter Grade

Addresses how organizations make decisions to cope effectively with their environments. Theory and research on the behavior of individuals and groups, including how cognition, perceptions, knowledge, and social networks affect organizational performance.

MAN 7779 Seminar in Strategic Processes, Innovation, and Entrepreneurship 1-2 Credits**Grading Scheme:** Letter Grade

Theories and Research on how organizations implement strategic choices and change. Content includes decision making, corporate governance, innovation, and entrepreneurship.

MAN 7934 Org Res Methods Sem 4 Credits**Grading Scheme:** Letter Grade

Org Res Methods Sem

MAN 7935 Strategic Management 3 Credits**Grading Scheme:** Letter Grade

Strategic Management

MAN 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MAN 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Marketing

MAR 5805 Problems and Methods in Marketing Management 3 Credits**Grading Scheme:** Letter Grade

Concepts and techniques for resolving marketing management problems through the case method.

Prerequisite: Designed for MBA students.**MAR 5806 Problems and Methods in Marketing Management 2 Credits****Grading Scheme:** Letter Grade

Concepts and techniques for resolving marketing management problems through the case method.

MAR 6105 Marketing Ethics 2 Credits**Grading Scheme:** Letter Grade

Examination of ethical issues in marketing.

Prerequisite: MAR 5806 or GEB 5929.**MAR 6157 International Marketing 2 Credits****Grading Scheme:** Letter Grade

Analysis and strategies for international environment.

Prerequisite: MAR 5806 or GEB 5929.**MAR 6158 International Marketing 3 Credits****Grading Scheme:** Letter Grade

Analysis and strategies for marketing in the international environment.

Prerequisite: MAR 5805. Designed for M.B.A. students.**MAR 6237 The Art and Science of Pricing 2 Credits****Grading Scheme:** Letter Grade

Providing students with a good understanding of the strategy and tactics for an effective pricing decision. By the end of the course, students will be able to explain underlying mechanisms for the current pricing practices and apply their knowledge in improving pricing decisions.

Prerequisite: (MAR 5806 or GEB 5929) & (QMB 6358 or QMB 6755).**MAR 6256 Strategy and Tactics of Pricing 3 Credits****Grading Scheme:** Letter Grade

Providing students with a good understanding of the strategy and tactics for an effective pricing decision. By the end of the course, students will be able to explain underlying mechanisms for the current pricing practices and apply their knowledge in improving pricing decisions.

Prerequisite: MBA students.**MAR 6335 Building and Managing Brand Equity 2 Credits****Grading Scheme:** Letter Grade

Product and brand management decisions needed to build, measure, and manage branded equity. Focal objectives are to increase understanding of important issues in planning and evaluating brand strategies and to provide the appropriate theories, models, and other tools to make better branding decisions.

Prerequisite: MAR 5806 or GEB 5929.**MAR 6456 Business-to-Business Marketing 2 Credits****Grading Scheme:** Letter Grade

Strategy concepts for marketing products and services to other businesses; institutions such as hospitals and universities, and government. Role of marketing strategy as part of overall business strategy. Developing and launching new products, managing channels of distribution and sales forces, and building and maintaining alliances and partnerships.

Prerequisite: MAR 5806.**MAR 6457 Business to Business Marketing 3 Credits****Grading Scheme:** Letter Grade

The course delves into the interconnections among B2B marketing decisions, strategy, organizational buying behavior, and selling, exploring the distinct challenges posed by B2B markets and the specialized skills required by marketers. B2B buyers engage with complex products, possess expertise in specific product domains, exhibit greater knowledge than B2C buyers, and hold higher expectations for their suppliers. This course equips students with the necessary understanding and insight.

Prerequisite: MAR 5805.**MAR 6479 Professional Selling 2 Credits****Grading Scheme:** Letter Grade

This is a basic survey course in professional selling. It is designed to teach future business leaders the importance of the selling role, provide them with basic professional selling skills and begin to prepare them for a future role in sales or sales management.

Prerequisite: MAR 5806**MAR 6508 Customer Analysis 2 Credits****Grading Scheme:** Letter Grade

Theory and research in the behavioral and social sciences applied to individual and aggregate behavior of consumers.

Prerequisite: (MAR 5806 or GEB 5929) & (QMB 6358 or QMB 6755) & ISM 6413.**MAR 6509 Customer Insights and Analysis 3 Credits****Grading Scheme:** Letter Grade

This course is designed to inform future managers, analysts, consultants, and advisors of insights on customers' behaviors, with an emphasis on leveraging these insights to develop evidence-based solutions that change customer behavior.

MAR 6590 Managerial and Consumer Decision Making 3 Credits**Grading Scheme:** Letter Grade

In this class we explore what constitutes high-quality decision making, how managers and consumers may fall short of these standards in predictable ways, and some ways that your decision making can be systematically improved.

MAR 6591 Consumer and Managerial Decision-Making 2 Credits**Grading Scheme:** Letter Grade

In this class we explore what constitutes high-quality decision making, how managers and consumers may fall short of these standards in predictable ways, and some ways that your decision making can be systematically improved.

Prerequisite: MAR 5806 or GEB 5929.**MAR 6646 Marketing Research for Managerial Decision Making 3 Credits****Grading Scheme:** Letter Grade

Examination of approaches and methods of marketing research with particular attention given to the perspective of the marketing manager.

Prerequisite: MAR 5805 and QMB 5303. Designed for M.B.A. students.**MAR 6648 Marketing Research for Managerial Decision Making 2 Credits****Grading Scheme:** Letter Grade

Examination of approaches and methods with particular attention given to the perspective of the marketing manager.

Prerequisite: MAR 5806 and QMB 5305. Designed for M.B.A. students.**MAR 6667 Marketing Analytics Methods 2 Credits****Grading Scheme:** Letter Grade

This course is designed to engage you in the analytics activities that support marketing decision-making using Microsoft Excel.

Prerequisite: (MAR 5806 or GEB 5929) & (QMB 6358 or QMB 6755).**MAR 6668 Marketing Analytics 1 2 Credits****Grading Scheme:** Letter Grade

Marketers today typically have access to a large amount of data with different formats. Properly analyzing these data will help managers better understand the marketplace and improve their decision-making, such as pricing, advertising budget allocation, and product recommendation.

Prerequisite: MAR 5806 & (QMB 6358 or QMB 6755) & ISM 6413.

MAR 6669 Marketing Analytics 2 2 Credits**Grading Scheme:** Letter Grade

This course is designed to engage you in the marketing analytics activities that support marketing decision-making using machine learning.

Prerequisite: MAR 5806 (ISM 6413 recommended).**MAR 6722 Web-Based Marketing 2 Credits****Grading Scheme:** Letter Grade

Provides an understanding of the current online marketing environment and the strategies and tactics of web-based marketing.

Prerequisite: MAR 5806 & (QMB 6358 or QMB 6755).**MAR 6816 Advanced Marketing Management (MBA) 3 Credits****Grading Scheme:** Letter Grade

Advanced case course dealing with the wide range of strategic problems faced by the marketing manager.

Prerequisite: MAR 5805. Designed for M.B.A. students.**MAR 6818 Advanced Marketing Management 2 Credits****Grading Scheme:** Letter Grade

Advanced cases dealing with the wide range of strategic problems faced by the marketing manager.

Prerequisite: MAR 5806.**MAR 6833 Product Development and Management 2 Credits****Grading Scheme:** Letter Grade

Management of new product development process including identifying new product opportunities, product concept testing, market feasibility analysis, prototype development, market testing, and commercialization.

Prerequisite: MAR 5806 or GEB 5929.**MAR 6838 Brand Management 3 Credits****Grading Scheme:** Letter Grade

Focus on product and brand management decisions needed to build, measure, and manage brand equity. Both conceptual frameworks and financial metrics are emphasized.

Prerequisite: MAR 5805 or MAR 5806 or equivalents.**MAR 6839 Product Development and Management 3 Credits****Grading Scheme:** Letter Grade

Provides students with a structured way of thinking about the new product development process from a marketing perspective.

MAR 6861 Customer Relationship Management 2 Credits**Grading Scheme:** Letter Grade

Conceptual foundations, analytical techniques and marketing tactics for managing customer relationships.

Prerequisite: (MAR 5806 or GEB 5929) & (QMB 6358 or QMB 6755).**MAR 6862 Customer Relationship Management 3 Credits****Grading Scheme:** Letter Grade

Acquiring, building, and maintaining mutually beneficial relationships with customers. The customer as a financial asset that companies should measure, manage, and maximize.

MAR 6905 Individual Work 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Reading and/or research.

Prerequisite: departmental approval.**MAR 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

MAR 6930 Special Topics in Marketing 1-4 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Selected topics in marketing management, research, or theory.

Prerequisite: consent of instructor.**MAR 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

MAR 6942 Marketing Consulting Experience 2 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Immerses graduate business students in real-world marketing challenges across Florida's major cities. Through direct client engagements and on-site visits, students apply AI-driven tools like web scraping and Generative AI to extract insights, analyze competition, and craft data driven strategies. This hands-on approach builds technical proficiency, strategic acumen, and consulting expertise, giving students a competitive edge in digital marketing.

Prerequisite: MAR 5806.**MAR 6957 International Studies in Marketing 1-4 Credits, Max 12 Credits****Grading Scheme:** S/U

International Studies in Marketing

Prerequisite: admission to approved study abroad program and departmental approval.

MAR 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

MAR 7507 Perspectives on Consumer Behavior 3 Credits**Grading Scheme:** Letter Grade

In-depth analysis of the field. Critically examines various theoretical and methodological approaches through marketing and consumer behavior literatures. Students must develop an original research project.

Prerequisite: graduate standing or consent of instructor.**MAR 7588 Consumer Information Processing and Decision Making 3 Credits****Grading Scheme:** Letter Grade

In-depth treatment of consumer information processing and choice behavior as a function of psychological and environmental factors. Underlying concepts and theories of individual judgment and decision making; critical evaluation of research in this area.

Prerequisite: MAR 7507 or consent of instructor.**MAR 7589 Judgment and Decision Making 3 Credits****Grading Scheme:** Letter Grade

Literature review related to psychology of judgment and decision making. Discussion of normative and descriptive theories of decision making and empirical evidence that speaks to those theories.

Prerequisite: consent of instructor.**MAR 7626 Multivariate Statistical Methods in Marketing 3 Credits****Grading Scheme:** Letter Grade

Review of application of multivariate methods including multiple regression; factor discriminant and cluster analysis; and conjoint measurement to summarize and analyze marketing data.

MAR 7636 Research Methods in Marketing 3 Credits**Grading Scheme:** Letter Grade

Experimental and quasi-experimental design; procedures for laboratory and field experiments; statistical conclusion, internal, external, and construct validity in research design; reliability and validity in measurement; creativity in hypothesis generation and theory testing in behavioral research.

Prerequisite: admission to Ph.D. in marketing or consent of instructor.

MAR 7666 Marketing Decision Models 3 Credits**Grading Scheme:** Letter Grade

Development and implementation of model-based approaches to marketing decision making. Model-based analysis of advertising, pricing, promotion, distribution. Research project.

Prerequisite: ECO 7408 and departmental approval.**MAR 7671 Artificial Intelligence and Machine Learning 3 Credits****Grading Scheme:** Letter Grade

This doctoral-level course is designed to engage students in the Artificial Intelligence (AI) and Machine Learning (ML) Methods for Research. The course focuses on the development of skills that will permit doctoral candidates to replicate data analysis techniques used in top-tier journal articles and to create visualizations most commonly found in these academic publications.

MAR 7925 Workshop in Marketing Research 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

In-depth analysis of current research topics. Emphasis on research programs of leading scholars. Students critically appraise the rationale, strengths, and weaknesses of each study.

Prerequisite: consent of department.**MAR 7932 Consumer Psychology Seminar 3 Credits****Grading Scheme:** Letter Grade

Designed for PhD and MA students in marketing, management, communications, social psychology, and related disciplines, this course examines how consumers form the beliefs that shape their choices, interpret others' behaviors, and manage their social identities through everyday decisions. Through critical reading and discussion of classic and contemporary research papers, students will engage deeply with key questions in consumer behavior and will be expected to generate novel research ideas.

MAR 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MAR 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Mass Communication

ADV 5005 Advertising Planning 3 Credits**Grading Scheme:** Letter Grade

Introduction to the process of developing advertising strategy, emphasizing theory and research methods.

ADV 5407 Content Marketing 3 Credits**Grading Scheme:** Letter Grade

This course teaches students the skills to be content marketers. Content marketing includes photos, words, audio, and video—every medium that helps tell the story of and promote a product or company, often online. This course addresses the what, why and how of content marketing and marketing strategy.

ADV 5409 Principles of Political Advertising 3 Credits**Grading Scheme:** Letter Grade

Students cover the mechanics of digital advertising focusing on political campaigning. Topics in the course include creating political advertisements, maximizing engagement, and measuring digital environments, social networks, and digital video. Students use current industry software to understand how to create paid communications on the internet to mobilize and persuade voters.

ADV 5815 Inbound Marketing Strategy 3 Credits**Grading Scheme:** Letter Grade

This course is designed to give learners the needed knowledge and skills to develop productive and realistic strategies for inbound marketing. The content of this course will provide essential business, marketing and social media information, and activities to assist the learner in understanding the changes, methods, techniques, and strategies used in the processes of conceptualizing, creating, implementing, and measuring inbound strategies and initiatives.

ADV 5825 Search and Display Advertising 3 Credits**Grading Scheme:** Letter Grade

This course focuses on educating and instilling core values around methodologies and strategies to launch and maintain performance campaigns within Google's AdWords platform including search, display, and video strategies. The students will learn the importance, techniques, and strategies of AdWords by analyzing the various products within the interface and what key performance indicators can fulfill the marketing goals of an organization.

ADV 6006 Theories of Advertising 3 Credits**Grading Scheme:** Letter Grade

Theories dealing with consumer responses to marketing communications: state-of-the-art advertising and marketing communications theory, academic articles examining consumer responses.

ADV 6325 Advertising and Social Media 3 Credits**Grading Scheme:** Letter Grade

Students will learn to create, write and maintain a social advertising campaign for clients. Learn about transparency and how the advent of social media has changed advertising. Case studies will be examined and students will create several pieces for their portfolio.

Prerequisite: MMC 5427, MMC 5006, and MMC 5636.**ADV 6405 International Advertising 3 Credits****Grading Scheme:** Letter Grade

Global competition and worldwide markets; technological revolutions; and branding products and services under different cultural, regulatory, and competitive conditions.

ADV 6503 Advertising Creative Strategy and Research 3 Credits**Grading Scheme:** Letter Grade

Social science findings as guides for decisions. Use of consumer behavior concepts in shaping advertising message content and improving media selection.

Corequisite: MMC 6421 or equivalent.**ADV 6505 Advertising Research Methods 3 Credits****Grading Scheme:** Letter Grade

Introduction to methods most commonly use in professional and scholarly research, including secondary, qualitative, survey, content analysis, and experimental methods.

COM 5256 Translational Com Science 3 Credits**Grading Scheme:** Letter Grade

This interdisciplinary course introduces communication science theories and concepts for translating scientific evidence in the domains of science, technology, engineering, and medicine to promote informed decision-making. Course reading, discussion, assignments focus developing, implementing, and evaluating strategies that enhance the accessibility, understandability, and usability of science in the public sphere.

COM 6255 Science and Health Policy 3 Credits**Grading Scheme:** Letter Grade

This course provides a background in science policy. How do political, economic, or social issues affect the construction of policy around a science/health topic? Conversely, how do scientific findings shape policy in those areas? What role do the media play? What are the criticisms of policy by all stakeholders?

COM 6338 Advanced Web Topics I: Advanced Design 4 Credits**Grading Scheme:** Letter Grade

Delving deeply into the processes of website design. Students will have 4 contact hours of instruction per week from lectures posted in E-Learning, not including individual work. Because the class is asynchronous, students may access lectures at any time during the week.

Prerequisite: Digital Design, Intro to Web Design, Digital Imagery**COM 6565 Social Media Community Management 3 Credits****Grading Scheme:** Letter Grade

This course was designed to provide students develop the necessary skills to build and grow communities, lead and moderate constructive and meaningful conversation for organizations, and to succeed on social media platforms. The students will learn how to seize opportunities to open public discussions and apply best practices to create highly interactive social media aimed at specific communities of people.

COM 6715 Grant Writing 3 Credits**Grading Scheme:** Letter Grade

The course provides students with an opportunity to develop grant writing and project development skills. Students will learn how to work collaboratively to conceptualize a grant proposal and develop standard proposal components, including project goal, background, logic model, approach, and budget. Students will also work individually to conduct preliminary research.

COM 6815 Risk Communication 3 Credits**Grading Scheme:** Letter Grade

Examine theory and research related to the communication of health, environmental, technological, agricultural, and geological risks. Explore risk communication from multiple perspectives, including psychological, social, and cultural. Emphasis on understanding, critiquing, and applying theories of risk communication.

Prerequisite: Graduate standing.**COM 6940 Supervised Teaching 1-3 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

JOU 5007 History of Journalism 3 Credits**Grading Scheme:** Letter Grade

Origin, development, and potentiality of print and broadcast media. Evolution of standards, policies, methods, and controls.

JOU 6391 Seminar in Journalism as Literature 3 Credits**Grading Scheme:** Letter Grade

Analysis of mass media writing, broadcast programs, and graphics to assess their merits both as journalism and as art. Various periods studied; emphasis on 20th century.

MMC 5006 Introduction to Multimedia Communication 3 Credits**Grading Scheme:** Letter Grade

Introducing media, journalism and communication themes, issues and how to's of an integrated approach to new multi-media communications to ensure the brand message reaches its intended audience. Taking a real-world viewpoint, students examine the various channels available to communication professionals.

Prerequisite: No prerequisites. Open to Graduate Students Only.**MMC 5007 Introduction to Audiences 3 Credits****Grading Scheme:** Letter Grade

The purpose of this course is to provide students with an understanding of the nature and evolution of contemporary audiences and how they can be conceptualized from both firm and consumer perspectives. The students will examine the diversity of audiences and how they can best be served in today's marketplace. In addition, students will learn about the ethical implications of serving modern consumers, including the challenges that accompany new technologies and data access.

MMC 5046 Presentation Power 3 Credits**Grading Scheme:** Letter Grade

Teaches theory and skills needed for effective small group sales presentations.

MMC 5155 Copywriting Digital Messaging 3 Credits**Grading Scheme:** Letter Grade

This course teaches how to stand out, drive engagement, communicate as a brand, and transform websites into brand stories. Students study the value of design and copy partnership while creating ads, emails, blog posts, and a brand manifesto. Students develop a brand guide and messaging documents for a brand.

MMC 5165 Influence and Selling 3 Credits**Grading Scheme:** Letter Grade

Students will learn to apply the techniques most commonly used by a broad range of compliance practitioners and explain how and why they work. They will be able to apply the three keys to influence and the six sources of influence to their current influence challenges.

Prerequisite: Graduate status or certificate or combined degree status**MMC 5206 Advanced Law of Mass Communication 3 Credits****Grading Scheme:** Letter Grade

Problems of constitutional law, libel, privacy, and governmental regulation. Not open to students who have taken MMC 4200 or equivalent.

MMC 5215 Technology Policy 3 Credits**Grading Scheme:** Letter Grade

The legal structure of radio, television, cable, satellite, and new media forms; the Communication Act, and the Federal Communications Commission.

Prerequisite: Undergraduate or graduate law course, or consent of instructor.

MMC 5259 Customer Management and the Nurturing of Enduring Relationships 3 Credits**Grading Scheme:** Letter Grade

The concepts and theories of customer management and ensuring the right people, processes, and technology are employed to nurture long-term customer relationships.

Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5277 Web Design Principles 4 Credits**Grading Scheme:** Letter Grade

Completing the course will allow students to be comfortable creating, coding and posting basic HTML and CSS files to the Internet. Gaining a foundational knowledge of website creation and apply it to the planning, design and development of your own web page over the course of the semester.

MMC 5279 UX Design Theory 3 Credits**Grading Scheme:** Letter Grade

Students will be introduced to the theories behind Human-Computer Interaction (HCI) and apply them to User Experience Design (UXD). This course has bi-weekly projects that will build off of one another. By the end of this course students will gain the knowledge necessary to effectively communicate and evaluate user experiences.

MMC 5306 International Communication 3 Credits**Grading Scheme:** Letter Grade

Analysis and comparison of print and electronic communication systems among nations and cultures; barriers and stimuli to international communications; mass media in national development.

MMC 5308 Communicating for Success 3 Credits**Grading Scheme:** Letter Grade

Designed to help international students achieve success in a U.S. graduate-level communications curriculum. Included will be a focus on standards and mores for professional and academic writing, and on the development of public speaking skills.

MMC 5406 Selling Today 3 Credits**Grading Scheme:** Letter Grade

Addresses the critical concepts and theories of contemporary sales. Optimal selling requires an appreciation of the changes wrought by digital technologies and the emergence of millennials.

MMC 5422 Customer Research and the Fundamentals of Online Testing 3 Credits**Grading Scheme:** Letter Grade

Teaches the development and implementation of an online offer tests, including the selection of a research question, metrics selection, validity assurance, and data interpretation.

Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5427 Research Methods in Digital Communication 3 Credits**Grading Scheme:** Letter Grade

Teaching research techniques crucial for understanding Web audiences.

Specific tools and techniques of applied research are discussed and students do a research project.

Prerequisite: None.

MMC 5435 Messaging Strategy and the Centrality of the Value Proposition 3 Credits**Grading Scheme:** Letter Grade

Developing, measuring, testing, and expressing a value proposition throughout a company and its communications. The course teaches ways to position an offer that achieves a sustainable competitive advantage.

Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5436 Messaging Methodologies and the Practice of Conversion Optimization 3 Credits**Grading Scheme:** Letter Grade

Teaches the critical concepts and theories of offer response optimization, including techniques for creating compelling offers that optimize responses in both digital and mobile environments.

Prerequisite: Admissions to graduate certificate, combined degree, or graduate study.

MMC 5449 Consumer and Audience Analytics 3 Credits**Grading Scheme:** Letter Grade

Upon successful completion of the course, you should possess a basic understanding of the consumer and audience analytics that are valuable in most contemporary workplaces. The knowledge is helpful in careers related to analytics/research, social media, media business, advertising/marketing, and public relations.

MMC 5458 Statistics for Analysts in Communication 3 Credits**Grading Scheme:** Letter Grade

Students analyze statistical methods commonly utilized within the communications and media industries. Students develop an understanding of statistical principles and concepts, the ability to perform statistical tests within various research contexts, and critically evaluate statistical test results, their relevance, implications, and application.

MMC 5465 Communication Leadership 3 Credits**Grading Scheme:** Letter Grade

Prepares students to become leaders of organizations. The course explores communication and the variables involved when leaders attempt to influence members to achieve a goal. Topics include power, credibility, motivation, research on leader traits, styles, and situations, and current theories and models of leadership.

MMC 5468 Understanding Audiences 3 Credits**Grading Scheme:** Letter Grade

Understanding Audiences

MMC 5495 Introduction to Public Interest Communication 3 Credits**Grading Scheme:** Letter Grade

Students examine the history of public interest communication, its role in driving change, the strategic planning process, and the six spheres of effective social change communications campaigns. Students analyze the roles of branding, storytelling, and empathy. Students use media, policy, social marketing, activism, and communities of influence to drive change.

MMC 5616 Introduction to Political Organizing 3 Credits**Grading Scheme:** Letter Grade

This graduate course is an introduction to the field of digital political campaigning offering an overview of the skills and tactics necessary to develop and implement digital strategies for success in today's political environment. The students will be exposed to a wide range of challenges related to the technological impact on political campaigns and provided with strategies to solve those challenges.

MMC 5625 Political Engagement Strategy 3 Credits**Grading Scheme:** Letter Grade

Students utilize email and other channels to engage potential voters, volunteers, and donors. In addition, students examine voter messaging and contacting potential donors for contributions. The course explores email deliverability, A/B testing, and web analytics. After completing this course, students can reach voters organically in a variety of ways.

MMC 5626 Introduction to Political Campaigning 3 Credits**Grading Scheme:** Letter Grade

Students examine the field of digital political campaigning including the skills and tactics necessary to develop and implement digital strategies for success in today's political environment. Students analyze a wide range of challenges related to the technological impacts on political campaigns and develop strategies to solve those challenges.

MMC 5636 Introduction to Social Media 3 Credits**Grading Scheme:** Letter Grade

Social media and internet marketing have given businesses a new way to brand, promote and sell, allowing them to grow and shift their marketing efforts. Explore the various ways consumers communicate online and discuss how businesses may join the conversation. Students design and implement a social media marketing plan.

MMC 5648 Public Affairs Communication 3 Credits**Grading Scheme:** Letter Grade

Public Affairs Communication is structured around the idea that individuals, communities, and organizations have an obligation to work together to participate responsibly in democratic processes and help solve some of the world's most challenging problems. This course equips students with tools and skills to do that anywhere the need arises.

MMC 5708 Foundations of Intercultural Communication 3 Credits**Grading Scheme:** Letter Grade

Theory and practice of intercultural communication.

MMC 5717 Cross Platform Media Selling 3 Credits**Grading Scheme:** Letter Grade

Sales staff once specialized in specific media platforms. However, media companies now offer buying opportunities in both traditional and digital platforms, and synergy across platforms is a key selling point. As a result, modern media sales requires sales expertise across all platforms.

Prerequisite: Graduate status or certificate or combined degree status

MMC 5731 Digital Sales and Engagement 3 Credits**Grading Scheme:** Letter Grade

Social media afford sellers the chance to engage customers and prospects. Social media can be used to create new sales opportunities and service existing ones. This course will teach sales people how to use social media for these purposes.

MMC 5737 Lead Generation and Management 3 Credits**Grading Scheme:** Letter Grade

Teaches students marketing strategies that will attract new business, as well as retain and foster repeat customers in the world of digital selling. When executed effectively, these strategies will increase brand awareness, drive leads, boost referrals, maximize a brand's return on investment (ROI), and also create brand loyalists.

MMC 5739 Social Media Advertising for Conversions 3 Credits**Grading Scheme:** Letter Grade

Teaches students the skills and best practices of professional paid social media advertisers. They will learn where, how and why businesses use paid social media for lead generation. This course covers strategy, creative direction, ad products per platform and reporting on Facebook, Twitter, Instagram, Pinterest, LinkedIn and Snapchat.

MMC 6035 Personal Branding and Digital Reputation Management 3 Credits**Grading Scheme:** Letter Grade

This course introduces the students to guidelines and proven best practices that ensure individuals can produce and protect their online reputation (this course differs from other courses that focus on brand or organization reputation). The students will concentrate on the practical applications of guidelines to build their personal online reputation throughout the semester. This course will solely focus on producing and protecting an individual's digital reputation.

MMC 6047 Academic Writing For Mass Communication 3 Credits**Grading Scheme:** Letter Grade

Provides graduate students with practical knowledge and skills in various academic writing formats. Focuses on three types of academic writing products: 1) research writing, 2) other publication writing, and 3) career/professional development materials, including but not limited to social scientific research papers, extended abstracts, conference presentations, letters to journal editors, responses to reviewers, and IRB protocols.

Prerequisite: Graduate standing.

MMC 6135 Data Visualization 3 Credits**Grading Scheme:** Letter Grade

Covers the basics of effective data visualization. Students will learn how to find data sets, evaluate the methodology of data sets, create data-driven stories, and visually communicate these stories for various audiences. Visual communication principles and guidelines for effective data visualization, storytelling, and analysis are emphasized.

MMC 6137C Audio-Visual Storytelling 3 Credits**Grading Scheme:** Letter Grade

Audio-Visual Storytelling offers graduate students a systematic approach to electronic storytelling for marketing and audience engagement with a focus on telling a compelling story. This course will assist students in developing hands on technical skills for the creation and dissemination of content for digital production, including photography, video production, audio recording, and visualizations.

Prerequisite: Enrolled in MAMC Concentration in Professional Communication.

MMC 6145 Web Interactivity and Engagement 3 Credits**Grading Scheme:** Letter Grade

Provides the student with an understanding of the most practical tool of a web manager, the content management system (CMS). Using WordPress, you will gain an understanding of CMSs and how they are valuable tools for saving time and handling large amounts of data. You will also learn more about server scripting using PHP and database integration with MySQL.

MMC 6205 Social Media Ethics 3 Credits**Grading Scheme:** Letter Grade

Introduces students to critical issues, including accuracy, privacy and trust. Social media ethics is an ever evolving area of study and issues will be explored using real life case studies, readily updated. Issues will be discussed in relation to how they impact social media content and the relationships between communications organizations and their audiences.

MMC 6213 Strategic Communication Ethics and Concepts 3 Credits**Grading Scheme:** Letter Grade

Introduces strategic communication's fundamentals and ethical issues arising from its practice. Students are given a background in concepts such as branding, target audiences, technologies, and historical evolution. Armed with this knowledge, students are introduced to the schools of ethical thought, and via assignments apply these to real-world contexts.

MMC 6269 Computer-Mediated Communication 3 Credits**Grading Scheme:** Letter Grade

Explores our understanding of how certain technology features in computing environments deliver messages, how people form bonds with each other online, and how unique networks are created through computing systems. Course topics include: interpersonal and hyperpersonal models of communication, spatial and social presence, online dating, virtual reality, augmented reality, media addiction, location-based mobile media, and future Computer-mediated communications (CMC) development.

Prerequisite: Graduate standing.**MMC 6278 Advanced Web Topics II 4 Credits****Grading Scheme:** Letter Grade

This class will be teaching students about the concept of the semantic web, the features of HTML5 and CSS3 that are used professionally, and the concept of "progressive enhancement". It will also explore, in depth, JavaScript, the integration of third-party APIs, jQuery, and some of the essential jQuery plugins.

Prerequisite: MMC 5326–Digital Design, MMC 6936 Web Design Principles, VIC 5325 –Digital Imagery, VIC 5315 –Corporate Brand Identity, COM 6338 –Advanced Web Design I

MMC 6400 Mass Communication Theory 3 Credits**Grading Scheme:** Letter Grade

Structure, content, process, effects of communication; contributions of other disciplines; barriers to effective communication; use of research concepts.

MMC 6402 Seminar in Mass Communication Theory 4 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Specialized aspects of mass communication theory; in-depth investigation of particular concepts and research literature. Student research required.

Prerequisite: MMC 6400, MMC 6421, or equivalents, statistics, and consent of instructor.

MMC 6406 Innovation and Entrepreneurship in Mass Communication 3 Credits**Grading Scheme:** Letter Grade

Focusing on the theoretical and conceptual foundations of innovation and entrepreneurship and relevant scholarship, as well as applications and implications of these foundations within the mass communication industry.

MMC 6408 Applied Theories in Mass Communication 3 Credits**Grading Scheme:** Letter Grade

Applied Theories in Mass Communication aims to bridge theory with practice in mass communication. The course will help students understand mass communication theories, media law and ethics, and use them to address contemporary issues. The course focuses on theories that can be utilized as the foundation for effective communication strategies.

Prerequisite: Student Group PROM or Sub_Plan COM_MAMC11.**MMC 6409 Science/Health Communication 3 Credits****Grading Scheme:** Letter Grade

Overview of the field of mass communication. Nexus of scientists, journalists, public information officers and audiences. Topics include science literacy, framing of science, issues, public involvement, and the impact of science communication on policy.

MMC 6414 Strategic Public Interest Communication 3 Credits**Grading Scheme:** Letter Grade

Students develop an interdisciplinary approach to strategic communications through public interest communications, a science-driven discipline that draws from fields including anthropology, sociology, social psychology, cognitive science, political science, and social marketing. Students examine frameworks, analyze cases, and synthesize insights from academic research and best practices into strategies that drive change.

MMC 6417 New Media, Health Behavior and the Health Environment 3 Credits**Grading Scheme:** Letter Grade

Mass communication and health communication theories examined as they related to intended and unintended effects on individual behavior and on public health policy. Focus on effects other than those associated with mass mediated public health campaigns.

MMC 6421 Research Methods in Mass Communication 3 Credits**Grading Scheme:** Letter Grade

Introduction to experiments, surveys, content analysis, sampling, measurement. Laboratory applications.

MMC 6423 Content-Analysis Methods 3 Credits**Grading Scheme:** Letter Grade

Sampling, category construction, calculation of intercoder reliability, and analysis of data. Evaluation of content analysis methods and opportunity to undertake project using this methodology. Focus on analysis of mass media messages, but includes content analysis of other communication content.

MMC 6426 Qualitative Research 3 Credits**Grading Scheme:** Letter Grade

Theory and application in social science and communication. Qualitative data analysis, evaluation, ethical considerations, and writing.

MMC 6428 Collaborative Communication Research 3 Credits**Grading Scheme:** Letter Grade

Experience in conducting team research. Student-faculty teams select and work through projects with intent to produce scholarly work for conference presentation, publication, or research grant proposal.

MMC 6455 Mass Communication Statistics 3 Credits**Grading Scheme:** Letter Grade

Mass communication statistics provides an introduction to the fundamentals of descriptive and inferential statistics in communication science. Topics covered include central tendency/dispersion, index reliability, factor analysis, chi-square, t-test, ANOVA, regression, and path analysis, among others. Ethical issues germane to the replicability and reproducibility of data are also discussed.

MMC 6456 Data Storytelling and Visualization 4 Credits**Grading Scheme:** Letter Grade

Covers the fundamentals of effective data-driven storytelling. Students will learn how to detect and articulate the stories behind data sets and communicate data findings in visual, oral, and written contexts for various audiences and publics. Students will become familiar with associated tools.

MMC 6457 Mass Communication Statistics 2 3 Credits**Grading Scheme:** Letter Grade

Mass communication statistics 2 teaches the fundamentals of path analysis and structural equation modeling. Topics to be covered include parallel mediation, serial mediation, moderated mediation, measurement models, path analysis, structural equation modeling, and multiple group analysis.

MMC 6466 Digital Persuasive Communication 3 Credits**Grading Scheme:** Letter Grade

Introduces the major theories and concepts prevalent in persuasive communication and provides the opportunity to apply the knowledge to understanding the psychology of persuasion in digital media environments. It will deal with a wide range of digital persuasion issues and topics, particularly in the areas of advertising and marketing communication.

MMC 6475 Audience Research Methods 3 Credits**Grading Scheme:** Letter Grade

Covers quantitative and qualitative research methods, strengths and weaknesses of all research methods and their suitability for various goals, and how students should build arguments and rationale for methods. Students will design and strategize execution of research methods to address specific hypotheses and answer research questions regarding audiences.

MMC 6476 Understanding Audiences 3 Credits**Grading Scheme:** Letter Grade

An overview of the primary theories used in the study of audiences, including their conceptualization and behavior. Students will learn how to apply academic scholarship to the industry to help them understand and explain industry dynamics, as well as to inform decision making.

MMC 6477 Measuring Social Change: Research and Evaluation 3 Credits**Grading Scheme:** Letter Grade

Students examine the role of research and evaluation in strategic communication effectiveness at affecting social change while building a foundation and tactics for working productively with evaluators. Evaluations answer questions with some certainty rather than with guesses or assumptions. Students analyze the evaluation phases and different research designs that evaluators use to measure campaign impact and ability to drive social change.

MMC 6485 Advanced Qualitative Methods: Narrative Health Methods and Analyses 3 Credits**Grading Scheme:** Letter Grade

We will examine the value of qualitative research design in understanding social and behavioral phenomena, with a primary focus on narrative approaches to health research across the entire research process, with a primary focus on how to analyze narrative data thematically using the constant comparative method.

MMC 6486 Family Communication and Health Across the Lifespan 3 Credits**Grading Scheme:** Letter Grade

We explore how family communication and health intersect across the entirety of our lives, in the home and in clinical settings. We will use a lifespan, developmental theoretical lens to identify the centrality of family communication to physical, psychological, and social health from birth to death and across generations.

MMC 6487 Interpersonal Health Communication Theory 3 Credits**Grading Scheme:** Letter Grade

We explore how family communication and health intersect across the entirety of our lives, in the home and in clinical settings. We will use a lifespan, developmental theoretical lens to identify the centrality of family communication to physical, psychological, and social health from birth to death and across generations.

MMC 6496 Public Interest Communication Theory 3 Credits**Grading Scheme:** Letter Grade

Students learn public interest communications theories and their strategic applications to practice. Students are introduced to professional resources in public interest communications related to theory and strategic application. Students will understand the major areas of public interest communications theory and how those areas have been developed through empirical research.

MMC 6497 Media Psychology 3 Credits**Grading Scheme:** Letter Grade

Examines how we interact with media on the psychological level. Media use and effects as an interaction between media, content message, and users are explored.

MMC 6506 Critical and Cultural Theories in Media Studies 3 Credits**Grading Scheme:** Letter Grade

Introduces the theoretical underpinnings of critical and cultural approaches to studying media. Trace the origins of critical/cultural and explores these developments to various schools of thought. Themes covered include political economy, critical race theory, feminist media studies (both US centered and transnational), media globalization studies and cultural histories.

Prerequisite: Graduate standing.**MMC 6566 Communicating Privacy 3 Credits****Grading Scheme:** Letter Grade

Trains students to effectively communicate privacy and security information, and to recognize the importance of the interdisciplinary study of this topic. This class is a seminar with the expectation that students will have read materials before class, formulated questions, and be prepared to discuss the topics.

MMC 6568 Communication in Healthcare 3 Credits**Grading Scheme:** Letter Grade

Examines the role communication plays in healthcare, across the continuum from prevention to end of life. Explore descriptive studies and intervention studies that include physicians, nurses, allied healthcare providers, patients, and families, and interprofessional communication. Examine research from various epistemological perspectives.

MMC 6612 New Media and a Democratic Society 3 Credits**Grading Scheme:** Letter Grade

Relationships among new media, citizens, and governments; effects of Internet on democracy and globalization; role of journalism in democratic society.

MMC 6615 Race, Class, Gender, and Media 3-4 Credits**Grading Scheme:** Letter Grade

Examination of race, class, and gender portrayals in media, from critical and cultural studies perspectives.

MMC 6618 Survey of Political Communication 3 Credits**Grading Scheme:** Letter Grade

Role of communication in political process, including study of news coverage of political events, political advertising, political debates, international political communication, and politics and new technologies.

MMC 6638 Global Activism and Social Change Communication 3 Credits**Grading Scheme:** Letter Grade

Delves into activism and social change from a global perspective to enhance student understanding of social change as manifested via media and community action. Students will analyze and apply activist rhetoric, strategies for social justice, and methods for inter-movement organizing. They will learn engagement tools in strategic communication.

MMC 6639 Non-Profit and Government Communication 3 Credits**Grading Scheme:** Letter Grade

Students determine client needs, advise executives, create innovative tactics, and coordinate partnerships for non-profit organizations and governments. Students build awareness for organizations committed to domestic or worldwide support of humanitarian assistance, environmental/wildlife advocacy, government services, social justice, disaster relief, health/human services, ethical economic practices, and education progression.

MMC 6647 Financial Business Essentials for Communication**Professionals 3 Credits****Grading Scheme:** Letter Grade

Helps students in learning and applying the theoretical and practical concepts related to the business and financial responsibilities of communication professionals. Through projects and assignments students will develop a business acumen related to communication activities. It provides an understanding of these responsibilities whether employed at agencies or organizations.

MMC 6660 Communication, Technology and Society 3 Credits**Grading Scheme:** Letter Grade

Impacts of communication technology on individuals and society, and the impact that society has on these technologies; Rights, responsibilities, ethics of communication and media.

MMC 6665 Seminar in First Amendment Theory 4 Credits**Grading Scheme:** Letter Grade

Investigation into meaning and purpose of press, speech, petition, and assembly clauses of First Amendment. Offered in fall semester, even-numbered years.

Prerequisite: MMC 5206L or equivalent, and consent of instructor.**MMC 6666 Seminar in Research in Mass Communication Law 4 Credits****Grading Scheme:** Letter Grade

Investigation of legal research techniques for the mass communication scholar and of literature of a particular mass media law topic. Offered in fall semester, odd-numbered years.

Prerequisite: MMC 5206 or equivalent, and consent of instructor.**MMC 6709 The Art and Science of Storytelling 3 Credits****Grading Scheme:** Letter Grade

Students explore what the growing pool of research from behavioral, cognitive and social science tells us about storytelling including how people process information and how to design information to break through to specific communities. Students analyze new approaches to storytelling techniques and structure of effective storytelling to drive belief and behavior change. We'll explore and apply precepts of human-centered design methodologies in the story generation and design processes.

MMC 6725 Social Media and News 3 Credits**Grading Scheme:** Letter Grade

This course explores questions such as: What impact does tweeting, status-updating, blogging, etc. have on society? How is the public's use of social media changing the way we work, study, socialize, vote, invest, pursue interests? What are the effects on our health, our political systems, our relationships and our careers?

Prerequisite: MMC 5006: Introduction to Multimedia Communication, MMC 5427: Research Methods in Digital Communication, MMC 5636: Introduction to Social Media, MMC 6400: Mass Communication Theory**MMC 6726 Social Media and Emerging Technology 3 Credits****Grading Scheme:** Letter Grade

Introducing research and communication uses of 3D virtual environments and online games. using Second Life as a virtual platform, students will be required to create an online persona and be trained on navigating, building and communicating in the environment.

Prerequisite: MMC 5006: Introduction to Multimedia Communication, MMC 5427: Research Methods in Digital Communication, MMC 5636: Introduction to Social Media, MMC 6400: Mass Communication Theory**MMC 6727 Social Media Metrics 3 Credits****Grading Scheme:** Letter Grade

Students gain clear foundation in marketing strategy and apply it to social media marketing. Examine international case studies and determine if social media drive incremental sales volume and earnings. Understand what the drivers of value are for a brand and how social media messages differ from messages in traditional media.

Prerequisite: MMC 5006: Introduction to Multimedia Communication, MMC 5427: Research Methods in Digital Communication, MMC 5636: Introduction to Social Media, MMC 6400: Mass Communication Theory**MMC 6728 Branding Using Social and Mobile Media 3 Credits****Grading Scheme:** Letter Grade

Special attention focusing on how online tools can enhance and strengthen a product or service's brand strategy. Using current case studies and step-by-step process, students will be learning to maximize the online efforts while maintaining brand continuity and consistency.

Prerequisite: MMC 5006: Introduction to Multimedia Communication, MMC 5427: Research Methods in Digital Communication, MMC 5636: Introduction to Social Media, MMC 6400: Mass Communication Theory**MMC 6730 Social Media Management 3 Credits****Grading Scheme:** Letter Grade

Practicing necessary skills for creating high-touch customer experiences, driving community across multiple social media platforms.

Prerequisite: MMC 5006: Introduction to Multimedia Communication, MMC 5427: Research Methods in Digital Communication, MMC 5636: Introduction to Social Media, MMC 6400: Mass Communication Theory**MMC 6738 Digital Promotions/Campaigns 3 Credits****Grading Scheme:** Letter Grade

Examines the evolving world of digital communications with a focus on how to use social media strategically to create value. Hands-on experience supported by theoretical, strategic and professional best practices. Students will get a comprehensive knowledge of and experience in how to develop an integrated digital public relations campaign.

MMC 6746 Developing Intercultural Competence 3 Credits**Grading Scheme:** Letter Grade

Aims to help build an understanding of intercultural communication competence based on foundational texts in order to reflect on students' intercultural abilities. Becoming an interculturally-minded professional requires self-reflection, interpersonal skills, cultural knowledge, and an open mind. Students will strengthen competencies to achieve success for themselves and their organizations.

MMC 6905 Individual Work 1-3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Reading or research.

MMC 6910 Supervised Research 1-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Supervised Research

MMC 6929 Communication Colloquium 2 Credits, Max 8 Credits**Grading Scheme:** S/U

Provides common grounding in subjects across doctoral students' research approaches. Students enroll in the fall during the first year.

MMC 6930 Seminar in Mass Communication Teaching 3 Credits**Grading Scheme:** Letter Grade

Research and training for teaching and supervision of student mass media.

MMC 6936 Special Topics in Mass Communication 1-3 Credits**Grading Scheme:** Letter Grade

Special Topics in Mass Communication

Prerequisite: Consent of instructor or graduate adviser.

MMC 6945 Professional Master's Practicum 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Students will take part in an immersion experience at one of the properties and centers affiliated with the College of Journalism and Communications. Students will work under the supervision of a field supervisor to learn and master hands-on skills beneficial to their professional development. Depending on the student's academic and professional interests, a wide variety of experiences and associated skills will be available to them. One credit is equal to 50 hours of practicum experience.

Prerequisite: Sub_Plan COM_MAMC11.

MMC 6949 Professional Internship 1-3 Credits, Max 3 Credits**Grading Scheme:** S/U

Training in an approved mass communication office; instructor receives reports from on-site supervisor.

MMC 6950 Mass Communication Capstone 3 Credits**Grading Scheme:** Letter Grade

The capstone is the final course in the Mass Communication master's degree program. Students apply their collective knowledge to solve a real-world challenge in their concentration. The final deliverable consists of a written proposal and communications campaign, recorded pitch video, supplemental presentation slides, and written process reflection. Students demonstrate problem-solving, analysis, and critical thinking whereby students apply theory and practice professional communication skills.

MMC 6951 Masters Project Seminar 1 Credit**Grading Scheme:** Letter Grade

Working through the process of creating a masters-level project that will showcase professional skills and serve as a capstone for a masters program. The class will assist with conceptualizing and producing a professional quality journalism project by the last semester of the masters program.

MMC 6960C Professional Master's Seminar 3 Credits**Grading Scheme:** Letter Grade

This course introduces students to the college and Professional Master's Program and provides a structure to kick-off your individual Professional Master's Capstone project. The course is a combination of lectures and guest speaker presentations. This course includes a writing lab where students will develop writing skills for a variety of professional settings. Students will complete a proposal and timeline for their projects, in addition to securing a chairperson to guide their project.

Prerequisite: Subplan COM_MAMC11.

MMC 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

Prerequisite: consent of instructor.

MMC 6973 Project in Lieu of Thesis 1-9 Credits**Grading Scheme:** S/U

Developing, testing, and evaluating an original mass communication project.

Prerequisite: consent of instructor.

MMC 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MMC 7980 Research for Doctoral Dissertation 1-12 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PUR 5107 Strategic Writing for Public Relations 3 Credits**Grading Scheme:** Letter Grade

The students in this course will learn the fundamentals of strategic writing communications including measurable objectives, storytelling, and audience/channel analysis to design a comprehensive communication plan to achieve internal and external organizational goals. The students will be able to analyze and evaluate new information that may impact a communication plan.

PUR 5507 Persuasion Theory and Research 3 Credits**Grading Scheme:** Letter Grade

Introduction to the principal theories and empirical research programs exploring how communication, particularly from public relations efforts, impacts persuasion.

Prerequisite: None.

PUR 6005 Theories of Public Relations 3 Credits**Grading Scheme:** Letter Grade

Theories that dominate the field. Evolution of theories, their critiques, and current standing.

PUR 6006 Public Relations Foundations 3 Credits**Grading Scheme:** Letter Grade

Roles and responsibilities of public relations professionals and the function of public relations in institutions and society.

PUR 6206 Public Relations Ethics and Professional Responsibility 3 Credits**Grading Scheme:** Letter Grade

Aims to study public relations ethics and social responsibility practiced in organizations. It focuses on different ethical and social responsibility models and their effects on the organization and stakeholders. The course has two components: readings and critiques of classic and current research and case studies development.

PUR 6403 Crisis and Risk Management 3 Credits**Grading Scheme:** Letter Grade

Theories, applications and issues of crisis/risk management, exploring the difference between crisis-prone and crisis-prepared organization.

Prerequisite: None.**PUR 6409 International Issues and Crisis Communication 3 Credits****Grading Scheme:** Letter Grade

Focuses on practical applications of theory and research to identify and strategically manage issues that can materially affect the continuity of organizations globally. Emphasis is placed on preparing managers for effective communication during crises, including the formulation of a strategic crisis communication plan and evaluation programs.

PUR 6475 Digital Social Advocacy 3 Credits**Grading Scheme:** Letter Grade

Aims to explore and develop theoretical and practical implications of social advocacy for the profession of public relations with emphasis on usage of digital media. Social advocacy is defined as the deliberate effort of groups of people to mobilize for or against institutions, governments, causes, and/or public figures.

PUR 6506 Public Relations Research 3 Credits**Grading Scheme:** Letter Grade

Applied research methods for strategic management of public relations. Emphasis on using formative research for planning and implementing programs/campaigns and evaluative research for measuring effectiveness.

PUR 6509 Public Relations Measurement and Evaluation 3 Credits**Grading Scheme:** Letter Grade

This course will teach you how to tell stories with data and identify insights that drive outcomes and impact organizations. Measuring and evaluating communications and engagement activities impact and highlight the objectives of an organization. Measurement and evaluation are how smart organizations learn, improve, and succeed and is instrumental to any organization.

PUR 6603 Public Relations Strategy and Messaging 3 Credits**Grading Scheme:** Letter Grade

This course focuses on the strategy and messaging tactics used to reach an audience directly. The students will learn how environmental variables such as political systems, level of economic development, legal systems, culture, and media control, access, and diffusion impacts planning. The students will create a strategic communications plan for a campaign to reach diverse audiences using research, planning, evaluation, messaging, public interest, and persuasion.

PUR 6607 Public Relations Management 3 Credits**Grading Scheme:** Letter Grade

Application of strategic management to development of public relations plans and programs. Emphasis on theoretical framework for relationship management in public relations.

PUR 6608 International Public Relations 3 Credits**Grading Scheme:** Letter Grade

Factors to assist conceptualization and execution of international public relations activities. Explores the relationship between environmental variables and international public relations practices. Review of empirical evidence about public relations practices in other countries and methodological issues pertaining to conducting research.

PUR 6616 Corporate Reputation and Communication 3 Credits**Grading Scheme:** Letter Grade

Examines the fundamental roles that communication plays in corporate reputation affairs, including its production, conceptualization, dimensions, topics and attributes, monitoring, measurement, evaluation, management, effects, valorization, and valuation. The course prepares students involved in consulting, and those who are in strategic planning, market research, competitive intelligence, and general management.

PUR 6934 Problems in Public Relations 3 Credits**Grading Scheme:** Letter Grade

Special topics, case studies, community relations, and theory-based analysis of public relations problems.

RTV 6508 Audience Analysis 3 Credits**Grading Scheme:** Letter Grade

Methods of audience analysis. Survey research, sampling, and program content analysis. Analysis of secondary audience data.

RTV 6801 Media Management and Theory 3 Credits**Grading Scheme:** Letter Grade

Management Theory and principles as applied to the evolving media industry.

RTV 6973 Project in Lieu of Thesis 1-9 Credits**Grading Scheme:** S/U

Development, testing, and evaluation of an original electronic media product, audience research, or management analysis.

Prerequisite: consent of instructor.**VIC 5006 Foundations of Design for Communicators 3 Credits****Grading Scheme:** Letter Grade

Students will be introduced to the principles of visual communication design through the lens of a communication professional. Students experiment with type, image, color, and shape to create messages and apply designs method to solve communication problems creating both weekly assignments and a final comprehensive project.

VIC 5315 Corporate and Brand Identity on the Web 3 Credits**Grading Scheme:** Letter Grade

Synthesizing two different but complementary tools of communication: graphic design and assembly (both print and electronic). You will learn fundamental design principles and techniques for effective visual communication.

VIC 5325 Digital Imagery in Web Design 4 Credits**Grading Scheme:** Letter Grade

Constructing, deconstructing and further analyzing the impact of visual messages in interactive media. Gaining an understanding of how audiences form meanings, the importance of signs and symbols and how to manipulate images to reflect a point of view.

VIC 5326 Digital Media Layout and Design 3 Credits**Grading Scheme:** Letter Grade

Introduction to the skills and concepts that will help create documents for both print and interactivity. The course teaches both the theory and application of design principles. Using Adobe InDesign, students will apply their understanding of these principles to create a portfolio project. While InDesign permits several possible workflows, this course will focus on those that most readily translate into digital design.

VIC 6008 Video Storytelling 4 Credits**Grading Scheme:** Letter Grade

Students analyze storytelling examples including corporate messaging, branding, news, self-published stories and opinion pieces. Students will examine narrative structures like character, arc, master plots and framing that apply to communication contexts relevant to rapid communication and ubiquitous information. Students create video content with emotional connections without sacrificing accuracy or message.

VIC 6316 Brand Management 3 Credits**Grading Scheme:** Letter Grade

Developing an understanding of the importance of brand equity, how to build, measure, and manage brand equity. It will cover topics in the utilities of branding, steps/process of building brands, methods of measuring brand equity, strategies in managing brand portfolios, and management of brands over time, geographic boundaries, market segments.

Materials Science and Engineering

ECH 6726 Interfacial Phenomena I 3 Credits**Grading Scheme:** Letter Grade

Introduction to the forces responsible for unique physical properties at interfaces, including wetting phenomena, the adsorption of polymers and surface-active molecules at interfaces, and the structure of these solutions.

ECH 6727 Interfacial Phenomena II 3 Credits**Grading Scheme:** Letter Grade

Discussion on the forces responsible for unique physical properties at solid-liquid interfaces and their application in various engineering problems. Topics include the role and application of colloids, spreading of liquids on surfaces, lubrication, flotation, and nanomaterial synthesis.

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.**EGN 6640 Entrepreneurship for Engineers 3 Credits****Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

EMA 5095 Critical Analysis of Research in Materials Science & Engineering 3 Credits**Grading Scheme:** Letter Grade

Critical methods for reviewing technical papers, for writing effective technical papers, and for developing meaningful research projects, in the field of materials science and engineering.

Corequisite: EMA 6313**EMA 6001 Properties of Materials - A Survey 3 Credits****Grading Scheme:** Letter Grade

Review of physical properties of materials such as mechanical, electrical, optical, magnetic, and thermal properties.

Prerequisite: Bachelor's degree in physics, chemistry, or engineering.**EMA 6005 Thin and Thick Films 3 Credits****Grading Scheme:** Letter Grade

Techniques for depositing thin metallic semiconductor and dielectric films. The relationships between deposition technique and thin film properties. Properties unique to thin films.

Prerequisite: (EMA3010 & CHM2046 & PHY2048) or equivalents**EMA 6105 Fundamentals and Applications of Surface Science 3 Credits****Grading Scheme:** Letter Grade

Fundamental and experimental description of phenomena occurring at surface of solids, including structure, composition, atomic and molecular processes, and electronic properties. Experimental approaches and data used to support theoretical models.

Prerequisite: (CHM2045 & MAP2302) or equivalents or consent of instructor**EMA 6106 Advanced Phase Diagrams 3 Credits****Grading Scheme:** Letter Grade

Phase diagrams considering systems with as many as four components; emphasis on pressure temperature composition diagrams.

Prerequisite: (EMA4120 & EMA4224) or equivalents**EMA 6107 High Temperature Materials 3 Credits****Grading Scheme:** Letter Grade

Physical and mechanical metallurgy. Principles of strengthening alloys, alloy and process selection, alloy development, and design principles for elevated temperature applications.

Prerequisite: (EMA4120 & EMA4224) or equivalents**EMA 6110 Electron Theory of Solids for Materials Scientists I 3 Credits****Grading Scheme:** Letter Grade

Wave equation and its application to free electrons, bound electrons, and electrons in crystals. Electron-band theory and its applications. Electrical properties of metals, alloys, and semiconductors, heat capacity and thermal properties.

Prerequisite: (EMA3010 & MAP2302 & PHY2049) or equivalents**EMA 6111 Electron Theory of Solids for Materials Scientists II 3 Credits****Grading Scheme:** Letter Grade

Atomistic (classical) and electron theory of optical properties of metals, alloys, and dielectrics. Nonlinear optics, lasers. Raman-spectra.

EMA 6114 Properties of Functional Materials 3 Credits**Grading Scheme:** Letter Grade

The course will cover fundamental principles governing the structure of materials and its implications on properties. Structure-property relations will be showcased by covering the mechanical properties of materials.

Prerequisite: EMA 6313 or EMA 6001 or an undergraduate class in electronic materials, solid state physics, quantum mechanics or a related topic.**EMA 6128 Materials Microstructures 3 Credits****Grading Scheme:** Letter Grade

Geometry of microstructures: kinematics and kinetics of microstructural evolution in materials processing.

Prerequisite: EMA 6316 or equivalent.**EMA 6136 Diffusion, Kinetics, and Transport Phenomena 3 Credits****Grading Scheme:** Letter Grade

Physical basis, equation, and theories of diffusion, tracer, chemical, multicomponent, and multiphase diffusion in general force fields.

Prerequisite: EMA 4125 or equivalent.**EMA 6165 Polymer Physical Science 3 Credits****Grading Scheme:** Letter Grade

Solid state properties of amorphous and semi-crystalline polymers.

Prerequisite: EMA3066 or equivalent

EMA 6166 Polymer Composites 3 Credits**Grading Scheme:** Letter Grade

Physical and mechanical properties of polymers and polymer composites as related to preparation and microstructure.

EMA 6227 Advanced Mechanical Metallurgy II 3 Credits**Grading Scheme:** Letter Grade

Continuation of EMA 6226.

EMA 6265 Mechanical Properties of Polymers 3 Credits**Grading Scheme:** Letter Grade

Linear and nonlinear viscoelastic behavior of polymers with emphasis on molecular and microstructure aspects.

Prerequisite: EMA 3066 or equivalent.**EMA 6313 Structure and Mechanical Properties of Materials 3 Credits****Grading Scheme:** Letter Grade

Covers fundamental principles governing the structure of materials and its implications on properties. Structure-property relations will be showcased by covering the mechanical properties of materials.

EMA 6316 Materials Thermodynamics 3 Credits**Grading Scheme:** Letter Grade

Thermodynamics of materials systems, surfaces in solids, irreversible processes.

Prerequisite: EMA4314 or equivalent**EMA 6412 Synthesis and Characterization of Electronic Materials 3 Credits****Grading Scheme:** Letter Grade

Principles of materials growth and characterization in electronic and photonic industries. Bulk and epitaxial growth technologies, corresponding characterization methods for evaluation and quality control. Theoretical bases for these techniques.

Prerequisite: (EMA3413 & EMA4314) or equivalents**EMA 6416 Organic Electronics 3 Credits****Grading Scheme:** Letter Grade

Basics of semiconductors, electronic structures, charge transport properties, and optoelectronic devices based on organic semiconductors.

Prerequisite: EMA3413 or equivalent**EMA 6445 Electroceramics 3 Credits****Grading Scheme:** Letter Grade

Basic physical, chemical and mathematical principles of ceramic conductors, dielectrics and ferroelectrics and their applications are discussed. Emphasizes structure-processing-microstructure property relationships.

EMA 6446 Solid State Ionics 3 Credits**Grading Scheme:** Letter Grade

Defect solid state and its relation to electronic properties of ceramic materials; defect equilibria and transport; influence of chemical and electric potentials and interfaces; and application of ionically conducting solids in solid-state electrochemical transducer systems and devices.

Prerequisite: EMA 6316 or equivalent, or consent of instructor.**EMA 6448 Ceramic Processing 3 Credits****Grading Scheme:** Letter Grade

Introduction to the science of ceramic processing, with emphasis on theoretical fundamentals. Examples of state-of-the-art industrial processes discussed.

EMA 6461 Polymer Characterization 3 Credits**Grading Scheme:** Letter Grade

Use of a broad variety of spectroscopic and other scattering phenomena in polymer research.

Prerequisite: EMA3066 or equivalent**EMA 6507 Scanning Electron Microscopy and Microanalysis 3 Credits****Grading Scheme:** Letter Grade

Principles and theories of microscopy with an emphasis on scanning electron microscopy (SEM). Provides the necessary theoretical background to become an effective user of MAIC SEM facilities.

Prerequisite: EMA3010 or equivalent**EMA 6507L Scanning Electron Microscopy and Microanalysis Lab 1 Credit****Grading Scheme:** Letter Grade

Practical training to become a proficient user of MAIC SEM facilities, leading to an authorization as a JEOL SEM-6400 user at the MAIC.

Corequisite: EMA 6507.**EMA 6510 Survey of Materials Analysis Techniques 3 Credits****Grading Scheme:** Letter Grade

Principles and techniques used in characterization of materials. Chemical, microstructural, and surface analysis of materials; metals, ceramics, polymers, and semiconductor systems.

Prerequisite: EMA3010 or equivalent**EMA 6516 X-Ray Methods for Materials Characterization 3 Credits****Grading Scheme:** Letter Grade

Provides an introduction to the principles and methods of materials characterization via x-ray interactions. The course will focus primarily on diffraction and scattering techniques for crystallographic and thin film analysis.

EMA 6516L X-Ray Methods Laboratory for Materials Characterization 1 Credit**Grading Scheme:** Letter Grade

Provides an introduction to the practical use of xray diffraction for materials characterization.

Prerequisite: EMA6XXX - X-Ray Methods for Materials Characterization**EMA 6518 Transmission Electron Microscopy 3 Credits****Grading Scheme:** Letter Grade

Instrumentation associated with transmission electron microscopy. Kinematical and dynamical theories of diffraction contrast and their application. Diffraction analysis in TEM for structural determination. Analytical techniques for obtaining structural and compositional information at high spatial resolution. Phase contrast and high resolution electron microscopy.

Prerequisite: EMA 3513C or equivalent.**EMA 6518L Transmission Electron Microscopy Laboratory 1 Credit****Grading Scheme:** Letter Grade

Specimen preparation for analysis in TEM. Demonstration of principles of contrast theories. Specialized methods for characterizing structure and composition of materials at high spatial resolution.

EMA 6519L Specialized Research Techniques in Materials Science 1-2 Credits**Grading Scheme:** Letter Grade

Utilizing primarily STEM, TEM, SEM, EMP, FIM, and optical metallography.

Prerequisite: EMA 6507C or equivalent.**EMA 6540 Fundamentals of Crystallography 3 Credits****Grading Scheme:** Letter Grade

The course will cover the derivation and analysis of structure-property relationships in common electroceramic material systems based on their crystal structure, symmetry and anisotropy.

EMA 6541 Applied Crystallography and Powder Diffraction 3 Credits**Grading Scheme:** Letter Grade

Explores crystal structures, microstructures, and diffraction. Emphasizes the determination of structure from diffraction patterns. Hands-on and practical applications directly related to graduate student research are integrated components of the course.

EMA 6580 Science of Biomaterials I 3 Credits**Grading Scheme:** Letter Grade

Introduction to variables that control compatibility and performance of biomaterials, including physical and chemical properties, corrosion, fatigue, and interfacial histochemical changes.

Prerequisite: (CHM2045 or CHM2095) or equivalent**EMA 6581 Polymeric Biomaterials 3 Credits****Grading Scheme:** Letter Grade

Biomedical implant and device applications of synthetic and natural polymers. Biocompatibility and interfacial properties of polymers in physiological environment, especially concerning short-term devices (catheters) and long-term implants (intraocular lenses, vascular and mammary prostheses, etc.).

Prerequisite: ((CHM2045 or CHM2095) & EMA3066) or equivalents**EMA 6583 The Science of Cell Material Interactions 3 Credits****Grading Scheme:** Letter Grade

Biological aspects of the various processes involved as cells interact with biomaterial. Interactions of materials with biological systems examined from the molecular (e.g. protein), cellular, tissue and systemic (whole body) perspectives.

Prerequisite: Bachelor's degree in materials science and engineering or biomedical engineering or related field.**EMA 6589 Mechanical Behavior of Biomaterials 3 Credits****Grading Scheme:** Letter Grade

Basis for elastic and viscoelastic response of biological materials to stress and strain. Foundation for composite behavior of organic-organic and organic-inorganic materials. Description of modeling biological structures to achieve mechanical optimization.

Prerequisite: EMA 4223 or equivalent.**EMA 6590 Advances in Biomaterials and Tissue Engineering for Healthcare 3 Credits****Grading Scheme:** Letter Grade

Use of new bioactive and bio-nano structures, surfaces and properties for healthcare applications, including tissue engineering, regenerative medicine, stem cell engineering, protein therapeutics, and bio-photonics testing of cell-material interactions. Socio-economic issues affecting cost and availability of new materials and technologies for healthcare.

EMA 6616 Advanced Electronic Materials Processing 3 Credits**Grading Scheme:** Letter Grade

Materials requirements for high speed devices and processing modules needed for their fabrication. Examples of current industrial processes.

Prerequisite: EMA3413 or equivalent**EMA 6625 Advanced Metals Processing 3 Credits****Grading Scheme:** Letter Grade

Advanced treatment of solidification phenomena during metals processing. Topics to include nucleation, kinetics, solidification structure, segregation, and effects of processing variables on structure and properties.

Prerequisite: (EMA4120 & EMA4224) or equivalents**EMA 6667 Polymer Processing 2-3 Credits, Max 3 Credits****Grading Scheme:** Letter Grade

Major processing methods for polymers and polymeric composites as related to the rheological behavior of these systems. Synthesis of polymers via industrial processes.

Prerequisite: EMA 3066 or equivalent.**EMA 6715 Fracture of Brittle Materials 3 Credits****Grading Scheme:** Letter Grade

Latest concepts in deformation, fracture, and toughening of brittle materials. Application of fracture mechanics and fractals to failure of brittle materials. Development of an approach to failure analysis for brittle materials.

Prerequisite: EMA 4223, EGM 3520, or equivalent.**EMA 6803 Classical Methods in Computational Materials Science 3 Credits****Grading Scheme:** Letter Grade

Proficiency developing and using common tools for computational materials research at the atomic level.

EMA 6804 Quantum Methods in Computational Materials Science 3 Credits**Grading Scheme:** Letter Grade

Theory, methods, and application of common quantum mechanical software (GAUSSIAN and VASP) for computational study of materials.

Prerequisite: EMA 6313, C/C++, Fortran, or other suitable scientific programming language.**EMA 6808 Error Analysis and Optimization Methodologies in Materials Research 3 Credits****Grading Scheme:** Letter Grade

Statistical approach to materials research, basic and relevant statistical concepts, error analysis, factorial matrices, reducing variance, nested designs and sampling plans, mixture designs, optimization techniques, response surface method, and Taguchi method.

EMA 6905 Individual Work in Materials Science and Engineering 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Individual Work in Materials Science and Engineering

EMA 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

EMA 6920 Professional Development for Materials Science and Engineering 1 Credit**Grading Scheme:** S/U

Professional development training as a graduate student in Materials Science and Engineering, including serving as teaching assistant in the instruction of materials science and engineering courses, and developing and defending research proposals.

Prerequisite: Graduate Status**EMA 6936 Seminar in Materials Science and Engineering 1 Credit, Max 14 Credits****Grading Scheme:** S/U

Offered in fall and spring. Required of all students.

EMA 6938 Special Topics in Materials Science and Engineering 1-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Special Topics in Materials Science and Engineering

EMA 6941 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

A supervised teaching experience.

EMA 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

EMA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EMA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

ENU 6805 Introduction to Nuclear Reactor Materials 3 Credits**Grading Scheme:** Letter Grade

Introducing the materials used in nuclear energy systems and their response to the reactor environment. The majority of materials related issues encountered in the nuclear power plants are discussed in this course.

Mathematics

MAA 5104 Advanced Calculus for Engineers and Physical Scientists I 3 Credits**Grading Scheme:** Letter Grade

Advanced Calculus for Engineers and Physical Scientists I

MAA 5105 Advanced Calculus for Engineers and Physical Scientists II 3 Credits**Grading Scheme:** Letter Grade

Advanced Calculus for Engineers and Physical Scientists II

Prerequisite: MAA 5104.**MAA 5228 Modern Analysis I 3 Credits****Grading Scheme:** Letter Grade

Topology of metric spaces, numerical sequences and series, continuity, differentiation, the Riemann-Stieltjes integral, sequences and series of functions, the Stone-Weierstrass theorem, and the Lebesgue theory.

Prerequisite: advanced calculus.**MAA 5229 Modern Analysis II 3 Credits****Grading Scheme:** Letter Grade

Modern Analysis II

Prerequisite: MAA 5228.**MAA 5404 Introduction to Complex Variables for Engineers and Physical Scientists 3 Credits****Grading Scheme:** Letter Grade

Introduction to Complex Variables for Engineers and Physical Scientists

MAA 6406 Complex Analysis I 3 Credits**Grading Scheme:** Letter Grade

Rapid survey of properties of complex numbers, linear transformations, geometric forms and necessary concepts from topology. Complex integration. Cauchy's theorem and its corollaries. Taylor series and the implicit function theorem in complex form. Conformality and the Riemann-Caratheodory mapping theorem. Theorems of Bloch, Schottky, and the big and little theorems of Picard. Harmonicity and Dirichlet's problems.

Prerequisite: MAA 5229.**MAA 6407 Complex Analysis II 3 Credits****Grading Scheme:** Letter Grade

Complex Analysis II

Prerequisite: MAA 6406.**MAA 6616 Analysis I 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of measure and integration theory, including L_p spaces and the Radon-Nikodym theorem. Introduction to functional analysis: Banach spaces, Hilbert spaces, and the theory of linear operators.

Prerequisite: MAA 5229.**MAA 6617 Analysis II 3 Credits****Grading Scheme:** Letter Grade

Continuation of MAA 6616 Analysis I.

Prerequisite: MAA 6616.**MAA 7526 Advanced Topics in Functional Analysis I 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Algebraic and topological approach to current material and methods in analysis.

Prerequisite: MAA 6617**MAA 7527 Advanced Topics in Functional Analysis II 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Advanced Topics in Functional Analysis II

Prerequisite: MAA 7526.**MAD 6206 Combinatorial Theory I 3 Credits****Grading Scheme:** Letter Grade

Matching theory, Ramsey's theorem, lattice theory, Mobius inversion, generating functions. Polya's theorem, matroids, applications, block designs, graph theory.

MAD 6207 Combinatorial Theory II 3 Credits**Grading Scheme:** Letter Grade

Combinatorial Theory II

Prerequisite: MAD 6206.**MAD 6406 Numerical Linear Algebra 3 Credits****Grading Scheme:** Letter Grade

Topics most useful in applications with emphasis on numerical techniques: systems of linear equations, positive definite and toeplitz systems, least squares problems, singular value decomposition, and eigenvalues. Numerical stability and efficiency of algorithms as well as effect of perturbations on the problem. Companion to MAD 6407.

Prerequisite: MAS 3114, 4105, or 4124; and programming language.**MAD 6407 Numerical Analysis 3 Credits****Grading Scheme:** Letter Grade

Numerical techniques to solve systems of nonlinear equations to approximate functions, to compute derivatives, to evaluate integrals, and to integrate systems of differential equations. Introduction to numerical techniques for partial differential equations. Companion to MAD 6406.

Prerequisite: MAA 4212, MAA 5105, or MAA 5229; and programming language.**MAD 7396 Topics in Combinatorial Theory I 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Topics chosen from among graph theory, coding theory, matroid theory, finite geometries, projective geometry, difference methods, and Latin squares.

Prerequisite: MAS 5312.**MAD 7397 Topics in Combinatorial Theory II 3 Credits****Grading Scheme:** Letter Grade

Topics in Combinatorial Theory II

Prerequisite: MAD 7396.

MAE 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

Prerequisite: consent of graduate adviser.**MAE 6943 Internship in College Teaching 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Internship in College Teaching

Prerequisite: consent of graduate adviser.**MAP 5304 Intermediate Differential Equations for Engineers and Physical Scientists 3 Credits****Grading Scheme:** Letter Grade

Intermediate Differential Equations for Engineers and Physical Scientists

MAP 5345 Introduction to Partial Differential Equations 3 Credits**Grading Scheme:** Letter Grade

Introduction to Partial Differential Equations

MAP 5489 Modeling in Mathematical Biology 3 Credits**Grading Scheme:** Letter Grade

Mathematical models of biological systems. Models of growth, predator-prey populations, competition, chemostat, epidemics, excitable systems, and analytical tools such as linearization, phase-plane analysis, Poincare-Bendixson theory, Lyapunov functions, and bifurcation analysis.

Prerequisite: undergraduate course in ordinary differential equations.**MAP 6208 Numerical Optimization 3 Credits****Grading Scheme:** Letter Grade

Unconstrained and constrained optimization, linear and nonlinear programming, gradient, multiplier, and quasi-Newton methods. Penalty, multiplier, and projection methods for constrained problems.

Prerequisite: MAD 6406 and MAD 6407 or consent of instructor.**MAP 6213 Variational Analysis 3 Credits****Grading Scheme:** Letter Grade

Develops smooth analysis through problems that arise in the calculus of variations and explores nonsmooth analysis through problems that arise in optimal control. Develops first and second-order optimality conditions, discrete approximations to continuous problems, and mathematical tools to analyze discretization errors.

Prerequisite: (MAA 5104 & MAA 5105) or MAD 6406.**MAP 6327 Applied Differential Equations I 3 Credits****Grading Scheme:** Letter Grade

Theory and methods for solving linear and nonlinear systems of differential equations and partial differential equations. Applications and computer techniques included.

Prerequisite: MAA 5229.**MAP 6356 Partial Differential Equations I 3 Credits****Grading Scheme:** Letter Grade

Cauchy-Kowalewski theorem, first order equations, classification of equations, hyperbolic equations, elliptic equations, parabolic equations, hyperbolic systems, nonlinear hyperbolic systems, existence theory based on functional analysis. Applications to physical sciences.

Prerequisite: MAA 5229, MAP 5345 or MAP 6506.**MAP 6357 Partial Differential Equations II 3 Credits****Grading Scheme:** Letter Grade

Partial Differential Equations II

Prerequisite: MAP 6356.**MAP 6375 Numerical Partial Differential Equations 3 Credits****Grading Scheme:** Letter Grade

Introduction to partial differential equations and fundamental concepts.

Parabolic equations: finite differences, consistency, convergence and stability, 2- and 3-dimensional problems. Elliptic equations: finite differences, solution to linear equations, boundary integral equation methods. Hyperbolic equations: finite differences and method of characteristics. Introduction to finite elements. Methods of lines.

Prerequisite: MAD 6406 and MAD 6407 or consent of instructor.**MAP 6376 Finite Element Method 3 Credits****Grading Scheme:** Letter Grade

Variational formulations of partial differential equations, finite element approximations; addresses theoretical framework and numerical issues. Finite element spaces in one, two, and three dimensions. Error analysis. Nonconforming finite element spaces. Isoparametric approximations to boundary conditions.

Prerequisite: MAD 6406 and MAD 6407 or consent of instructor.**MAP 6467 Stochastic Differential Equations and Filtering Theory I 3 Credits****Grading Scheme:** Letter Grade

Introduction to random functions; Brownian motion process. Ito's stochastic integral; Ito's stochastic calculus; stochastic differential equations. Linear filtering; Kalman filtering; nonlinear filtering theory.

MAP 6468 Stochastic Differential Equations and Filtering Theory II 3 Credits**Grading Scheme:** Letter Grade

Stochastic Differential Equations and Filtering Theory II

Prerequisite: MAP 6467.**MAP 6472 Probability and Potential Theory I 3 Credits****Grading Scheme:** Letter Grade

Random variables, independence and conditioning. Laws of large numbers and the Central Limit Theorem. Stochastic processes, martingales, Gaussian processes, Markov processes, potentials and excessive functions.

Prerequisite: MAA 5229 or STA 6326.**MAP 6473 Probability and Potential Theory II 3 Credits****Grading Scheme:** Letter Grade

Probability and Potential Theory II

Prerequisite: MAP 6472**MAP 6487 Biomathematics Seminar I 3 Credits****Grading Scheme:** Letter Grade

Stochastic processes, differential equations, and reaction-diffusion equations used to model various biological processes. Among the applications covered are the following: population dynamics, epidemiology, genetics, enzyme kinetics, cell differentiation and morphogenesis, nerve impulse generation, and aggregation of slime mold. The course is designed to benefit graduate students in biological sciences, as well as mathematics.

Prerequisite: MAC 2312, MAP 2302, STA 6326 or MAP 4102.**MAP 6488 Biomathematics Seminar II 3 Credits****Grading Scheme:** Letter Grade

Continuation of MAP 6487.

Prerequisite: MAP 6487.

MAP 6505 Mathematical Methods of Physics and Engineering 3 Credits**Grading Scheme:** Letter Grade

Orthogonal functions; theory of distributions; integral equations; eigenfunctions and Green's functions; special functions; boundary and initial value problems, with emphasis on potential theory (Laplace and Poisson equations); the wave equation; and the diffusion equation.

Prerequisite: MAA 5404, MAP 5304, MAP 5345, MAS 5157 or equivalent.**MAP 6506 Mathematical Methods of Physics and Engineering II 3 Credits****Grading Scheme:** Letter Grade

Mathematical Methods of Physics and Engineering II

Prerequisite: MAP 6505.**MAP 6941 Internship in Applied Mathematics 1-5 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Mathematical research on projects sponsored by a university laboratory or an off-campus industrial internship program.

Prerequisite: consent of supervisory committee chair.**MAP 7436 Seminar in Applied Mathematics I 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Various topics in applications of mathematics both classical and in areas of current research.

MAP 7437 Seminar in Applied Mathematics II 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Seminar in Applied Mathematics II

MAS 5311 Introductory Algebra I 3 Credits**Grading Scheme:** Letter Grade

The basic algebraic systems: groups, rings, vector spaces, and modules. Linear transformations, matrices, and determinants.

Prerequisite: MAS 4105 and 4302.**MAS 5312 Introductory Algebra II 3 Credits****Grading Scheme:** Letter Grade

Introductory Algebra II

Prerequisite: MAS 5311.**MAS 6331 Algebra I 3 Credits****Grading Scheme:** Letter Grade

Solvable and nilpotent groups, Jordan-Holder theorem, abelian groups, Galois theory, Noetherian rings, Dedekind domains, Jacobson radical, Jacobson density theorem, Wedderburn-Artin theorem.

Prerequisite: MAS 5312.**MAS 6332 Algebra II 3 Credits****Grading Scheme:** Letter Grade

Algebra II

Prerequisite: MAS 6331.**MAS 7215 Theory of Numbers I 3 Credits****Grading Scheme:** Letter Grade

Introduction to theory of numbers; theorems on divisibility; congruence, number-theoretic functions; primitive roots and indices; quadratic reciprocity law; Diophantine equations and continued functions.

Prerequisite: 2 of MAA 6407, MAA 6617, MAS 6332.**MAS 7216 Theory of Numbers II 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Theory of Numbers II

Prerequisite: MAS 7215.**MAS 7396 Advanced Topics in Algebra I 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Current topics in algebra.

Prerequisite: MAA 6407, MAA 6617, MAS 6332 or MTG 6347.**MAS 7397 Topics in Algebra II 3 Credits****Grading Scheme:** Letter Grade

Topics in Algebra II

MAT 6905 Individual Work 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Individual Work

MAT 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

MAT 6932 Special Topics in Mathematics 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special Topics in Mathematics

Prerequisite: consent of graduate adviser, who should be consulted well in advance of registration.**MAT 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

MAT 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MAT 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

MHF 5107 Introduction to Set Theory 3 Credits**Grading Scheme:** Letter Grade

Basic axioms and concepts of set theory, axiom of choice, Zorn's lemma, Schroder-Bernstein theorem, cardinal numbers, ordinal numbers, and the continuum hypothesis.

MHF 5207 Foundations of Mathematics 3 Credits**Grading Scheme:** Letter Grade

Models and proofs. Foundations of the real and natural number systems. Algorithms. Turing Machines, undecidability and independence. Examples and applications in algebra, analysis, geometry, and topology.

MHF 6306 Mathematical Logic I 3 Credits**Grading Scheme:** Letter Grade

Languages, models, and theories; Godel's completeness and incompleteness theorems; formal number theory and axiomatic set theory; applications to other areas of mathematics.

MHF 6307 Mathematical Logic 2 3 Credits**Grading Scheme:** Letter Grade

The three sub-areas Model theory, computability theory, and set theory will be covered. Specific topics may include axiomatization of set theory, transfinite recursion and cardinal arithmetic, Goedel's constructible universe, Cohen's method of forcing, Turing degrees, and Post's problem.

Prerequisite: MHF 6306.**MTG 5316 Introduction to Topology I 3 Credits****Grading Scheme:** Letter Grade

Basic axioms and concepts of point-set topology, compactness, connectedness, separation axioms, metric spaces, metrization. Tietze extension theorem. Urysohn lemma, Tychonoff theorem, fundamental group.

MTG 5317 Introduction to Topology II 3 Credits**Grading Scheme:** Letter Grade

Introduction to Topology II

Prerequisite: MTG 5316.**MTG 6256 Differential Geometry I 3 Credits****Grading Scheme:** Letter Grade

Foundations of the theory of smooth manifolds, vector fields, and differential forms. Topics chosen from a list including differential topology, Lie groups, symplectic geometry, Riemannian geometry, and applications to physics.

Prerequisite: consent of instructor.**MTG 6257 Differential Geometry II 3 Credits****Grading Scheme:** Letter Grade

Differential Geometry II

Prerequisite: MTG 6256.**MTG 6346 Topology I 3 Credits****Grading Scheme:** Letter Grade

A basic introduction to advanced topology. Topics covered include general topology, algebraic topology, homotopy theory and topology of manifolds.

Prerequisite: MTG 5317.**MTG 6347 Topology II 3 Credits****Grading Scheme:** Letter Grade

Topology II

Prerequisite: MTG 6346.**MTG 6401 Ergodic Theory and Dynamical Systems I 3 Credits****Grading Scheme:** Letter Grade

Periodic points, recurrence, nonwandering and chain recurrent sets, topological conjugacy, minimal sets. Topological entropy, metric entropy. Measure preserving transformations, ergodicity, mixing. Birkhoff's ergodic theorem. Bernoulli shifts. Anosov diffeomorphisms, structural stability, hyperbolic sets. Basic sets, symbolic dynamics, Markov partitions. Lyapunov exponents, KAM (Kolmogorov, Arnold, Moser) theory.

Prerequisite: MTG 5317, MAA 6617, or consent of instructor.**MTG 6402 Ergodic Theory and Dynamical Systems II 3 Credits****Grading Scheme:** Letter Grade

Continuation of MTG 6401.

Prerequisite: MTG 6401.**MTG 7396 Advanced Topics in Topology I 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Topics change yearly.

Prerequisite: MTG 6347.**MTG 7397 Advanced Topics in Topology II 3 Credits****Grading Scheme:** Letter Grade

Discussion of advanced topics in topology and its applications.

Prerequisite: MTG 7396.

Mechanical and Aerospace Engineering

BME 5580 Introduction to Microfluidics and BioMEMS 3 Credits**Grading Scheme:** Letter Grade

Introduction to concepts of miniaturization, materials and methods for microfabrication, principles of microfluidics, and biological applications of microfluidic devices and biomedical microelectromechanical systems.

Prerequisite: EGN 3353C or equivalent.**EAS 5242 Mechanics of Composite Materials 3 Credits****Grading Scheme:** Letter Grade

Micro- and macro-mechanics, thermo-mechanical analysis and failure theories for composite materials. Design and analysis of composite structural elements.

EAS 5938 Special Topics in Aerospace Engineering 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Special Topics in Aerospace Engineering

EAS 6138 Gasdynamics 3 Credits**Grading Scheme:** Letter Grade

Theory of sound waves, subsonic and supersonic flows, shockwaves, explosions and implosions.

Prerequisite: EAS 4132 or EML 5714 or equivalent.**EAS 6242 Advanced Structural Composites 3 Credits****Grading Scheme:** Letter Grade

Micro- and macro-behavior of a lamina. Stress transfer of short fiber composites. Classical lamination theory, static analysis of laminated plates, free-edge effect, failure modes.

Prerequisite: EGM 3520.**EAS 6403 Spacecraft Attitude Dynamics 3 Credits****Grading Scheme:** Letter Grade

Rigorous development of theoretical concepts, analytical, mathematical procedures, and methods associated with defining, determining, and controlling the attitude of a spacecraft.

Prerequisite: Undergraduate vector calculus, programming (python or MATLAB), and dynamics courses together with an undergraduate linear algebra or numerical methods course.

EAS 6413C Spacecraft Attitude Estimation and Control 3 Credits**Grading Scheme:** Letter Grade

Sensors and actuators used in spacecraft attitude navigation and control, how to process data from sensors, and how to command actuators. Kalman and extended Kalman filtering, control methods based on momentum exchange devices (reaction wheels, control moment gyroscopes), and thrusters.

Prerequisite: (EAS 4510 or EAS 6939) and EML 5215, with minimum grades of B.**EAS 6415 Guidance and Control of Aerospace Vehicles 3 Credits****Grading Scheme:** Letter Grade

Applying modern control theory to aerospace vehicles. Parameter identification methods applied to aircraft and missiles.

Prerequisite: EAS 4412 or equivalent.**EAS 6416 Robust and Adaptive Control for Aerospace Systems 3 Credits****Grading Scheme:** Letter Grade

Modern robust, optimal, and adaptive control theories that address flight control challenges for aerospace systems. Topics include robust servomechanism design, linear quadratic methods, optimal observer-based feedback, loop transfer recovery, multivariable frequency domain analysis, and guidance fundamentals.

Prerequisite: Undergraduate courses in Linear Algebra & Differential Equations & Linear Controls & Programming in MATLAB.**EAS 6511 Intermediate Astrodynamics 3 Credits****Grading Scheme:** Letter Grade

Rigorous analysis of spacecraft motion using different dynamic models and perturbation methods. Development of analytical and computational tools to solve problems in astrodynamics.

Prerequisite: EML 5215 or equivalent graduate-level dynamics course.

EAS 6905 Individual Projects in Aerospace Engineering 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Individual Projects in Aerospace Engineering

EAS 6910 Supervised Research 1-5 Credits**Grading Scheme:** S/U**EAS 6939 Special Topics in Aerospace Engineering 1-6 Credits, Max 15 Credits****Grading Scheme:** Letter Grade

Laboratory, lectures, or conferences covering selected topics in space engineering.

EAS 6940 Supervised Teaching 1-3 Credits, Max 5 Credits**Grading Scheme:** S/U

Provides students with supervised teaching experience on developing effective instructional methods and materials in engineering education as well as effective mentoring skills in a professional setting.

Prerequisite: ARO_PHD.**EAS 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

EAS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EAS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EGM 5111L Experimental Stress Analysis 3 Credits**Grading Scheme:** Letter Grade

Introduction to techniques of experimental stress analysis in static systems. Lecture and laboratory include applications of electrical resistance strain gauges, photoelasticity, brittle coatings, moiré fringe analysis, and X-ray stress analysis.

Prerequisite: EGM 3520.**EGM 5121C Data Measurement and Analysis 3 Credits****Grading Scheme:** Letter Grade

Tools for random data analysis (including types of random data, mean values, mean-square values, probability density and distribution functions, moments and characteristic functions, and spectral and correlation analysis); bias and random error estimates in data measurements; input-output system models; and measurement examples.

EGM 5423 High Strain Rate Behavior of Materials 3 Credits**Grading Scheme:** Letter Grade

Dynamic behavior of materials, comparison of material response between quasistatic and extremely high strain rates, deformation mechanisms, microstructural evolution at high strain rate, dynamic fracture, constitutive modeling, mechanical properties.

Prerequisite: EGM3520 or equivalent**EGM 5533 Applied Elasticity and Advanced Mechanics of Solids 3 Credits****Grading Scheme:** Letter Grade

Bars, beams, thin-walled structures, and simple continua in the elastic and inelastic range. Virtual work approaches, elastic energy principles, plastic limit theorems, and creep deformation procedures. Introduction to instability and fracture mechanics. Design applications.

Prerequisite: EGM 3520.**EGM 5584 Biomechanics of Soft Tissue 3 Credits****Grading Scheme:** Letter Grade

Introduction to solid and fluid mechanics of biological systems.

Rheological behavior of materials subjected to static and dynamic

loading. Mechanics of cardiovascular, pulmonary, and renal systems.

Mathematical models and analytical techniques used in biosciences.

Prerequisite: EGN 3353C and EGM 3520.**EGM 5586 Modeling and Control of Biomolecular Machines 3 Credits****Grading Scheme:** Letter Grade

Overview of biomolecular systems engineering. Introduction to cell processes, biochemical kinetics, models of biological macromolecules, analyses of biomolecular dynamics, simulation of stochastic behaviors, common gene regulatory network motifs, and the design of synthetic biology circuits.

Prerequisite: MAP 2302 with a minimum grade of C.**EGM 5816 Intermediate Fluid Dynamics 3 Credits****Grading Scheme:** Letter Grade

Basic laws of fluid dynamics. Introduction to potential flow, viscous flow, boundary layer theory, and turbulence.

Prerequisite: A proficiency in Fluid Mechanics and Differential equations is needed.**EGM 6321 Principles of Engineering Analysis I 3 Credits****Grading Scheme:** Letter Grade

Solution of linear and nonlinear ordinary differential equations. Methods of Frobenius, classification of singularities. Integral representation of solutions. Treatment of the Bessel, Hermite, Legendre, hypergeometric, and Mathieu equations. Asymptotic methods including the WKB and saddle point techniques. Treatment of nonlinear autonomous equations. Phase plane trajectories and limit cycles. Thomas-Fermi, Emden, and van der Pol equations.

Prerequisite: MAP 4305.**EGM 6322 Principles of Engineering Analysis II 3 Credits****Grading Scheme:** Letter Grade

Partial differential equations of first and second order. Hyperbolic, parabolic, and elliptic equations including the wave, diffusion, and Laplace equations. Integral and similarity transforms. Boundary value problems of the Dirichlet and Neumann type. Green's functions, conformal mapping techniques, and spherical harmonics. Poisson, Helmholtz, and Schroedinger equations.

Prerequisite: MAP 4341.**EGM 6341 Numerical Methods of Engineering Analysis I 3 Credits****Grading Scheme:** Letter Grade

Finite-difference calculus; interpolation and extrapolation; roots of equations; solution of algebraic equations; eigenvalue problems; least-squares method; quadrature formulas; numerical solution of ordinary differential equations; methods of weighted residuals. Use of digital computer.

Prerequisite: EGM 4313 or equivalent.**EGM 6342 Fundamentals of Computational Fluid Dynamics 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of computational fluid dynamics. Spatial discretisations, semi-discretisations, time-integration methods, full discretisations.

Prerequisite: EGM 6341 and EGM 6813 or consent of instructor.

EGM 6352 Advanced Finite Element Methods 3 Credits**Grading Scheme:** Letter Grade

The discontinuous Galerkin method applied to transient problems. Optimization theory applied to formulating mixed FEM; treatment of constraints (e.g., incompressibility). General shape functions. Electromagnetics, heat, fluids, and solids. Other advanced topics.

Prerequisite: EML 5526.**EGM 6365 Structural Optimization 3 Credits****Grading Scheme:** Letter Grade

Structural optimization via calculus of variations. Applying techniques of numerical optimization to design trusses, frames, and composite laminates. Calculating the sensitivity of structural response. Approximation and fast reanalysis techniques. Optimality criteria methods.

Prerequisite: EML 4500, EGM 4350, EML 5526, or EGM 6451.**EGM 6570 Principles of Fracture Mechanics 3 Credits****Grading Scheme:** Letter Grade

Introduction to the mechanics of fracture of brittle and ductile materials. Linear elastic fracture mechanics; elastic-plastic fracture; fracture testing; numerical methods; composite materials; creep and fatigue fracture.

Prerequisite: EGM 6611.**EGM 6611 Continuum Mechanics 3 Credits****Grading Scheme:** Letter Grade

Tensors of stress and deformation. Balance and conservation laws, thermodynamic considerations. Examples of linear constitutive relations. Field equations and boundary conditions of fluid flow.

Prerequisite: EGM 3520.**EGM 6671 Inelastic Materials 3 Credits****Grading Scheme:** Letter Grade

Virtual work, stability, extremum principles. Applications on the microscale, miniscale, and macroscale. Thermodynamics, internal variables, damage parameters, and time and temperature effects. Fracture mechanics. Finite elastoplasticity.

Prerequisite: EGM 6611.**EGM 6812 Fluid Mechanics I 3 Credits****Grading Scheme:** Letter Grade

Flow kinematics. Fundamental laws and equations in integral and differential forms. Potential flows. Introduction to laminar flows in simple geometries, laminar and turbulent boundary layer flows. External flows. One-dimensional compressible flows.

Prerequisite: EGN 3353C.**EGM 6813 Fluid Mechanics II 3 Credits****Grading Scheme:** Letter Grade

Mathematical and physical structures of the Navier-Stokes equation. Exact solutions of the Navier-Stokes equation for viscous flows. Low Reynolds number flows. Incompressible and compressible laminar boundary layer flows. Free shear flows. Energy equation and heat transfer. Unsteady flows. Instability. Turbulence.

Prerequisite: EGM 6812.**EGM 6855 Bio-Fluid Mechanics and Bio-Heat Transfer 3 Credits****Grading Scheme:** Letter Grade

Biothermal fluid sciences. Emphasizes physiological processes occurring in human blood circulation and underlying physical mechanisms, from an engineering perspective.

Prerequisite: undergraduate fluid mechanics.**EGM 6905 Individual Study 1-6 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual Study

EGM 6934 Special Topics in Engineering Mechanics 1-6 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Special Topics in Engineering Mechanics

EGM 6936 Graduate Seminar 1 Credit, Max 6 Credits**Grading Scheme:** Letter Grade

Discussions and presentations in the fields of graduate study and research.

EGM 7819 Computational Fluid Dynamics 3 Credits**Grading Scheme:** Letter Grade

Finite difference methods for PDE. Navier-Stokes equations for incompressible and compressible fluids. Boundary fitted coordinate transformation, adaptive grid techniques. Numerical methods and computer codes for fluid flow problems.

Prerequisite: EGM 6342 and EGM 6813 or equivalent.**EGM 7845 Turbulent Fluid Flow 3 Credits****Grading Scheme:** Letter Grade

Definition of turbulence, basic equations of motion. Instability and transition. Statistical methods, correlation and spectral functions. Experimental methods, flow visualization. Isotropic homogeneous turbulence. Shear turbulence, similitude, the turbulent boundary layer, rough turbulent flow. Jets and wakes. Heat convection, thermally driven turbulence.

Prerequisite: EGM 6813 or equivalent.**EGM 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EGM 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

EGN 5949 Practicum/Internship/Cooperative Work Experience 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical cooperative engineering work under approved industrial and faculty supervision.

Prerequisite: graduate student.**EGN 6640 Entrepreneurship for Engineers 3 Credits****Grading Scheme:** Letter Grade

Introduction to entrepreneurship, idea generating and feasibility analysis, and business planning. Lectures, case studies, student-led discussions, team business plans, and investor presentations.

EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Course will provide the student with supervised research in a laboratory setting.

EGN 6950 Engineering Capstone 3 Credits**Grading Scheme:** Letter Grade

The Engineering Capstone is a culminating project experience for engineers. Students work on an individual project or in multidisciplinary teams of engineering students to design and build authentic products and processes—on time and within budget. While working with industry experts, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management, and people skills.

Prerequisite: Students in their final semester of their engineering MS degree.

EML 5045 Computational Methods for Design and Manufacturing 3 Credits**Grading Scheme:** Letter Grade

Geometric and solid modeling, feature-based design, and parametric models. Applications to product design, rapid prototyping, and manufacturing.

Prerequisite: EML 3023 or consent of instructor.

EML 5104 Classical and Statistical Thermodynamics 3 Credits**Grading Scheme:** Letter Grade

First and second laws of thermodynamics. Free energy and chemical equilibrium. Micro- and macroscopic states. Fermi-Dirac and Bose-Einstein statistics. Partition functions.

EML 5131 Combustion 3 Credits**Grading Scheme:** Letter Grade

Chemical thermodynamics, chemical kinetics, flame propagation, detonation and explosion, combustion of droplets and spray.

Prerequisite: EML 3100 or equivalent.

EML 5215 Analytical Dynamics I 3 Credits**Grading Scheme:** Letter Grade

Analytical methods of statics and dynamics. Principle of virtual work, holonomic and nonholonomic constraints. Lagrange equations for constrained and unconstrained systems, conservation laws, stability analysis by perturbation about steady state, Jacobi first integral, generalized impulse and momentum.

Prerequisite: dynamics.

EML 5223 Structural Dynamics 3 Credits**Grading Scheme:** Letter Grade

Vibration analysis and synthesis of continuous and multidegree-of-freedom lumped-parameter systems. Computational and experimental techniques in modal analysis.

Prerequisite: EML 4220.

EML 5224 Acoustics 3 Credits**Grading Scheme:** Letter Grade

Theory of sound. Plane waves and three-dimensional acoustic fields. Sound transmission and reflection. Dissipation, radiation, and scattering.

Prerequisite: ENG 3353C, EGM 4313, or consent of instructor.

EML 5233 Failure of Materials in Mechanical Design 3 Credits**Grading Scheme:** Letter Grade

Evaluation of fatigue life of machine elements and aerospace structures. Steady and alternating multi-axial stress. High cycle fatigue and low cycle fatigue.

Prerequisite: 6EG, 7EG, 8EG, 9EG, or EML3005

EML 5311 Control System Theory 3 Credits**Grading Scheme:** Letter Grade

Analyzing dynamic mechanical engineering control systems. Introduction to classical, digital, and state space techniques. Modeling, stability, transient response, and frequency response. Considers implementation.

EML 5318 Computer Control of Machines and Processes 3 Credits**Grading Scheme:** Letter Grade

Basic concepts, including hardware and software. Modeling of machines, processes, and their controllers.

Prerequisite: CGS 2425 or consent of instructor.

EML 5465 Energy Management for Mechanical Engineers 3 Credits**Grading Scheme:** Letter Grade

Energy use analysis in building envelopes, mechanical systems, and industrial processes. Energy conservation strategies and design techniques. Alternative energy applications.

Prerequisite: consent of instructor.

EML 5515 Gas Turbines and Jet Engines 3 Credits**Grading Scheme:** Letter Grade

Theory and analysis of gas turbine engines and major components.

Prerequisite: EGN 3353C or EAS 4101 or equivalent.

EML 5516 Design of Thermal Systems 3 Credits**Grading Scheme:** Letter Grade

Modeling of thermal equipment; system simulation; optimization, search methods, thermal system design and optimization using dynamic, geometric, and linear programming; simulation of large systems, vector and reduced gradient searches.

Prerequisite: (EGN 3353C and EML 4140) or equivalent.

EML 5526 Finite Element Analysis and Application 3 Credits**Grading Scheme:** Letter Grade

Fundamentals, including discrete system analysis, dynamic analysis of structures, steady state and transient heat transfer analysis, and incompressible fluids analysis. Modeling, analysis, and design using FEA software.

Prerequisite: EGM 3520 or equivalent.

EML 5598 Orthopedic Biomechanics 3 Credits**Grading Scheme:** Letter Grade

Mechanical properties of the human body's hard and soft tissues. Mechanical and biological considerations for repair and replacement of soft and hard tissues and joints. Fracture fixation, orthopedic implants for hip and knee, and orthotic and prosthetic devices.

Prerequisite: mechanics of materials.

EML 5605 Advanced Refrigeration 3 Credits**Grading Scheme:** Letter Grade

Analysis and design considerations for vapor compression, absorption, steam-jet, thermoelectric, and air refrigeration systems.

Prerequisite: EML 4601.

EML 5714 Introduction to Compressible Flow 3 Credits**Grading Scheme:** Letter Grade

One-dimensional and quasi-one-dimensional compressible fluid flows. Mach waves, normal shocks, oblique shocks, Prandtl-Meyer expansions, isentropic flow with area change, Fanno flow, Rayleigh flow.

EML 6048 Machine Learning and System Control 3 Credits**Grading Scheme:** Letter Grade

Focuses on an area of machine learning for solving decision-making problems when there is uncertainty in sensing and control. Relies on recent advances in artificial intelligence and machine learning. Studies new data-driven methods for the control design of autonomous systems in unknown environments using reinforcement learning. Theory, algorithms, and Python/Matlab implementations of reinforcement learning and their applications to solve control problems for unmanned vehicles and robots.

Prerequisite: Undergraduate linear control or undergraduate statistics or undergraduate Python, Matlab, or similar programming course.

EML 6154 Conduction Heat Transfer 3 Credits**Grading Scheme:** Letter Grade

Heat conduction in homogeneous, heterogeneous, isotropic, anisotropic, stationary, and moving bodies; in Cartesian, cylindrical and spherical systems. Examines exact and approximate solutions.

Prerequisite: (EML 4140 and MAP 2302) or equivalent.**EML 6155 Convective Heat Transfer I 3 Credits****Grading Scheme:** Letter Grade

Applying equations of motion and energy to forced and free convection with laminar and turbulent flow. Solution techniques to include simplification to ordinary differential equations, boundary layer approximations, similarity transformations, and integral approximations. Phenomenological treatment of turbulent transport.

Prerequisite: (EGN 3353C and EML 4140) or equivalent.**EML 6156 Multiphase Convection Heat Transfer 3 Credits****Grading Scheme:** Letter Grade

Detailed coverage of advanced convection heat transfer topics: boiling and condensation, high-velocity convection, transpiration cooling, convection around bodies, free jet flow, oscillating fluids, and microelectronic cooling.

Prerequisite: EML 6155.**EML 6157 Radiation Heat Transfer 3 Credits****Grading Scheme:** Letter Grade

Theory and analysis of radiation exchange in transparent and absorbing, and emitting and scattering media.

Prerequisite: (EML 4140 and MAP 2302) or equivalent.**EML 6267 Advanced Manufacturing Processes and Analysis 3 Credits****Grading Scheme:** Letter Grade

Integrated treatment of the analysis and applications of advanced manufacturing processes.

EML 6281 Geometry of Mechanisms and Robots I 3 Credits**Grading Scheme:** Letter Grade

Developing applications to basic theory of the mathematics required to design spatial mechanisms and robot arms. Examples include mathematical description of the elements of mechanisms and robot arms (namely linkages and joints); their mobility and their analysis.

EML 6282 Geometry of Mechanisms and Robots II 3 Credits**Grading Scheme:** Letter Grade

Applying the theory of screws to determine stationary and uncertainty configurations of mechanisms and robot arms. Dexterity and workspace of robot arms.

EML 6323 Nontraditional Manufacturing 3 Credits**Grading Scheme:** Letter Grade

Focusing on nontraditional additive and subtractive manufacturing processes using electrical, chemical, ultrasonic, magnetic, and photonic energy - including processes and equipment.

Prerequisite: Graduate standing**EML 6324 Fundamentals of Production Engineering 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of metal cutting, metal forming, and welding. Accuracy and rigidity of machine tools. Automation, numerical control, adaptive control.

EML 6350 Introduction to Nonlinear Control 3 Credits**Grading Scheme:** Letter Grade

Introduction to nonlinear analysis and control systems theory. Lyapunov-based analysis and design techniques.

EML 6351 Nonlinear Control II: Adaptive Control 3 Credits**Grading Scheme:** Letter Grade

Control methods for uncertain nonlinear systems. Lyapunov-based robust, adaptive, learning, and estimation-based methods.

Prerequisite: EML 6350**EML 6352 Optimal Estimation and Kalman Filtering 3 Credits****Grading Scheme:** Letter Grade

Methods of estimating parameters and random variables from noisy measurements with applications. State estimation of linear and nonlinear dynamic systems with Kalman filtering and extended Kalman filtering, with mechanical and aerospace engineering applications such as target tracking.

Prerequisite: EML 5311 or EEL 5182 or Equivalent**EML 6364 Optimal Control 3 Credits****Grading Scheme:** Letter Grade

Focuses on how to search for a mathematical function that allows for the optimal control of a system. Uses the Calculus of Variations applied to optimal control, linear-quadratic problem, Pontryagin's minimum principle, bang-bang optimal control, singular optimal control, introduction to parameter optimization, and numerical methods for optimal control.

Prerequisite: Undergraduate Controls course or Undergraduate Dynamics course or Undergraduate Numerical Methods course.**EML 6386 Computational Nanomechanics and Nanomaterials 3 Credits****Grading Scheme:** Letter Grade

Modeling techniques in nanomechanics and nanomaterials. Modeling and simulation methods from atomistic to mesoscale domains with particular focus on "classical" atomistic modeling techniques: molecular mechanics, molecular dynamics, and Monte Carlo simulations. Applications include structural and thermomechanical properties of materials.

Prerequisite: Undergraduate level solid mechanics, material science, and physics. Matlab or Python programming and plotting.**EML 6417 Solar Energy Utilization 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Fundamentals of solar radiation, basic heat transfer and thermodynamic topics with solar engineering applications, solar concentrating devices and flat plate solar absorbers, thermal storage, concentrating power generation systems, photovoltaic systems and state of the art and emerging solar technologies including thermochemical and electrochemical conversion and storage methods.

Prerequisite: EML 3100 or equivalent.**EML 6451 Energy Conversion 3 Credits****Grading Scheme:** Letter Grade

Converting available forms of energy into mechanical and electrical forms; energy conversion schemes, including conventional cycles in unusual environments. MHD, photovoltaics, thermionic and thermoelectric conversion and fuel cells.

EML 6466 Industrial Energy Management 3 Credits**Grading Scheme:** Letter Grade

Fundamental topics of energy management such as: energy-policy development, equipment energy usage (electric and thermal), process and equipment efficiencies, industrial processes analysis and optimization. Critical evaluation of new technology for use from technical and economical perspectives.

Prerequisite: Undergraduate thermodynamics and heat transfer courses (or equivalents).

EML 6573 Nonlinear Programming 3 Credits**Grading Scheme:** Letter Grade

Focuses on the identification and formulation of convex optimization problems, where such problems are those nonlinear problems that have optimal solutions. Studies the principles for the selection of algorithms and their programmatic implementation to solve them. Derives convergence rates and compares these rates across major classes of problems. Explores the application to problems in approximate optimal control, such as model predictive control and reinforcement learning.

Prerequisite: Undergraduate linear algebra course (e.g. EGM 3344 or MAS 3114 or MAS 4105 or MAS 4124) and Undergraduate programming course (e.g. COP 2171 or COP 2173 or COP 2174).

EML 6577 Verification, Validation, and Uncertainty Quantification 3 Credits**Grading Scheme:** Letter Grade

In depth study of uncertainty, how to build system models based on uncertain data, how to determine the accuracy of the model, and how to verify, validate results. Covers the practical aspects of considering uncertainty and Bayesian statistics in the design process and the verification and validation of the resulting design.

Prerequisite: Graduate student standing and an Undergraduate course in programming.

EML 6606 Advanced Air Conditioning 3 Credits**Grading Scheme:** Letter Grade

Air-conditioning system selection and system design; air-handling techniques including noise control, cleaning, and temperature and humidity control; modern technological development and economic analysis.

Prerequisite: EML 4600.

EML 6905 Individual Projects in Mechanical Engineering 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Individual Projects in Mechanical Engineering

EML 6934 Special Topics in Mechanical Engineering 1-4 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Special Topics in Mechanical Engineering

EML 6940 Supervised Teaching 1-3 Credits, Max 5 Credits**Grading Scheme:** S/U

Provides students with supervised teaching experience on developing effective instructional methods and materials in engineering education as well as effective mentoring skills in a professional setting.

Prerequisite: MCE_PHD.

EML 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

EML 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

EML 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Medical Sciences

Information regarding advanced concentration courses can be found here (p. 287).

GMS 5057 Medical Cell Biology 3 Credits**Grading Scheme:** Letter Grade

Medical Cell Biology

GMS 5604 Medical Human Embryology 3 Credits**Grading Scheme:** Letter Grade

Providing the developmental basis for understanding the anatomical relationships and organization of major structures within the thorax, abdomen, head/neck, and back/limbs regions of the body. Congenital malformations associated with given organ systems will also be discussed.

Prerequisite: GMS 5605: Medical Anatomy

GMS 5605 Medical Anatomy 3 Credits**Grading Scheme:** Letter Grade

Medical human anatomy, using a combined regional and systemic approach to examine the relationships and organization of major structures within the thorax, abdomen, head/neck, and back/limbs regions of the body; correlations with diagnostic imaging and pathophysiology; medical-based scenarios to develop problem solving and critical thinking skills.

Prerequisite: Bachelor's degree.

GMS 5606L Medical Human Anatomy Laboratory 3 Credits**Grading Scheme:** Letter Grade

Medical Human Anatomy Laboratory

Prerequisite: Bachelor's degree.

GMS 5613 Medical Human Anatomy by Diagnostic Imaging 3 Credits**Grading Scheme:** Letter Grade

Focusing on the clinically relevant relationships of major anatomical structures within the thorax, abdomen, head/neck, and back/limbs regions of the body. Medically based scenarios will be used to develop problem solving and critical thinking skills. Anatomical imaging will be correlated to transverse, sagittal and coronal human sections.

Prerequisite: GMS 5605: Medical Anatomy

GMS 5630 Medical Histology 3 Credits**Grading Scheme:** Letter Grade

Correlating diagnostic imaging of normal and pathologic tissues, and medical-based scenarios, in order to develop problem solving and critical thinking skills, using microscopic structure and function of human cells and tissues.

Prerequisite: Bachelor's degree.

GMS 5905 Special Topics in Biomedical Sciences 1-4 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Analysis and discussion of contemporary topics and the development of biomedical sciences.

GMS 5909 Finding Biomedical Research Information and Communicating Science 1 Credit**Grading Scheme:** Letter Grade

Designed to introduce the most important concepts, resources, methods, and tools used in searching for and communicating biomedical information - both literature and data. Students will explore topics including literature searching, bibliographic citation software, basic NCBI resources, funding sources, data management, and plagiarism and information ethics.

GMS 5924 Navigating the Neuroscience PhD Program 1 Credit**Grading Scheme:** S/U

To provide first year PhD students with the basic knowledge that they need to succeed in graduate school and position them to achieve their career goals. This class will help align the students' expectations with those of the neuroscience program.

Prerequisite: Student must be in the first year of the Neuroscience PhD program.

GMS 6001 Fundamentals of Biomedical Sciences I 5 Credits**Grading Scheme:** Letter Grade

Integrated approach to cellular, molecular, biochemical, and genetic aspects of cell function.

Prerequisite: consent of instructor.

GMS 6003 Fundamentals of Graduate Research and Professional Development 1 Credit, Max 2 Credits**Grading Scheme:** S/U

Practical knowledge and understanding of issues to increase chances for a successful graduate education and professional career in biomedical sciences.

Prerequisite: consent of instructor. Designed for new graduate students. ;

Corequisite: GMS 6001.

GMS 6005 Medical Physics Career Preparation 1 Credit, Max 2 Credits**Grading Scheme:** Letter Grade

This course is intended to prepare students for their future graduate studies and future medical physics career by informing students about career choices, work environments, residencies, board certification, and ethics and professionalism.

Prerequisite: Permission of instructor.

GMS 6007 Fundamentals of Neuroscience 3 Credits**Grading Scheme:** Letter Grade

Fundamental concepts on development, structure, function, and plasticity of nervous system.

Prerequisite: MSC_MS or MED_GCT or consent of instructor.

GMS 6009 Principles of Drug Action and Therapeutics 3 Credits**Grading Scheme:** Letter Grade

Fundamental concepts of drug action, receptor structure and function, and pharmacokinetics.

Prerequisite: GMS 6001 or consent of instructor. Designed for first-year graduate students.

GMS 6012 Human Genetics 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Theoretical framework for understanding the fundamentals of human genetics. Advanced technical tools used for research.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6013 Developmental Genetics 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Theoretical framework for understanding the fundamentals of developmental genetics. Advantages and limitations of several model systems and their application to the study of development.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6014 Applications of Bioinformatics to Genetics 1 Credit**Grading Scheme:** Letter Grade

Storage, retrieval, and analysis of information related to genetics.

Prerequisite: GMS 6001; consent of instructor.

GMS 6021 Organization and Development of the Nervous System 2 Credits**Grading Scheme:** Letter Grade

Principles governing neural development and plasticity of the vertebrate central nervous system.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6022 Principles of Neurophysiology 2 Credits**Grading Scheme:** Letter Grade

Principles governing intercellular communication within the nervous system.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6023 Molecular Neuroscience and Neuropharmacology 3 Credits**Grading Scheme:** Letter Grade

Surveys the basic principles of neuropharmacology with an emphasis on the molecular pharmacology of CNS disorders. The specific focus is to provide a description of the cellular and molecular actions of drugs on synaptic transmission with in-depth discussion of drug-induced changes in functioning of the nervous system.

Prerequisite: Principles of Neuroscience I and II

GMS 6025C Statistics for Neuroscientists 4 Credits**Grading Scheme:** Letter Grade

Students will learn and apply data management, organization, visualization, and statistical methods necessary to plan experiments and analyze neuroscience data. Students will learn how to import data from a variety of source formats and structures, how to restructure and organize data for effective analysis and visualization using modern approaches, and statistical analysis of neuroscience data.

Prerequisite: GMS 6705 or equivalent.

GMS 6029 Brain Journal Club 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Opportunities to present and participate in discussions of top-tier research papers in the neurosciences.

Prerequisite: consent of instructor.

GMS 6034 Advanced Virology I: Genetics and RNA 1 Credit**Grading Scheme:** Letter Grade

Theoretical framework for understanding the fundamental concepts of viral genetics. Methods of analysis used to elucidate the mechanisms of virus reproduction.

Prerequisite: consent of instructor.

GMS 6035 Advanced Virology II: RNA Viruses 1 Credit**Grading Scheme:** Letter Grade

Molecular biology and genetics of virology, focusing on the molecular biology of RNA viruses.

Prerequisite: consent of instructor.

GMS 6036 Molecular Virology III: DNA Viruses 1 Credit**Grading Scheme:** Letter Grade

Molecular biology and genetics of virology, focusing on replication and pathogenesis of DNA viruses.

Prerequisite: consent of instructor.

GMS 6038 Bacterial Genetics and Physiology 1 Credit**Grading Scheme:** Letter Grade

Intermediate level graduate course aimed at helping students work with and study bacteria in their research, even those who are not microbiologists. It is a very practical educational experience with significant time spent on best practices for getting bacteria to work for the investigator.

Prerequisite: GMS 6121 or consent of instructor

GMS 6040 Host-Pathogen Interactions 1 Credit**Grading Scheme:** Letter Grade

Survey of medical microbiology, focusing on the host response and subsequent evasion of that response by pathogens.

Prerequisite: consent of instructor.**GMS 6051 Signal Transduction 1 Credit****Grading Scheme:** Letter Grade

Focuses on the mechanisms underlying cellular signal transduction.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6052 Medical Radiation Shielding & Protection 3 Credits****Grading Scheme:** Letter Grade

Shielding design fundamentals. Methods of calculation and design for medical diagnostic, nuclear medicine and radiation therapy facilities; medical radiation protection and regulations.

Prerequisite: BME 6535 and GMS 6651 and GMS 6654 or permission of instructor.**GMS 6053 Cancer Biology and Therapeutics 1 Credit****Grading Scheme:** Letter Grade

Integrated approach for teaching of pharmacology and physiology pertaining to cancer.

Prerequisite: GMS 6065 or consent of instructor.**GMS 6057 Radiation Biology 3 Credits****Grading Scheme:** Letter Grade

Effects of radiation in biological molecules, cells, tissues and man including cancer and deterministic effects and how to prevent in medicine, use of radiation in treatment of disease.

Prerequisite: one year each of college biology, chemistry, and physics; permission of instructor.**GMS 6061 Nuclear Structure and Dynamics 1 Credit****Grading Scheme:** Letter Grade

Cell biology of the nucleus. Offered in odd-numbered years.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6062 Protein Trafficking 1 Credit****Grading Scheme:** Letter Grade

Movement of proteins in cell. Offered in even-numbered years.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6063 Cell Biology of Aging 1 Credit****Grading Scheme:** Letter Grade

Recent developments in the field of aging.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6064 Tumor Biology 1 Credit****Grading Scheme:** Letter Grade

Current understanding of the molecular basis of cancer. Offered in odd-numbered years.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6065 Fundamentals of Cancer Biology 3 Credits****Grading Scheme:** Letter Grade

Broad-based introduction into causes of cancer, molecular and biological processes involved in malignancies, and current cancer treatment approaches.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6070 Sensory and Motor Systems 3 Credits****Grading Scheme:** Letter Grade

For students that wish to gain insights into how animals detect, process and respond to sensory stimuli such as light, odors, sound and temperature. Students will learn about the molecular mechanisms and neural systems used by vertebrates and invertebrates to sense the external and internal world.

Prerequisite: Permission of instructor.**GMS 6073 Disorders of the Developing Nervous System 1 Credit****Grading Scheme:** Letter Grade

Focuses on current research that is being conducted to build on an understanding of how the nervous system develops. Examines both cellular and molecular perspectives.

Prerequisite: GMS 6007 or consent of instructor.**GMS 6080 Basic Magnetic Resonance Imaging 1 Credit****Grading Scheme:** Letter Grade

Principles behind nuclear magnetic resonance imaging (MRI) and spectroscopy (MRS) and how these methods are applied to studies of the human brain.

Prerequisite: GMS 6007 or consent of instructor.**GMS 6082 Introduction to Functional Magnetic Resonance Imaging 1 Credit****Grading Scheme:** Letter Grade

Functional magnetic resonance imaging (fMRI) is at the forefront of many research fields in neuroscience. The method is widely in human and animal studies to investigate neural mechanisms. Introduction to Functional MRI will provide students with the basic and practical principles underlying fMRI of the brain. Students will complete the course having an in-depth introduction to neurophysiological mechanisms that couple magnetic resonance phenomenon to task- or stimulus-dependent changes in neuronal activity and cerebral metabolism.

Prerequisite: Consent from instructor**GMS 6084 Imaging System Analysis with Medical Physics Applications 3 Credits****Grading Scheme:** Letter Grade

The application of linear systems theory for the analysis of medical imaging systems with an emphasis on radiological imaging. Topics covered include the following: convolution, Fourier Transform, linear filtering, sampling theory, image reconstruction from projections and methods for image quality evaluation.

Prerequisite: Permission of instructor.**GMS 6085 Nuclear Medicine Physics 3 Credits****Grading Scheme:** Letter Grade

Theory, evaluation, applications of detecting and imaging systems in nuclear medicine including collimators, gamma cameras, Single-Photon (SPECT) and Positron (PET) Emission Tomography scanners. Uses of radionuclides in medicine for radiopharmaceutical preparation.

Prerequisite: BME 6535 or permission of instructor.**GMS 6086 Research Methods in Medical Physics 2 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Prepares students for their MS and PhD research in medical physics by teaching concepts essential to understanding the existing body of literature and creating and communicating new research.

Prerequisite: Permission of instructor.

GMS 6089 Medical Physics Graduate Seminar 1 Credit, Max 6 Credits**Grading Scheme:** Letter Grade

Students will be exposed to and updated on major concepts and issues impacting the science of Clinical Medical Physics. This includes principles, methods, and techniques (in practice and in research) for the prevention, diagnosis, and treatment of human diseases.

Prerequisite: Permission of instructor.**GMS 6090 Research in Medical Sciences 1-10 Credits, Max 10 Credits****Grading Scheme:** S/U

Supervised research other than that for the thesis or dissertation in biochemistry and molecular biology, genetics, immunology and microbiology, molecular cell biology, neuroscience, and physiology and pharmacology.

GMS 6096 Introduction to NIH Grant Writing for Biomedical Sciences 1 Credit**Grading Scheme:** Letter Grade

This 14-week course will cover introductory topics related to preparing and submitting an NIH grant application. The format will be a one-hour lecture once a week by accomplished NIH-funded researchers. Target audience is advanced graduate students, postdocs, junior faculty, and senior faculty seeking an introduction to current grant submission procedures.

GMS 6099 Research Methods in Gerontology 3 Credits**Grading Scheme:** Letter Grade

Teaching proficiency on critical assessment and understanding of methods used in research studies related to biomedical aging and clinical geriatrics. Students will gain the ability to understand, gather information and assess the quality of these studies including basic content and construction of peer reviewed journal articles.

GMS 6108 Bacterial Physiology, Antibiotics, and Genetics 3 Credits**Grading Scheme:** Letter Grade

Combines three one-credit courses: GMS 6038 Bacterial Genetics and Physiology, 6169 Antimicrobial Strategies, and GMS 6153 Advanced Bacterial Genetics. Material on metabolism, gene expression, protein synthesis and localization, antibiotics and resistance, and genetics is presented in a combination of lecture and literature-based formats.

GMS 6109 Advanced Bacteriology 2 Credits**Grading Scheme:** Letter Grade

Advanced bacteriology in two modules. The first module covers bacterial genetics (e.g., gene expression and regulation, plasmids and bacteriophages, genetic engineering and genetic analysis) and physiology (e.g., DNA replication, protein production and localization, biofilms). The second module covers antibiotics (e.g., classes of antibiotics and their mechanisms of action) and antibiotic resistance (e.g., mechanisms).

Prerequisite: GMS 6121.**GMS 6121 Infectious Diseases 3 Credits****Grading Scheme:** Letter Grade

Survey of medical microbiology directed at understanding infectious disease in terms of molecular pathogenesis, bacterial physiology, and genetics.

Prerequisite: Consent of instructor.**GMS 6123 Tropical Medicine Patient Case and Journal Discussion 1 Credit****Grading Scheme:** Letter Grade

Tropical Medicine Patient Case and Journal Discussion

GMS 6132 Introductory Gene and Immunotherapy 2 Credits**Grading Scheme:** Letter Grade

Provides an overview of gene and immunotherapy with emphasis on translational applications. Students will gain a fundamental understanding of the principles and mechanisms of gene and immunotherapy, specifically molecular biology of gene therapy and basic immunology and immunotherapy. Preclinical and clinical applications of both will be discussed.

Prerequisite: MCB 5205 or GMS 6121; BCH 5413 or MCB 6937; or permission of instructor.**GMS 6140 Principles of Immunology 4 Credits****Grading Scheme:** Letter Grade

Fundamental principles of basic and experimental immunology, from first engagement of innate immunity to the generation of the adaptive immune response and its clinical consequences.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6143 Cells of the Innate Immune System 1 Credit****Grading Scheme:** Letter Grade

Emphasizes the critical role that innate immune cells play in infectious and autoimmune diseases. Emphasis will be on understanding how individual innate immune cell types (macrophages, dendritic cells, natural killer cells and neutrophils) were discovered and understanding the fundamental roles of these cells within the immune response.

Prerequisite: GMS 6140**GMS 6153 Advanced Bacterial Genetics 1 Credit****Grading Scheme:** Letter Grade

Advanced principles of bacterial genetics, emphasizing work with bacteria and genetic constructs as tools in biotechnologies.

Prerequisite: GMS 6038 or consent of instructor.**GMS 6162 Oral Microbiology and Immunology 2 Credits****Grading Scheme:** Letter Grade

Provides a strong foundation of all aspects that relate to oral microbiology and oral immunology. Particular attention will be devoted to microbial diseases of the oral cavity (such as dental caries and periodontal disease) and the relationship between oral and general health.

Prerequisite: fundamentals of microbiology course or equivalent.**GMS 6169 Antimicrobial Strategies 1 Credit****Grading Scheme:** Letter Grade

Recent developments in the field of antimicrobial strategies including antibiotics and their mechanisms of action, antibiotic resistance mechanisms, phage therapy, antimicrobial target identification, and vaccine approach.

Prerequisite: consent of instructor.**GMS 6193 Research Conference in Oral Biology 1-3 Credits, Max 8 Credits****Grading Scheme:** S/U

Required of graduate students in oral biology; open to others by departmental approval. Critical discussion and appraisal of current research in the department by students and faculty.

GMS 6195 Epigenetics Journal Club 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Presentation and critical discussions of recent original papers published in high-impact journals relating to the topic of epigenetics.

Prerequisite: consent of instructor.

GMS 6196 Virology Journal Club 1 Credit, Max 12 Credits**Grading Scheme:** Letter Grade

Presentation and critical discussions of recent original articles in the virology literature.

GMS 6198 Bacterial Pathogenesis Journal Club 1 Credit, Max 12 Credits**Grading Scheme:** Letter Grade

Presentation and critical discussion of recent original papers on bacterial pathogenesis published in high-impact journals. Offered spring and fall term.

GMS 6221 Ethics in Genetics 1 Credit**Grading Scheme:** Letter Grade

Presentation and critical discussion of relevant topics pertaining to ethics, policy and translation in genetics research.

Prerequisite: Consent of instructor**GMS 6224 Foundations in Precision Medicine: Medical Molecular Genetics 1 Credit****Grading Scheme:** Letter Grade

Focuses on human genetics by providing foundational knowledge related to the human genome structure and organization, the molecular pathogenesis at the gene and chromosome level, and the application of genetic knowledge in modern medicine using real world examples.

Prerequisite: Students must have basic knowledge of genetics and molecular biology.**GMS 6231 Genomics and Bioinformatics 3 Credits****Grading Scheme:** Letter Grade

Principles of genomic characterization and bioinformatic analysis of eukaryotes.

Prerequisite: STA 6166 and PCB 5065 or consent of instructor.**GMS 6232 Advanced Applications of Bioinformatics in Genetics 1 Credit, Max 12 Credits****Grading Scheme:** Letter Grade

Applying bioinformatics and computational approaches to solve research problems.

Prerequisite: GMS 6014 or consent of instructor; programming experience.**GMS 6234 Introduction to phylodynamics: A practical approach to molecular phylogenetics of pathogens 3 Credits****Grading Scheme:** Letter Grade

Principles of molecular evolution. Mathematical models of DNA/RNA sequence evolution and their application to phylogenetic inference. Mathematical and statistical tools implemented in phylogenetic-tree reconstruction methods and molecular clock calibration. Introduction to coalescent theory. Phylodynamic models and their application to the study of viral and bacterial pathogens. Practical computer sessions analyzing real data with the MEGA5 and BEAST software packages.

GMS 6251 Molecular Therapy I – Vectors and Molecular Mechanisms 1 Credit**Grading Scheme:** Letter Grade

Gene therapy is an established molecular medicine for treatment of multiple genetic diseases (e.g., primary immune deficiencies, inherited forms of blindness) and cancers. This course covers the most important/widely studied diseases and applications of gene therapy. Emphasis is given to diseases successfully treated by gene therapy in clinical trials.

Prerequisite: GMS 6001 or instructor approval**GMS 6252 Molecular Therapy II – Disease Targets and Applications 1 Credit****Grading Scheme:** Letter Grade

Gene therapy is an established molecular medicine for treatment of multiple genetic diseases (e.g., primary immune deficiencies, inherited forms of blindness) and cancers. This course will be covering the most important/widely studied diseases and applications of gene therapy. Emphasis is given to diseases successfully treated by gene therapy in clinical trials.

Prerequisite: GMS 6251 Molecular Therapy I or instructor approval**GMS 6253 Molecular Therapy III – Immunology of Gene Transfer 1 Credit****Grading Scheme:** Letter Grade

This course will be covering the interaction between gene transfer vectors and their therapeutic gene products and the immune system, including mechanisms of innate and adaptive immune responses against gene-based drugs, viral immunology, immune modulation, immune tolerance, and use of gene transfer to enhance immune responses against cancer or infectious disease.

Prerequisite: GMS 6001 or instructor approval**GMS 6290 Genetics/Genomics Program Graduate Seminar 1 Credit, Max 20 Credits****Grading Scheme:** Letter Grade

Presentations, seminars, and critical discussions of recent original research relating to genetics and genomics.

Prerequisite: enrolled in campus-wide genetics and genomics program or consent of instructor.**GMS 6331 Stem Cell Biology 1 Credit****Grading Scheme:** Letter Grade

Recent progress in mammalian stem cell research.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6335 Advanced Stem Cell Biology: Tissue Engineering 1 Credit****Grading Scheme:** Letter Grade

Current state of the art in using stem cells and other technologies to engineer tissues and organs for therapeutic use.

Prerequisite: GMS 6331 and GMS 6336**GMS 6336 Advanced Stem Cell Biology: Regenerative Medicine 1 Credit****Grading Scheme:** Letter Grade

Potential clinical applications of tissue-specific, adult stem cells; derivation, manipulation, uses, and limitations.

Prerequisite: GMS 6331.**GMS 6337 B Cell Development in Health and Disease 1 Credit****Grading Scheme:** Letter Grade

Advanced understanding of the role and regulation of B cells, emphasizing dysregulation of B cell functions in autoimmune diseases.

Prerequisite: GMS 6031 , GMS 6032 , and GMS 6033 or equivalent. Strong background in immunology.**GMS 6338 Recent Advances in Cancer Metastasis 1 Credit****Grading Scheme:** Letter Grade

Recent progress in cancer metastasis including the interactions between tumor cells and host environments at molecular and cellular levels during metastatic process as well as tools and models available for cancer metastasis research.

Prerequisite: None.

GMS 6350 Forensic Investigation 3 Credits**Grading Scheme:** Letter Grade

The student will obtain a thorough understanding of the various professional disciplines that must come together to successfully process a crime scene that involves human death. Students will also explore the basic scientific and legal principles of physical evidence as well as issues of rights to privacy and evidence integrity.

GMS 6351 Trauma Analysis 3 Credits**Grading Scheme:** Letter Grade

Explains the differences between trauma to soft tissue and trauma to bone and how to distinguish between each. Ante-, peri-, or postmortem trauma will be compared to natural taphonomic effects and animal scavenging.

GMS 6352 Artifacts of Decomposition 3 Credits**Grading Scheme:** Letter Grade

Describes each of the main artifacts of decomposition that can be utilized to estimate the post mortem interval. Both biological and non-biological methods will be discussed, with a specific focus on the strengths and weaknesses of each method.

GMS 6352L Artifacts of Decomposition Laboratory 3 Credits**Grading Scheme:** Letter Grade

Provides a hands-on approach teaching concepts of human decomposition and PMI estimation. Students will become familiar with the multidisciplinary nature of death investigations through practical exercises to develop abilities to recognize and understand artifacts of decomposition including scattered skeletal remains recovery and clandestine grave detection and excavation.

GMS 6353 Gross Anatomical Exam and Forensic Pathology 3 Credits**Grading Scheme:** Letter Grade

Students will learn about the structure of all major body systems. Each is discussed in anatomical terms, and each module will culminate with discussions on the unique disease processes that can affect each body system. Focus will be given to the types of anatomical and/or pathological anomalies relevant at autopsy.

GMS 6354 Communication Skills in Forensic Science Context 3 Credits**Grading Scheme:** Letter Grade

Provides the student with an introduction to the importance of scientific writing and professionalism. Foundational issues including ethics and plagiarism will be discussed and several modules will focus on writing specialized forensic reports, with the intent to bring the information into a court of law.

GMS 6355 Traffic Homicide Investigation and Reconstruction 3 Credits**Grading Scheme:** Letter Grade

Students will learn the principles of traffic homicide investigation and the accepted methodologies necessary to reconstruct collision events. Topics will include Newton's Laws of Motion, visual observation and documentation of physical evidence, research, calculation of vehicle parameters, calculation of scene parameters, analysis of human factors and calculation of time-distance relationships.

GMS 6356 Applied Osteology 3 Credits**Grading Scheme:** Letter Grade

Provides a specialized application to the principles of forensic anthropology via the more common practices of a forensic anthropologist. Addressing the biological profile, comparative osteology, and unique cases that would involve a forensic anthropologist, the student will gain a better understanding of how osteology is applied in forensic casework.

GMS 6357 Forensic Photography 3 Credits**Grading Scheme:** Letter Grade

Provides instruction on the history of forensic photography and utilization of a camera in a crime scene setting. Students will learn basic photography skills, camera operation, exposure control, relational photographs, and flash control for crime scene and evidence documentation.

GMS 6357L Forensic Photography Laboratory 3 Credits**Grading Scheme:** Letter Grade

Provides a hands-on approach regarding the basic concepts of photographing crime scenes. Students will examine the history and operation of the digital camera, admissibility and court challenges of photos, camera functions, photo sequencing and composition, use of lighting, flash, ALS, macro photography, videography, and include photo exercises.

GMS 6358 Forensic Medicine III 4 Credits**Grading Scheme:** Letter Grade

Examines forensic pathology within the context of crime scene investigation. Postmortem changes will be evaluated and differentiated from antemortem wounds. Students will learn to evaluate wounds and patterns of injury and associate these findings at autopsy with evidence and circumstances identified at the crime scene.

GMS 6359 Principles of Bloodstain Pattern Analysis 3 Credits**Grading Scheme:** Letter Grade

Will provide a knowledge in the field of bloodstain pattern interpretation. It will illustrate the scientific principles and practical application of bloodstain pattern analysis to actual casework. Emphasis is placed on proper identification, documentation, interpretation, and presentation of bloodstain patterns. Includes analyzing multiple bloodstain events and cognitive bias.

GMS 6359L Principles of Bloodstain Pattern Analysis Laboratory 3 Credits**Grading Scheme:** Letter Grade

Designed to give students a hands-on approach regarding the basic concepts of bloodstain pattern analysis and interpretation. Students will become familiar with the history, properties of blood, distribution, shapes, sizes, mechanisms to create patterns/stains, surface textures, and methods to obtain Area of Convergence and Area of Origin.

GMS 6360 Principles of Forensic Medicine I 4 Credits**Grading Scheme:** Letter Grade

Introduces the basic concepts, techniques and practical philosophies that comprise the foundation of Forensic Pathology. Topics include the forensic autopsy, death scene investigation, techniques in human identification, death scene investigation and analysis of significant factors that contributed to a decedent's demise. Forensic histology is also reviewed.

GMS 6361 Principles of Forensic Medicine II 4 Credits**Grading Scheme:** Letter Grade

Advanced topics in Forensic Medicine and Pathology with complex situations and findings in death investigations are covered. Deaths occurring under suspicious circumstances, sudden, pediatric, child and elder abuse, diseases, toxins, drugs, and those via environmental exposure are addressed. Medical devices, implants and their contribution to morbidity and mortality is reviewed.

Prerequisite: GMS 6361

GMS 6362 Principles of Crime Scene Investigation 3 Credits**Grading Scheme:** Letter Grade

Designed to give students an overall understanding of the basic concepts of crime scene investigation and related examination of evidentiary items. Students will become familiar with the multidisciplinary nature of forensic science.

GMS 6362L Principles of Crime Scene Investigation Laboratory 3 Credits**Grading Scheme:** Letter Grade

Gives students a hands-on approach regarding the basic concepts of forensic science and crime scene investigation and related examination of evidentiary items. Students will become familiar with the multidisciplinary nature of forensic science and several of the specializations within them and perform tasks pertaining to each specialization.

GMS 6363 Principles of Osteology 3 Credits**Grading Scheme:** Letter Grade

Focuses on the principles of forensic anthropology by overview of the human skeleton and applications in death investigations. Students will study bone biology and an overview of human osteology and skeletal identification. Cases will be discussed including fragmented remains, mass fatalities, and skeletal diseases.

GMS 6364 Forensic Botany 3 Credits**Grading Scheme:** Letter Grade

This course will provide a foundation for botanists, teachers, students, and investigators who aim to understand how to collect and utilize plants for evidence in a forensic investigation. History of forensic botany, landmark cases, case studies, and techniques of field collection will all be address and described within this course.

GMS 6365 Principles of Forensic Psychology 3 Credits**Grading Scheme:** Letter Grade

This course introduces the field of forensic psychology and the relationship between psychological disorders and the adversarial legal system. This course will focus on research, testimony, and oral and written consultation on psychological issues and disorders as they pertain to the administration of justice.

GMS 6382 Special Topics in Immunology 1-3 Credits**Grading Scheme:** Letter Grade

Analysis and discussion of contemporary topics in development of current concepts. Evaluation of the most recently published research literature. Seminars and discussions with invited speakers.

Prerequisite: GMS 6140 or consent of instructor.**GMS 6383 Current Topics in Immunotherapy 1 Credit****Grading Scheme:** Letter Grade

Becoming acquainted with concepts of immune therapy for the treatment of cancer and autoimmune diseases. Students will be expected to develop critical thinking skills with regards to identifying problems, providing possible solutions and debating areas related to experimental design and data interpretation. The course will include the discussion of journal articles and presentations. The class will focus to a large extent on lectures and student presentations of both historically significant as well as recent journal articles.

Prerequisite: GMS 6140**GMS 6400C Principles of Physiology 6 Credits****Grading Scheme:** Letter Grade

Physiology of mammalian organ systems, with special reference to the human.

Prerequisite: consent of instructor.**GMS 6401 Medical Renal Physiology 2 Credits****Grading Scheme:** Letter Grade

Teaches the functions of the renal system of human body at a level required for clinical medicine and basic research in medical physiology. The course covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, online workshop, and online problem sets.

Prerequisite: Requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6402 Medical Respiration Physiology 3 Credits**Grading Scheme:** Letter Grade

Teaches the functions of the pulmonary system of human body at a level required for clinical medicine and basic research in medical physiology. The course covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, online workshop, and online problem sets.

Prerequisite: Requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6405 Fundamentals of Endocrine Physiology 1 Credit**Grading Scheme:** Letter Grade

Human body endocrine system physiology.

Prerequisite: GMS 6001 or consent of instructor. For 1st- and 2nd-year graduate students.

GMS 6406 Fundamentals of Pulmonary/Respiratory Physiology 1 Credit**Grading Scheme:** Letter Grade

Human body pulmonary/respiratory system physiology.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6408 Fundamentals of Renal Physiology 1 Credit****Grading Scheme:** Letter Grade

Human body gastrointestinal system physiology.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6410 Physiology of the Circulation of Blood 2 Credits****Grading Scheme:** Letter Grade

Physiology of the component parts of the circulation. The relation of structure and function. Emphasizes control mechanisms.

GMS 6411 Fundamentals of Cardiovascular Physiology 1 Credit**Grading Scheme:** Letter Grade

Human body cardiovascular system physiology.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6413 Advances in Hypertension Research 2 Credits****Grading Scheme:** Letter Grade

Exposes graduate students, post docs, and fellows to important aspects of hypertension research.

Prerequisite: GMS 6008: Fundamentals of Physiology and Functional Genomics

GMS 6414 Advanced Renal Physiology 2 Credits**Grading Scheme:** Letter Grade

Advanced knowledge of renal physiology and pathophysiology.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6415 Fundamentals of Gastrointestinal Physiology 1 Credit****Grading Scheme:** Letter Grade

Gastrointestinal system of human body.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6419 Medical Endocrinology and Reproduction 3 Credits**Grading Scheme:** Letter Grade

Teaches the functions of the endocrine and reproductive systems of human body at a level required for clinical medicine and basic research in medical physiology. The course covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, online workshop, and online problem sets.

Prerequisite: Requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6421 Cell Biology 3-4 Credits**Grading Scheme:** Letter Grade

Fundamental mechanisms of cell functions, specializations, and interactions that account for the organization and activities of basic tissues.

Prerequisite: undergraduate biochemistry or cell biology or consent of instructor. Taught in conjunction with 1st year IDP core course.

GMS 6440 Fundamentals of Medical Physiology 1 Credit**Grading Scheme:** Letter Grade

Teaches the basic functions of the human body at a level required for clinical medicine and basic research in medical physiology. This is an introductory course to be taken before courses on specific organ systems physiology. The course covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, online workshops, and online problem sets.

Prerequisite: Requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6470 Adv. Respiration Physiology 1 3 Credits**Grading Scheme:** Letter Grade

Covers a quantitative understanding of atmospheric, alveolar, and blood gas pressures, as well as quantitative understanding of oxygen carriage in blood and alterations in blood chemistry that result from changes in blood gases. Particularly, building an understanding of these concepts as defined in theoretical models as developed by theoretical physiologists.

Prerequisite: GMS 6400C or (GMS 6440 and GMS 6402 and GMS 6474).

GMS 6471 Core Principles of Physiology 3 Credits**Grading Scheme:** Letter Grade

Focuses on the "Core Principles of Physiology" and their application in forming and addressing research questions. The core principles include homeostasis, structure/function relationships, communication, causal mechanisms, levels of organization, and matter/energy transfer. Students will engage these principles in four key areas of research: 1) Gene Mutation Disorders, 2) Homeostasis and Circadian Rhythms, 3) Renal and Respiratory Regulation, and 4) Cell and Systemic Aging.

Prerequisite: Permission of instructor.

GMS 6472 Fundamentals of Physiology and Functional Genomics II 1 Credit**Grading Scheme:** Letter Grade

Fundamental physiological concepts with a focus on the impact of functional genomics technology on contemporary physiology. Emphasizes respiratory, renal, endocrine and autonomic nervous systems.

Prerequisite: Permission of the instructor

GMS 6473 Fundamentals of Physiology and Functional Genomics III 1 Credit**Grading Scheme:** Letter Grade

Fundamental physiological concepts with a focus on the impact of functional genomics technology on contemporary physiology. Emphasizes gastrointestinal system and modern experimental approaches in physiology.

Prerequisite: Permission of instructor.

GMS 6474 Medical Cardiovascular and Muscle Physiology 3 Credits**Grading Scheme:** Letter Grade

Teaches the functions of muscle and the cardiovascular system of human body at a level required for clinical medicine and basic research in medical physiology. Covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, online workshop, and online problem sets.

Prerequisite: Requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6475 Adv. Respiration Physiology 2 3 Credits**Grading Scheme:** Letter Grade

Covers a quantitative understanding of hypoxia, hypo- and hyper-baric atmospheric pressures, physical properties of breathing (lung and chest wall compliances, airway turbulence), and central nervous system mechanisms controlling respiration (arterial and medullary chemoreflexes, cardiopulmonary receptors, vasomotor and heart rate responses to changing blood gases).

Prerequisite: GMS 6400C or (GMS 6440 and GMS 6402 and GMS 6474).

GMS 6476 Fundamentals of Skeletal Muscle 3 Credits**Grading Scheme:** Letter Grade

Provides a comprehensive background of skeletal muscle properties, focusing on key aspects of function at the protein, cellular and whole organ level. Major topics include muscle contraction and force generation, fuel sources and energy utilization, growth and development, and an introduction to pathology.

GMS 6479 Medical Gastrointestinal Physiology 2 Credits**Grading Scheme:** Letter Grade

Teaches the functions of the digestive system of human body at a level required for clinical medicine and basic research in medical physiology. The course covers normal physiology, as well as selected diseases. Concepts are taught using a combination of lectures, online workshop, and online problem sets.

Prerequisite: Requires a BA or BS and a strong science foundation with at least 5 full semester courses related to Biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6483 Theories of Aging 3 Credits**Grading Scheme:** Letter Grade

Humans have theorized about aging since 3000 AD in an attempt to explain how specific changes during the lifecourse are an integral part of aging. This course will explore the fundamental theories of aging across a wide array of disciplines to give the learner a broad understanding of "healthy" aging.

GMS 6484 Geriatric and Age Related Diseases 3 Credits**Grading Scheme:** Letter Grade

Providing an overview of the practice of providing care to geriatric populations. This includes an understanding of common syndromes, conditions and diseases that are relevant to the quality of life in older adults.

GMS 6485 Population Based Research on Aging 3 Credits**Grading Scheme:** Letter Grade

Geared toward population-based research on diseases of elders that include: neurodegeneration, dementia, pulmonary disorders, chronic kidney disease, musculoskeletal, cardiovascular, and metabolic health conditions. At the completion of this course, students will be able to evaluate population-based research on aging and use these concepts in everyday practice.

GMS 6486 Biology of Aging 3 Credits**Grading Scheme:** Letter Grade

Students will learn: 1) major theories of biological aging, including Evolutionary Neuroendocrine, and Free Radical Theories of Aging, 2) the roles of vital organ systems, key cellular programs, and 3) how the aging process can be delayed through pharmaceutical and genetic manipulation, or calorie restriction.

GMS 6487 Anti-aging Interventions 3 Credits**Grading Scheme:** Letter Grade

Aging is a complex process determined by both genetic and environmental factors. By manipulating these aging-related factors, researchers have been able to extend lifespan and healthspan in lab animals. This course will focus on the current and emerging interventions to promote human lifespan and healthspan.

GMS 6488 Physiology and Aging Scientific Communication 1 Credit**Grading Scheme:** Letter Grade

Biomedical Scientific Communication teaches the basics of written and oral communication in science. Students will write a review article and give an oral presentation discussing the review. Students will discuss with their PI, or the Course Director, to select a topic on which to write. The class will meet for one hour per week to provide time to work on the paper and presentation. Presentations will be given during the final Departmental Seminar for Physiology and Aging.

Prerequisite: Students must be second year or above in graduate studies, and have selected a primary research lab.

GMS 6491 Journal Club in Physiology 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Timely research papers in all areas of physiology; namely, cellular physiology, molecular physiology, and functional genomics.

GMS 6495 Seminar in Physiology 1 Credit**Grading Scheme:** S/U
S/U**GMS 6504 Advanced Medical Pharmacology 2 Credits****Grading Scheme:** Letter Grade

This two-credit course is for basic and clinical scientists and others that wish to learn complex pharmacological principles as well as other advanced topics in the areas of drug design, development, and mechanisms. Topics to be discussed, among others, include receptor theory, pharmacological assays, binding, receptor biology, and molecular docking.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics; GMS 6551.

GMS 6506 Biologic Drug Development 1 Credit**Grading Scheme:** Letter Grade

Explores the manufacturing and testing of biomedical products, quality control, quality assurance responsibilities, and regulatory compliance, providing practical understanding of the successes and hurdles that are faced in biopharmaceutical product development today.

GMS 6510 Pharmacology of Cannabis, Tobacco, and Vaping 2 Credits**Grading Scheme:** Letter Grade

This two-credit course is for those that wish to gain knowledge in the pharmacology of cannabis, tobacco, and vaping. Material will focus on both their medical use and toxicology. This information is important for both clinicians treating patients and scientists looking to develop new therapies.

Prerequisite: This course requires at least 5 full semester courses related to biology, chemistry and/or physics.

GMS 6520 Medical Pharmacology and Therapeutics I: The Nervous System 2 Credits**Grading Scheme:** Letter Grade

Will cover the fundamentals of small molecule drugs and therapeutic biologics and their actions on the central nervous system, the peripheral nervous system and the autonomic nervous system. The course prepares students for more advanced studies of pharmacology and therapeutics in the context of human physiology and pathophysiology.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6530 Medical Pharmacology and Therapeutics II: Cardiovascular, Renal and Respiratory Systems 2 Credits**Grading Scheme:** Letter Grade

Covers the fundamentals of small molecule drugs and therapeutic biologics and their actions on the heart, vasculature, kidney and other parts of the cardiovascular, renal and respiratory systems. The course prepares students for more advanced studies of pharmacology and therapeutics in the context of human physiology and pathophysiology.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6531 Medical Pharmacology and Therapeutics III: Endocrine, Musculoskeletal and Reproductive Systems 2 Credits**Grading Scheme:** Letter Grade

Covers the fundamentals of small molecule drugs and therapeutic biologics and their actions in the treatment and/or control of endocrine disorders, reproduction, gastrointestinal system, musculoskeletal system and skin. The course prepares students for more advanced studies of pharmacology and therapeutics in the context of human physiology and pathophysiology.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6540 Medical Pharmacology and Therapeutics IV: Cancer, Antimicrobial and Antiparasitic Agents 2 Credits**Grading Scheme:** Letter Grade

Covers the fundamentals of small molecule drugs and therapeutic biologics and their actions in the treatment of cancers and of microbial and/or parasitic infections. The course will prepare students for more advanced studies of pharmacology and therapeutics in the context of human physiology and pathophysiology.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6551 Fundamentals of Medical Pharmacology and Therapeutics 1 Credit**Grading Scheme:** Letter Grade

Covers the fundamentals of small molecule drugs and therapeutic biologics (e.g., peptides, antibodies, gene and stem cell therapies) and their actions in the body. The course will prepare students for more advanced studies of pharmacology and therapeutics in the context of human physiology and pathophysiology.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics. A minimum undergraduate GPA = 2.0 is required for admission.

GMS 6552 Cell Signaling & Therapeutics 2 Credits**Grading Scheme:** Letter Grade

This two-credit course is for those that wish to gain knowledge of the signaling mechanisms that exist in human cells. These mechanisms are the source of many new drug targets and understanding their biology is critical for the development of new therapeutics and an advanced understanding of current treatment options.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics.

GMS 6560 Molecules to Man: Past, Present and Future Therapeutic Strategies for Disease 3 Credits**Grading Scheme:** Letter Grade

Covers the therapeutic application of small molecule drugs and biologics to the treatment of disease. It will provide students with a basic knowledge of mechanism(s) of action of prototype therapeutics, educate students on the history of drug development, and consider current approaches for development of new therapeutics.

Prerequisite: GMS 6009

GMS 6590 Seminar in Pharmacology 1 Credit, Max 15 Credits**Grading Scheme:** Letter Grade

Research reports and discussions of current research literature by graduate students, faculty, and invited lecturers.

Prerequisite: GMS 6500.

GMS 6591 Communicating Pharmacology 1 Credit**Grading Scheme:** Letter Grade

Communicating science and medicine to the general population is extremely important. This course will require students to create and record a presentation that communicates the science of both the pathophysiology and the pharmacology of a disease and its treatment. The target audience for this presentation is the general population.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics.

GMS 6592 Ion Channels Journal Club: Pharmacology, Biophysics, and Neuroscience of Excitable Membranes 1 Credit**Grading Scheme:** S/U

Recent papers in the context of larger issues in therapeutics and neuroscience. Discussions led by students and faculty.

Prerequisite: consent of instructor.

GMS 6594 Pharmacology Literature 1 Credit**Grading Scheme:** Letter Grade

The course will consist of recorded paper discussions that will be used to facilitate an online discussion. Each student will be required to record their own paper discussion. In addition, students will be required to complete problem sets in conjunction with each paper.

Prerequisite: This course requires a BA or BS and a strong science foundation with at least 5 full semester courses related to biology, chemistry and/or physics.

GMS 6602 Radiological Anatomy 2 Credits**Grading Scheme:** Letter Grade

Fundamentals of radiological and cross-sectional human anatomy and physiology.

Prerequisite: Permission of instructor.

GMS 6607C Essential Human Anatomy 4 Credits**Grading Scheme:** Letter Grade

Human dissection and application of anatomical principles underlying clinical sciences including systemic approach to radiographic interpretation. Offered summer term B.

Prerequisite: consent of instructor, recommendation of graduate adviser, good standing in approved master's or doctoral program.

GMS 6609 Advanced Gross Anatomy 2-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Regional and specialized anatomy of the human body taught by laboratory dissection, conferences, and demonstrations.

GMS 6610 Anatomy of the Peripheral Nervous System 3 Credits**Grading Scheme:** Letter Grade

The Anatomy of the Peripheral Nervous System Course will be presented by a combination of online lectures and online laboratory sessions. The anatomy and function of spinal and cranial nerves of the human body will be discussed and observed in the Vivile Human Body software program. Anatomical imaging will be correlated to transverse, sagittal, and coronal human sections. Medical-based scenarios, e.g., nerve lesions, will be used to promote retention and recall.

Prerequisite: Students are expected to have already taken GMS5605 Online Medical Human Anatomy; GMS5606 Medical Human Anatomy Laboratory and permission of instructors.

GMS 6622 Mitochondrial Biology in Aging and Disease 2 Credits**Grading Scheme:** Letter Grade

Basic biology of mitochondria; mitochondria in aging and disease; assessments for mitochondrial function and genetic variance.

Prerequisite: graduate standing or consent of instructor

GMS 6635 Organization of Cells and Tissues 3 Credits**Grading Scheme:** Letter Grade

Three credit full semester course covering tissues and nine organ systems related to cell and tissue biology.

Prerequisite: GMS 6001 or consent of instructor.

GMS 6647 Transcriptional and Translational Control of Cell Growth and Proliferation 1 Credit**Grading Scheme:** Letter Grade

Fundamental mechanisms that govern cell growth and proliferation.

Prerequisite: 1st and 2nd Yr IDP Students.

GMS 6651 Diagnostic Radiological Physics I 3 Credits**Grading Scheme:** Letter Grade

The student will learn the basics and application of projection x-ray imaging, including: x-ray imaging equipment, x-ray production, x-ray interactions within the human body, geometric principles, image receptors, image quality and patient dose. Projection imaging modalities covered in this course will include radiography, fluoroscopy, and mammography.

Prerequisite: BME 6535 or permission of instructor.**GMS 6652 Diagnostic Radiological Physics II 3 Credits****Grading Scheme:** Letter Grade

A comprehensive analysis of computed tomography (CT) and ultrasound (US) medical imaging systems. Fundamentals of these diagnostic imaging modalities, such as basic physics, image reconstruction, and associated bio-effects, will be discussed. Multiple lab demos will help illustrate the physics that go into creating these images: students will observe residents performing CT studies on multiple phantoms and then be tasked with identifying image quality changes due to different acquisition technique.

Prerequisite: GMS 6651 or permission of instructor.**GMS 6653 Diagnostic Radiological Physics III 3 Credits****Grading Scheme:** Letter Grade

Fundamentals of nuclear magnetic resonance. Principles of magnetic resonance imaging, pulse sequences, frequency and spatial encoding of signals for image reconstruction. Principles of facility design, safety in MRI and biological effects.

Prerequisite: GMS 6651 and GMS 6652 or permission of instructor.**GMS 6654 Therapeutic Radiological Physics I 3 Credits****Grading Scheme:** Letter Grade

This is a graduate-level, introductory course in basic therapeutic radiation physics. Topics discussed will include the basic working principles of clinical radiation generators, principles and methods for measurement of ionizing radiation, conventional and historical methods for dosimetric calculations, treatment planning for radiation therapy, and specific topics relevant to the modern practice of radiation therapy.

Prerequisite: BME 6535 (Radiological Physics, Measurements and Dosimetry) or permission of instructor.**GMS 6655 Therapeutic Radiological Physics II 3 Credits****Grading Scheme:** Letter Grade

Building upon the basic principles of radiation therapy studying more advanced radiation treatment planning, electron beam and brachytherapy techniques. Topics of clinical and regulatory significance including radiation shielding and quality assurance.

Prerequisite: GMS 6654 and GMS 6057 or permission of instructor.**GMS 6683 Fundamentals of Vascular Physiology and Pathology 2 Credits****Grading Scheme:** Letter Grade

Seeking to introduce the fundamentals of vascular biology and discussing the current understanding of the pathogenesis of common vascular diseases. Subjects to be covered include: mature and progenitor vascular cells, vascular physiology and histology, and the cellular and molecular mechanisms that drive vascular stenosis/restenosis and aortic aneurysm.

Prerequisite: GMS 6001**GMS 6690 Molecular Cell Biology Journal Club 1 Credit, Max 12 Credits****Grading Scheme:** Letter Grade

Faculty-student discussion of research papers and topics.

GMS 6691 Special Topics in Cell Biology and Anatomy 1-4 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Readings in recent research literature of anatomy and/or applied disciplines including cell, developmental, and reproductive biology.

GMS 6692 Research Conference in Anatomy and Cell Biology 1 Credit, Max 12 Credits**Grading Scheme:** Letter Grade

Research reports and discussions of current research by graduate students, faculty, and invited speakers.

GMS 6701 Functional and Comparative Neuroanatomy for Professionals 3 Credits**Grading Scheme:** Letter Grade

This course covers the structure and function of all major systems in the central nervous system of humans, quadrupeds, and rodents (brain and spinal cord). The anatomical studies and brain function will be complemented by clinical cases. At the end of this course, you will have both a working knowledge of human and comparative neuroanatomy, and you will also be able to use this knowledge to explain how disruption of brain structure leads to changes in human behavior and cognition.

Prerequisite: This course will be required for first year neuroscience graduate students. Any other graduate student must obtain instructor's permission to register.**GMS 6705 Functional Human Neuroanatomy 4 Credits, Max 4 Credits****Grading Scheme:** Letter Grade

Intensive introduction to the anatomy, function, and dysfunction of the human central nervous system.

Prerequisite: consent of instructor.**GMS 6711 Neurobiology of Pain 1 Credit****Grading Scheme:** Letter Grade

Overview of neurobiological processes involved in pain, including methods of investigating pain processing in humans and other animals.

Prerequisite: GMS 6001 or consent of instructor.**GMS 6712 Biological Clocks in Neural Health and Disease 3 Credits****Grading Scheme:** Letter Grade

This course covers the molecular nature of the circadian clocks, their locations in the human body, and how they control brain function. Additional topics include the relationships between circadian clocks, sleep, and affective and neurodegenerative disorders. Students will also critically examine how circadian rhythms impact specific areas of neuroscience research.

Prerequisite: GMS6007 or consent of instructor.**GMS 6713 Neurobiol of Behav Disorders 3 Credits****Grading Scheme:** Letter Grade

This course is for Masters students in the Online Biomedical Neuroscience MSc Program. This course focuses on the neurobiological of neurobehavioral disorders autism spectrum disorder, obsessive-compulsive disorder, and attention deficit hyperactivity disorder. The course will cover the clinical presentation, genetics, neuropathology, structural and functional brain changes characteristic of these disorders

Prerequisite: GMS 6007 and GMS 6705.**GMS 6715 Healthy Aging: Behavioral and Clinical Outcomes 3 Credits****Grading Scheme:** Letter Grade

Examining behavioral antecedents of major diseases, by reviewing epidemiological and population-based studies of behavioral/psychosocial variables and disease conditions and decreased longevity. Focusing on behavioral interventions to modify risk for disease, including the conceptual basis for the interventions, clinical trial data supporting efficacy, and application in clinical practice.

GMS 6717 Healthy Aging in The New Millennium 3 Credits**Grading Scheme:** Letter Grade

Building on the behavioral concepts of lifestyle-based intervention discussed in the Lifestyles I. We will examine the underlying physiologic changes experienced by older adults in response to lifestyle-based interventions. Adaptations will be evaluated across the spectrum of physiologic organization, from whole-body to molecular and cellular changes.

GMS 6719 Computational Skills for Neuroscience 2 Credits**Grading Scheme:** Letter Grade

Teaches basic software skills for neuroscience graduate students and how computing can enhance and accelerate neuroscience research.. Students will learn to use basic programming skills for quantitative analyses of datasets, as well as edit and understand code done by others. Students will also be exposed to basic concepts in Artificial Intelligence as they relate to neuroscience.

Prerequisite: basic knowledge of calculus and computing and/or consent of instructor.

GMS 6740 Neuromuscular Diseases 3 Credits**Grading Scheme:** Letter Grade

The course addressed molecular, cellular and pathophysiological mechanisms underlying various disorders of the neuromuscular system in both model systems and clinical populations. As the majority of these disorders are without curative treatment, this course will also have a particular focus on the rationale and development of novel therapeutic strategies.

Prerequisite: This 3-credit course is open to all PhD candidates at the University of Florida. The student is highly recommended to have either taken GMS 7593 "Fundamentals of Skeletal Muscle" or consent of the instructor.

GMS 6741 Neuropathology 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

This course will focus on the histopathological evaluation of tissues using light microscopy primarily. The course will discuss neuropathological lesions in rodent models (experimental), as well as in human post-mortem tissues. Topics to be covered will vary with students' needs and interests; they will include the aging brain and neurodegenerative diseases, brain tumors, and experimental models of peripheral nerve injury, stroke and trauma.

Prerequisite: GMS 6705 Functional Human Neuroanatomy.

GMS 6750 Molecular Pathobiology of Neural Disease 1 Credit**Grading Scheme:** Letter Grade

Overview of a broad range of neural disorders emphasizing genetically determined conditions.

Prerequisite: GMS 6705.

GMS 6757 Introduction to Alzheimer's Disease and Related Dementias: Clinical and Mechanistic Principles 2 Credits**Grading Scheme:** Letter Grade

Designed to allow students to gain mechanistic insights into the clinical and preclinical aspects of Alzheimer's disease and related dementia.

Prerequisite: Prior knowledge of neuroscience is highly recommended. Students are expected to have at minimum a bachelors level degree in arts or sciences.

GMS 6771 Clinical Neuroscience of Aging 3 Credits**Grading Scheme:** Letter Grade

Using a clinical science approach that examines the relationship between aging and change in brain systems as they relate to clinical disorders. Overviews of modern clinical neuroscience methodology, clinical assessment, intervention strategies, functional neuroanatomy, and major cognitive systems and age-related changes are provided.

GMS 6780 Addiction: Neuroscience and Trends 3 Credits**Grading Scheme:** Letter Grade

Presenting findings from leading-edge neuroscience research on how different drugs act on the brain, and how differences in age, gender and other factors influence those effects. It introduces different types of drugs, and describes global trends in substance use disorders and addiction.

Prerequisite: Bachelor's degree or higher from a regionally accredited institution or equivalent

GMS 6781 Foundations in Addiction and Substance Use Disorders 3 Credits**Grading Scheme:** Letter Grade

Covers cross-disciplinary areas underlying the work of addiction professionals: understanding addiction, treatment knowledge, application to practice and professional readiness. It presents models and theories of addiction, treatment and recovery; research-based diagnosis, treatment and outcome-measurement methods; sociocultural and other factors influence drug use and treatment, and practice setting differences.

GMS 6782 Addiction: Clin Eval 3 Credits**Grading Scheme:** Letter Grade

Addiction: Clin Eval

GMS 6783 Addiction: Counseling and Treatment Methods 3 Credits**Grading Scheme:** Letter Grade

Looks in-depth at collaboration between counselor and client in establishing treatment and recovery goals and promoting beneficial behaviors and discouraging harmful behaviors that put clients at risk for infectious diseases and other issues. It covers individual and group counseling, and counseling for families, couples and significant others.

GMS 6784 Addiction: Referral 3 Credits**Grading Scheme:** Letter Grade

Addiction: Referral

GMS 6785 Addiction:Pro Ethical 3 Credits**Grading Scheme:** Letter Grade

Addiction:Pro Ethical

GMS 6790 New Developments in Neuroscience 2 Credits**Grading Scheme:** S/U

This course will introduce students to the strategies that can be adopted that will enable them to successfully read and understand peer-reviewed papers published in the top science and neuroscience journals. By the end of the course, students will be able to apply what they learn in this course to their future efforts to read and understand scientific papers.

Prerequisite: GMS 6007 or consent of instructor.

GMS 6791 Visual Neuroscience Journal Club 1-2 Credits, Max 9 Credits**Grading Scheme:** S/U

Presentation and discussion of cutting-edge research papers.

Prerequisite: 1st-year IDP core course; or consent of instructor.

GMS 6792 Neuroscience Graduate Research Seminar 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Critique and analysis of student-developed neuroscience projects and presentations.

GMS 6793 Neuroimaging 1 Credit**Grading Scheme:** S/U

Images are powerful tools that excel at conveying complex and often subtle ideas or concepts at speeds unrivaled by other forms of information-based media. This course provides a historical perspective on the development of those research-based and clinical imaging techniques that were most foundational to the fields of neuroscience and neurology.

Prerequisite: GMS 6007 with a minimum grade of B.**GMS 6796 Aging and the Brain 3 Credits****Grading Scheme:** Letter Grade

To address questions of the primary causes of aging and the history of research on aging. Theories of aging will be applied to the brain and cognitive decline and include biomarkers from biochemistry to physiology, through to structural changes. Differences in the rate of aging due to sex, resilience, compensation, and cognitive reserve, and the role of aging in disease will be discussed. Finally, therapeutic implications and related topics will be explored.

Prerequisite: Consent of instructor. Designed for graduate students in the Online M.Sc. program, PhD programs, and Biomedical Neuroscience M.Sc. program.

GMS 6797 Neuroscience Professional Survival Skills 3 Credits**Grading Scheme:** Letter Grade

The ability to effectively communicate scientific ideas through written, poster, or oral presentations is critically important in professional settings. Persons who excel in these skills often have a tremendous advantage over their peers in terms of job opportunities and career advancement. This course is designed to provide students with foundational knowledge that will enable them to effectively improve their communication skills.

GMS 6802 Health Outcomes Research for Chronic Diseases 3 Credits**Grading Scheme:** Letter Grade

In-depth analysis of risk factors and health outcomes assessment for adult and childhood chronic diseases. The impact of childhood chronic conditions on adult health is emphasized. The interplay of health disparities and chronic diseases also will be discussed.

Prerequisite: GMS 6851 & Instructor Approval**GMS 6803 Data Science for Clinical Research 3 Credits****Grading Scheme:** Letter Grade

Students are introduced to the broad landscape of data science for biomedical and clinical research: learn how to design and implement computerized databases for data collection, perform basic query and reporting operations, prepare databases for analytical tasks, perform quality assurance procedures, and understand basic data analytical methods and approaches.

Prerequisite: Consent of instructor.**GMS 6804 Translational Bioinformatics 3 Credits****Grading Scheme:** Letter Grade

Fundamental issues of bioinformatics and how they apply to translational and clinical problems. The course is organized in 4 parts: sequence analysis, databases and ontologies, genome-wide association and linkage analysis, and networks. Each part will cover the computing and mathematical concepts used, and motivated by the actual underlying bioinformatics questions.

Prerequisite: Basic statistics or consent of instructor.**GMS 6805 Information Modeling in Biomedicine 3 Credits****Grading Scheme:** Letter Grade

Introduces students to information science and knowledge representation methodologies (e.g., set theory, formal logic, etc.) for purposes of information integration. Students gain familiarity with traditional information modeling methodologies (e.g., UML) and with Semantic Web Technologies, rich in semantics for use with AI applications.

GMS 6806 Security and Privacy for Clinical Research 3 Credits**Grading Scheme:** Letter Grade

Students will be introduced to a broad landscape of information security data privacy for biomedical clinical research: SP related regulations and guidelines in clinical research; concepts of computer security; analysis of a study's security plan; best practices in data management (e.g., de-identification and encryption).

Prerequisite: Instructor's Approval.**GMS 6808 GeronTechnology 3 Credits****Grading Scheme:** Letter Grade

This course introduces students to the state-of-the-art concepts in technology and data science and their applications in the healthcare domain with a focus on geriatric health outcomes. Students will recognize how data science is revolutionizing the healthcare sector. Students will describe the fundamental concepts in data science and apply it to geriatric medicine. Additionally, students will summarize the perception of older adults towards the use of technology and the challenges they face.

GMS 6812 Health Outcomes Research in Cancer 3 Credits**Grading Scheme:** Letter Grade

Methods and measurement issues in cancer health outcomes assessment are addressed across the continuum of cancer care - prevention, screening, diagnosis, treatment, survivorship, and end of life.

Outcomes covered include survival, health-related quality of life, patient satisfaction with care, and economic burden.

Prerequisite: GMS 6851 & Instructor Approval**GMS 6813 Pragmatic Clinical Trials 3 Credits****Grading Scheme:** Letter Grade

Provides students with knowledge related to designing and conducting pragmatic clinical trials, which evaluate the effectiveness of interventions and treatments in typical community and clinical care settings.

Prerequisite: PHC 6052 and (GMS 6885 or PHC 6001).**GMS 6820 Qualitative Inquiry and Analysis in Health Intervention Development and Implementation 3 Credits****Grading Scheme:** Letter Grade

Students will receive intensive training on using qualitative inquiry when developing and implementing evidence-informed interventions or programs. Qualitative inquiry is an expansive field. Our focus is on designing studies that utilize a narrative approach, in terms of narrative frameworks that inform aims or intervention goals, narrative-based data collection methods, analyzing narrative data, implementing narrative evidence into interventions, and presenting narrative findings rigorously.

GMS 6822 Measuring and Analyzing Health Outcomes II 3 Credits**Grading Scheme:** Letter Grade

Cross-cultural translation, data-analysis issues, outcome measures for special populations.

Prerequisite: consent of instructor.**GMS 6827 Advanced Clinical Trial Methods 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Statistical principles and methods used in the design and analysis of clinical trials. Rotating topics include group sequential designs, adaptive clinical trials, and Statistical Monitoring of Clinical Trials.

Prerequisite: consent of instructor.**GMS 6829 Longitudinal Research Design 2 Credits****Grading Scheme:** Letter Grade

Design, evaluation, and implementation of cross-sectional and longitudinal research.

Prerequisite: a graduate course in epidemiology, a graduate course in statistics, and consent of instructor.**GMS 6833 Health Outcomes Research in Vulnerable Populations 3 Credits****Grading Scheme:** Letter Grade

Policy tools used to explore how the health care system can serve vulnerable populations such as the poor, elderly, and children.

Prerequisite: consent of instructor.**GMS 6836 Foundations of Learning Health Systems Research 1 Credit****Grading Scheme:** S/U

Provides an overview of the foundational principles required to conduct research in a learning health system environment. Students will gain introductory knowledge in Systems Science, Research and standards of Scientific Evidence, Research Methods, Informatics, Ethics and Implementation in Health Systems, Improvement and Implementation science, Engagement, and Leadership.

GMS 6846 Systematic Review and Meta-Analysis in Clinical, Health Services Research and Public Health 2 Credits**Grading Scheme:** Letter Grade

Systematic overviews and meta-analysis techniques. Lectures and laboratory work. Develop and conduct a meta-analysis in small groups.

Prerequisite: Consent of instructor**GMS 6847 Translational Research and Therapeutics: Bench, Bedside, Community, & Policy 3 Credits****Grading Scheme:** Letter Grade

Introduces and explores in-depth the multi-T-phase concept of translational research. Emphasizes moving knowledge and discovery gained from basic science research at the bench to its application in clinical and community settings and finally into national health policy. "Bench-to-bedside-to-community-to-policy."

Prerequisite: Approval by the Course Director.**GMS 6848 Ensuring Rigor and Reproducibility in Clinical and Translational Research 2 Credits****Grading Scheme:** Letter Grade

Introduces best principles and practices required to conduct rigorous and reproducible research across the translational spectrum. Topics will include sound study planning and design, consideration of all relevant biomedical variables, sound data management practices, statistical considerations and techniques, and transparency in reporting research results.

Prerequisite: GMS 6861**GMS 6850 Foundations of Biomedical Informatics 3 Credits****Grading Scheme:** Letter Grade

Covers foundational issues in biomedical informatics, including the unique nature of biomedical information, why biomedical information is created and used, analysis methods and inference on biomedical information, and ethical and privacy issues. Information systems and software in biomedicine and issues in implementation and use will also be covered.

GMS 6851 Implementation Science Fundamentals 3 Credits**Grading Scheme:** Letter Grade

An overview of principles and practices of dissemination and implementation research in the context of the translational research continuum. Content areas include the populations studied, data sources, and user audiences. Exposure to a range of dissemination and implementation research topics, and conceptual frameworks.

Prerequisite: Permission of instructor.**GMS 6852 Collaborative Clinical and Health Research Methods 2 Credits****Grading Scheme:** Letter Grade

This course covers the principles and practices of clinical effectiveness and implementation science research conducted with community partners. The benefits of and barriers to conducting community engaged research will be addressed in the context of the translational research continuum. The relationships between community partner involvement and study design, data collection, and analytic methods are addressed. Additional topics include partnership development, relationships between researchers and the community, capacity building, and sustainability.

Prerequisite: GMS 6851 & Instructor Approval**GMS 6853 Implementation Science in the Learning Health System 3 Credits****Grading Scheme:** Letter Grade

This course provides a framework for examining dissemination research and implementation sciences and its applicability to clinical and community-based research. The role of dissemination research and implementation sciences in the translational research spectrum will be a key focus. Translation research involves the study of how best to transfer evidence-based knowledge into routine or representative practice, and by definition requires involvement and input of the end-user, thus a key focus will be on examining different study designs in dissemination research and implementation science, and the strengths and limitations of different methodological approaches.

Prerequisite: GMS 6851 & Instructor Approval**GMS 6856 Introduction to Biomedical Natural Language Processing 3 Credits****Grading Scheme:** Letter Grade

Introduces the basic knowledge of natural language processing (NLP), examine methods, systems, and ontologies/resources in the biomedical domain. Students will gain necessary skills to process biomedical text, apply state-of-the-art NLP systems and handle biomedical NLP tasks such as Information Extraction and Word Sense Disambiguation.

Prerequisite: Experience of computer programing, such as python for data processing.**GMS 6857 Clinical Decision Support Systems 3 Credits****Grading Scheme:** Letter Grade

Introduces students to fundamentals of clinical decision-making systems and software. Students learn underlying mathematics of decision theory and decision-making, managing risk and uncertainty, pattern recognition and machine learning in decision-making. Students explore usability of clinical decision support systems, patient-centered approaches, implementation science and how systems are integrated with EHR and clinical workflows and their impact on care access and quality of care.

GMS 6859 Foundations of Programming in Biomedical Studies 3 Credits
Grading Scheme: Letter Grade

This course is targeted for biomedical scientists looking for working knowledge of programming and a quantitative foundation of artificial intelligence (AI) and biomedical informatics. This is a fast-paced, hands-on course covering the following topics: programming basics in Python, elements of data processing and analytics, and essential knowledge on using high-performance computing environments for biomedical research.

GMS 6865 Quantitative Literacy for Translational Research 2 Credits
Grading Scheme: Letter Grade

Designed to give beginning translational researchers without background an overview of the quantitative skills needed to 1) understand what constitutes useful research data, 2) organize research data, 3) use statistical software to analyze research data, and 4) organize and present research data in meaningful ways.

Prerequisite: Undergraduate Statistics course or Graduate Introduction to Statistics course or instructor permission.

GMS 6867 Big Data for the Biologist 3 Credits
Grading Scheme: Letter Grade

Designed for biology graduate students who wish to be able to analyze their own large scale omics or multi omics data. This class teaches the foundational knowledge needed to understand those analyses. The class is fast paced and demanding.

Prerequisite: Calculus 2.

GMS 6873 Introduction to Medical Bioethics 3 Credits
Grading Scheme: Letter Grade

Reviewing the impact of bioethics in medical practice and research. It delves into topics such as stem cell research, reproductive rights, privacy laws, humans as research subjects, cultural and religious considerations in medical decision-making, and the role of government vs. the rights of individuals.

Prerequisite: Bachelor's degree from an accredited regional institution or equivalent.

GMS 6874 Medicine and the Law 3 Credits
Grading Scheme: Letter Grade
Medicine and the Law**GMS 6875 Ethical and Policy Issues in Clinical Research 2 Credits**
Grading Scheme: Letter Grade

Ethical and policy issues relating to conduct of clinical research. Basic understanding of regulations governing research on human subjects. Introduction to the topic of research with animals.

GMS 6876 Law & Ethics of Aging 3 Credits
Grading Scheme: Letter Grade

Providing an overview of the legal and ethical challenges that our aging society and their caregivers (whether family members, health care providers, or others) face as well as a framework for analyzing these challenges.

GMS 6885 Translational Health Research Design 3 Credits
Grading Scheme: Letter Grade

This course will provide students with an overview of the research designs common in translational health research, a foundational understanding of a variety of research designs including the creation of defensible and meaningful hypotheses, bias potential, strengths, and limitations.

Prerequisite: Graduate level statistics course or instructor approval.

GMS 6889 Systematic Review Methods 3 Credits
Grading Scheme: Letter Grade

Examines the science and rigorous methodology of conducting a systematic review using the PRISMA guidelines. Systematic reviews are considered one of the highest levels of evidence quality and are important studies in their own right. Students will finish the course as critical consumers of systematic reviews and equipped with the skills to produce a systematic review, which is more likely to be publishable as a stand-alone paper than a narrative review.

Prerequisite: Instructor approval.

GMS 6893 Clinical and Translational Science Seminar Series 2 Credits, Max 6 Credits
Grading Scheme: Letter Grade

Researchers discuss clinical, laboratory, epidemiologic, and economic aspects of a given topic; also, intervention strategies and community outreach activities. Exposure to faculty who may be available for Clinical Preceptorship assignments. Topics rotate every 2 weeks.

Prerequisite: consent of instructor.

GMS 6895 CTS Journal Club 1 Credit, Max 3 Credits
Grading Scheme: S/U

Rotating topics include the presentation and critical discussion of recent, original papers about clinical and/or translational research relevant to human health and disease.

Prerequisite: GMS 6847.

GMS 6903 Manuscript and Abstract Writing for Clinician/Scientists 2 Credits
Grading Scheme: Letter Grade

Didactic and interactive sessions to improve the quality of manuscript and abstract writing.

Prerequisite: consent of instructor.

GMS 6905 Independent Studies in Medical Sciences 1-10 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Independent Studies in Medical Sciences**GMS 6910 Supervised Research 1-5 Credits, Max 5 Credits**
Grading Scheme: S/U
Supervised Research**GMS 6920 Genetics Journal Colloquy 1 Credit, Max 12 Credits**
Grading Scheme: S/U

Critical presentations and discussions of recent original articles.

Prerequisite: consent of instructor.

GMS 6921 Immunology/Microbiology Journal Colloquy 1 Credit, Max 12 Credits
Grading Scheme: Letter Grade

Critical presentations and discussions of recent original articles.

Prerequisite: GMS 6001, GMS 6006, or consent of instructor.

GMS 6934 Cancer Biology Data Discussion 1 Credit
Grading Scheme: Letter Grade

Research reports and discussions of current Cancer Biology research performed by graduate students, faculty, and invited speakers.

GMS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U

Supervised Teaching

GMS 6943 Master's Translational Biotechnology Internship 3 Credits**Grading Scheme:** S/U

Summer Internship in Translational Biotechnology at a Biotechnology company (Florida-based preferred). Exposure to and participation in product development, regulatory compliance, business, science, medicine, manufacturing, and quality systems.

Prerequisite: GMS 6971**GMS 6945 Team Science 1 Credit****Grading Scheme:** Letter Grade

Addressing today's complex research and societal problems requires integration of specialized knowledge bases and cross-disciplinary collaboration. This course offers practical guidance about engaging in Team Science to pursue complex research questions, work effectively with team members, and assess team performance in order to produce high impact research outcomes.

Prerequisite: Graduate standing.**GMS 6951 Teaching Biomedical Science 2 Credits****Grading Scheme:** Letter Grade

Acquire the skills necessary for creating and modifying courses through a combination of self-awareness activities and information drawn from the field of curriculum that informs teaching across content areas. Learning skills to write a teaching philosophy, draft components of their own course syllabus, add these components to their portfolio. Learning platform-online;Canvas

GMS 6952 Curricular Models for Biomedical Science 3 Credits**Grading Scheme:** Letter Grade

Students are introduced to various models of teaching and instructional strategies. Models of teaching give instructors the tools they need to build strong learning environments and interactions that accelerate learning. Models provide a blueprint, structure, direction for teaching. Students will learn to develop curriculum, analyze structure and identify the teaching models.

GMS 6953 Art and Science of Mentoring 1 Credit**Grading Scheme:** Letter Grade

Learn to mentor other professionals who are in early stages of career development. Develop knowledge and skills through provision of didactic information and experiential learning activities. Complete an individual development plan, identify ethical dilemmas in mentoring and describe strategies to prevent them, and articulate their own mentoring philosophy.

GMS 6954 Assessing Effectiveness of Biomedical Science Teaching and Curricula 3 Credits**Grading Scheme:** Letter Grade

Overview of the models of evaluation within contrasting paradigms as it relates to biomedical science education. Topics address concerns while adhering to the professional, scholarly and ethical roles the evaluator must uphold. Develop rubrics, select assessments, use peer observations for assessment of teaching methods, products and outcomes in clinics/laboratories, learning environments.

GMS 6956 Artificial Intelligence in Healthcare Education I 3 Credits**Grading Scheme:** Letter Grade

Provides the students with the fundamentals of artificial intelligence, including machine learning and deep learning, and how these methods can be used to learn from data as they relate to healthcare education. Students will also have opportunities to process and analyze various types of real-world healthcare and educational data to discover useful insights and knowledge.

GMS 6957 Artificial Intelligence in Healthcare Education II 3 Credits**Grading Scheme:** Letter Grade

Builds on the knowledge and skills acquired Artificial Intelligence in Healthcare Education I. Students will develop the skills necessary to manipulate, analyze, visualize and present data in Python, leveraging the JupyterLab interface of the Jupyter Project. Students will learn the fundamentals of Python, coding environments, as well as libraries for data science including pandas.

Prerequisite: GMS 6956.**GMS 6958 Foundations of Healthcare Education 3 Credits****Grading Scheme:** Letter Grade

Provides an overview of the field of medical education, including its history, principles, and current trends. Students will learn about the various stages and components of medical education, from pre-medical education to postgraduate medical education. Topics will include curriculum design and development, teaching and learning methods, assessment in medical education, accreditation and regulation, and the impact of technology and innovation on medical education.

GMS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

GMS 6975 Team Science 1 Credit**Grading Scheme:** Letter Grade

Team Science

GMS 7093 Introduction to Clinical and Translational Research 2 Credits**Grading Scheme:** Letter Grade

Design, management, measurement, and study limitations for research in the clinical setting.

Prerequisite: Consent of APPCI program.**GMS 7122 Advanced Tropical Medicine 3 Credits****Grading Scheme:** Letter Grade

Advanced Tropical Medicine

Prerequisite: GMS 6121 & PHC 6001 or equivalents**GMS 7133 Advanced Molecular Virology 2 Credits****Grading Scheme:** Letter Grade

Advanced Molecular Virology

Prerequisite: GMS 6121 or equivalent**GMS 7191 Research Conference 1 Credit, Max 12 Credits****Grading Scheme:** S/U

Critical discussion and appraisal of research programs of faculty and students of the department.

GMS 7192 Journal Colloquy 1 Credit, Max 12 Credits**Grading Scheme:** Letter Grade

An online course in which primary research papers in medical microbiology (virology, bacteriology, mycology, and parasitology) are assigned for reading and analysis on a weekly basis. A homework quiz and bulletin board-type discussion are assigned for each paper to help students understand and demonstrate mastery of the material.

GMS 7194 Biotechnology Seminar 1-2 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Given concurrently with BCH 7410. Presentations related to biotechnology industry by outside speakers and students.

Prerequisite: Prereq or coreq: Molecular Biology.**Corequisite:** undefined**GMS 7593 Topics in Pharmacology and Toxicology 1-3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Seminars, informal conferences, or laboratory work on selected topics.

GMS 7794 Neuroscience Seminar 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Research seminars given by local, national, and occasionally international speakers.

GMS 7795 Special Topics in Neuroscience 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Specialized subjects in the neurosciences and allied disciplines. Current topics include biological imaging techniques, fundamentals of computational neuroscience, graduate research seminar series, write clubs, scientific communication workshop (Whitney Lab), and electrophysiological journal club (Whitney Lab).

GMS 7858 Causal Artificial Intelligence for Health Research 3 Credits**Grading Scheme:** Letter Grade

This course covers foundational issues in “causal Artificial Intelligence” embedding machine learning with causal inference methods on real-world data, and methodologies for automated causal learning. Health research approaches such as target trials and transportability will be discussed, as well as Artificial Intelligence fairness to tackle health disparities and inequity.

Prerequisite: Instructor approval. GMS7858**GMS 7866 Principles of Referent Tracking in Biomedical Informatics 3 Credits****Grading Scheme:** Letter Grade

Provides an in-depth exploration of the purpose, scope, technical structures; uses of Referent Tracking as a methodology to design information systems that are maximally self-explanatory and explicit in terms of the data they manage and self-aware in terms of their interactions with other systems and users thereof.

Prerequisite: GMS 6850 & GMS 6803 & GMS 6804 & GMS6805**GMS 7877 Responsible Conduct of Biomedical Research 2 Credits****Grading Scheme:** Letter Grade

Key issues in the responsible conduct of biomedical research, following the research process from inception to planning, conducting, reporting, and reviewing biomedical research.

Prerequisite: GMS 6001 or consent of instructor.**GMS 7886 Health Outcomes and Policy PhD Seminar: Applied Research 3 Credits****Grading Scheme:** Letter Grade

This course builds on students' knowledge of health outcomes theory, research design and methods with an applied focus. Students critically evaluate research with faculty who have successfully implemented health outcomes research in biomedical, clinical, and community settings. Students develop research questions, hypotheses, and study protocols in preparation for independent research.

Prerequisite: GMS 6885, GMS 6862, and instructor approval. One of: GMS 6826, GMS 6829, GMS 6832, GMS 6844, or GMS 6846.**GMS 7887 Health Outcomes & Policy PhD Research Seminar 1 Credit****Grading Scheme:** S/U

Seminar series where advanced PhD students will meet to present, critically appraise, and discuss current research in the health outcomes and policy academic literature as well as the research programs of HOP faculty and graduate students.

Prerequisite: Instructor approval.**GMS 7906 Grant Writing for Health Outcomes Studies 2 Credits****Grading Scheme:** Letter Grade

Students learn grant writing basics, with focus on submissions to NIH, AHRQ, and PCORI. Specific aims, significance, hypotheses are developed, culminating in production of a grant proposal draft during the semester. Other topics covered include biosketch development, budget preparation/ justification, sample size justification, and navigation of funding opportunities.

GMS 7944 Practicum in Biomedical Science Education 3 Credits**Grading Scheme:** S/U

Teach biomedical science and/or biotechnology (supervised by a professor) at summer workshops for high school students and teachers.

Prerequisite: GMS 7950.**GMS 7950 Fundamentals of Biomedical Science Education 2 Credits****Grading Scheme:** Letter Grade

Overview of educational issues faced by biomedical scientists teaching at the undergraduate, graduate, or professional level. Practical guidelines most relevant for beginning biomedical science educators, including teaching skills and strategies and the underlying theory of learning and teaching.

Prerequisite: consent of instructor.**GMS 7955 Practicum in Learning Analytics and Artificial Intelligence 3 Credits****Grading Scheme:** Letter Grade

Serves as a culminating experience for learners. Learners will apply knowledge and skills learned during coursework to design and implement scholarly projects using artificial intelligence/machine learning methods.

GMS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

GMS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Microbiology and Cell Science

BSC 6438 R for Functional Genomics 3 Credits**Grading Scheme:** Letter Grade

Introductory course to the basics of the R language and to state of the art methods for functional genomics data analysis. Students will learn how to write R scripts, choose appropriate statistical tools and how to use linux environments to analyse high-throughput genomics data.

Prerequisite: BSC2010 or BSC2011 or MCB3020 or MCB3023 or BCH4024 or CHM3218 or equivalent AND STA6166 or STA6167 or equivalent.**BSC 6459 Fundamentals of Bioinformatics 3 Credits****Grading Scheme:** Letter Grade

An introduction to the basic bioinformatics tools used in computational biology for life science research. The course will use web-based resources that analyze gene and protein sequences as pertinent data examples.

BSC 6895C AI in Agricultural and Life Sciences 3 Credits**Grading Scheme:** Letter Grade

Artificial intelligence (AI) is used to solve problems in research and industry. This course provides students with an understanding of AI systems and how they can be applied to answer challenging questions in life sciences. Through online study materials and hands on exercises, students will obtain the skills and knowledge they need to use AI to solve real world life sciences problems.

MCB 5205 Microbiology of Human Pathogens 3 Credits**Grading Scheme:** Letter Grade

Surveying advanced topics and current scientific literature related to human host-pathogen interactions and microbial pathogenesis, focusing on emerging bacterial and viral pathogens as agents of human disease, biosecurity, molecular identification methods, spread of multi-drug resistance among bacterial pathogens, drug discovery and alternative treatment research.

MCB 5215 Clinical Immunology 1 Credit**Grading Scheme:** Letter Grade

Study of the human immune system and their response mechanisms to pathogens and their relevance in maintaining health. Methods in clinical immunology labs, result interpretation, correlation with clinical practice. Discussion of current advancements and trends in clinical immunology research. Analysis of immune disorders and their impact on patient's health. Integration of laboratory results with clinical observations and improvement of patient care.

Prerequisite: Students must be enrolled in the Clinical Laboratory Microbiologist graduate certificate program to take this course.

MCB 5252 Microbiology, Immunology, and Immunotherapeutics 4 Credits**Grading Scheme:** Letter Grade

Microbiology and immunology for pharmacy students. Microorganisms and infection, control with antimicrobials, host immune response, immune disorders.

Prerequisite: CHM 2210, 2211, and consent of instructor.

MCB 5255 Clinical Bacteriology 3 Credits**Grading Scheme:** Letter Grade

Study of human pathogenic bacterial species and their identification by biochemical, immunological and molecular biology methods. The virulence factors of bacteria, their clinical manifestations, and significance in human health, as well as correlation of bacterial metabolism and physiological characteristics with host interactions to enhance diagnostic and susceptibility testing. Integration of laboratory results with clinical observations and improvement of patient care.

Prerequisite: Students must be enrolled in the Clinical Laboratory Microbiologist graduate certificate program to take this course.

MCB 5256 Clinical Mycology, Virology and Parasitology 3 Credits**Grading Scheme:** Letter Grade

Study of human pathogenic fungi, virus and parasites and their identification via laboratorial methods. The virulence factors of non-bacterial microbes, their interactions with the host immune system and their clinical significance and impact on public health. Review the traditional and most current laboratory techniques for the isolation, identification and susceptibility testing of these pathogens. Integration of laboratory results with clinical observations and improvement of patient care.

Prerequisite: Students must be enrolled in the Clinical Laboratory Microbiologist graduate certificate program to take this course.

MCB 5270 Antimicrobial Resistance (AMR) 3 Credits**Grading Scheme:** Letter Grade

Covers content related to antimicrobial resistance: the origins of antimicrobial resistance, dissemination, mechanisms, therapeutics, and impact on healthcare, agriculture, and the environment, concentrating on resistance in bacteria; will also discuss other organisms, including viruses, parasites, fungi, and cancer.

Prerequisite: Bachelor's Degree.

MCB 5305L Microbial Genetics and Biotechnology Laboratory 2 Credits**Grading Scheme:** Letter Grade

Methods for mutagenesis, gene transfer and genetic mapping, plasmid isolation, restriction enzyme use, construction of chimeric (recombinant) plasmids, phage isolation and preparation.

Prerequisite: MCB 3023/3023L and 4303 or PCB 4522 with grade of C or higher.

MCB 5505 General Virology 3 Credits**Grading Scheme:** Letter Grade

Basic information on families of viruses from humans, plants, insects, animals, and bacteria. Medical, clinical, diagnostic, biotechnological, and molecular aspects of these viruses.

Prerequisite: MCB 3020/3020L and 4203 with grade of C or higher.

MCB 5655 Clinical Laboratory Ethics, Management, Safety, and Professional Issues 2 Credits**Grading Scheme:** Letter Grade

Designed for students entering healthcare, research, or clinical laboratory science. It explores clinical laboratory microbiology, emphasizing theoretical knowledge and practical applications. Key topics include fiscal and personnel management, laboratory information systems, legal aspects of test reporting, government regulations, certification, licensure, and medical ethics and accreditation policies.

Prerequisite: Enrollment in the CLM program.

MCB 5666 Clinical Research, Assessment, Education, and Quantitative Methods 1 Credit**Grading Scheme:** Letter Grade

Explores clinical laboratory microbiology for healthcare, research, and lab science students. It emphasizes theoretical knowledge and practical applications, focusing on interprofessional healthcare, integrity, and education theory. Students learn scientific inquiry, research steps, topic selection, literature evaluation, data analysis, and various research designs, including quantitative and qualitative methods.

Prerequisite: Enrollment in the CLM program.

MCB 5705 Astrobiology 3 Credits**Grading Scheme:** Letter Grade

Astrobiology examines the origin, evolution, and future of life in our solar system. Topics will include: planet and star formation, biosphere formation, evolutionary processes biogeochemistry, microbial adaptation to extreme environments, planetary habitability, and microbiology on the International Space Station.

Prerequisite: MCB 6656 Environmental Microbiology.

MCB 5942L Clinical Microbiology Lab 2 Credits**Grading Scheme:** Letter Grade

The Clinical Microbiology Laboratory course is a hands-on exploration of the microorganisms that play a pivotal role in human health and disease. Designed for students pursuing careers in healthcare, research, or clinical laboratory science, this course emphasizes practical skills and real-world applications. You will engage in a variety of laboratory techniques to culture, identify, and analyze bacteria, viruses, fungi, and parasites.

Prerequisite: Bachelor's degree in microbiology, Biology or similar, including one microbiology course with lab and student must be enrolled Clinical Laboratory Microbiologist (CLM) certificate or permission of the instructor.

MCB 5945L Clinical Experience in Microbiology 2 Credits**Grading Scheme:** Letter Grade

This course is a hands-on training in a clinical microbiology laboratory with practical exposure to the essential functions of a clinical microbiology laboratory. This course is designed to equip students with the skills needed to conduct a variety of clinical laboratory tests with accuracy, safety, and efficiency. Students will learn to apply quality control principles and practices, critically evaluate laboratory results while consider quality control measures and instrument operation.

Prerequisite: Bachelor's degree in microbiology, Biology

MCB 6095 Careers for Impact in Microbiology and Cell Science 1 Credit**Grading Scheme:** Letter Grade

Prepares students with connections into a variety of Microbiology and Cell Science careers. Essential networking and communication skills will be honed through practical application exercises. A portfolio will be created to identify and obtain suitable experiential learning and career opportunities.

MCB 6096 Innovation Project Management for Life Sciences 1 Credit**Grading Scheme:** Letter Grade

Empowers students with practical tools to manage innovation projects typical of life science research development. Challenges and methodologies associated with developing objectives, preparing project plans, establishing metrics, defining responsibilities, as well as mitigating risks and dealing with uncertainties will be discussed. Skills for strategic prioritization, time management, meeting facilitation, and communication will be strengthened to promote an innovative culture.

MCB 6151 Prokaryotic Diversity 3 Credits**Grading Scheme:** Letter Grade

An introduction to the diversity of Bacteria and Archaea. Discussions will provide a conceptual and historical framework for understanding their 1) origin and evolution; 2) morphological, metabolic, and molecular characteristics; 3) genetic and physiological diversity; 4) importance in human/animal/plant health; and 5) roles in elemental cycling.

MCB 6317 Molecular Biology of Gene Expression 1 Credit**Grading Scheme:** Letter Grade

Synthesis, processing, transport, and translation of RNA in microorganisms and eukaryotes. Additional topics include epigenetic regulation of gene expression.

MCB 6318 Comparative Microbial Genomics 2 Credits**Grading Scheme:** Letter Grade

Methods to allow experimental scientists to efficiently use genomic and post-genomic data that is publicly available. Examples taken primarily from the field of microbial metabolism and regulation.

Prerequisite: PCB 4522 and a working knowledge of basic bioinformatic tools.

MCB 6326 Computational Genomics and Epigenomics 3 Credits**Grading Scheme:** Letter Grade

Genomics and epigenomics utilize high-throughput sequencing technologies in understanding biology questions. The primary goal of this course is to introduce history, theory, latest advances, and computational approaches in (epi)genomics for conducting large-scale genomic analyses. Course topics include sequence alignment, genome assembly and annotation, variant identification, transcriptomics, small RNAs, DNA methylation, histone modification, open chromatin region, and 3D chromatin interaction.

MCB 6355 Microbial/Host Defense 1 Credit**Grading Scheme:** Letter Grade

Principles of host defense to microbial invasion in a context of cellular biology involving both plants and animals.

Prerequisite: MCB 4203 and PCB 5235: Immunology or equivalents, with the minimum grade of a C.

MCB 6407 Prokaryotic Cell Structure and Function 3 Credits**Grading Scheme:** Letter Grade

This course explores the structure and physiology of prokaryotic cells. We review the principles of energy and biosynthesis in aerobic and anaerobic microorganisms and current research topics in microbiology, including chemotaxis, antimicrobial resistance, and adaptations of microbes to extreme environments. One of the emphases of this course is scientific writing.

Prerequisite: CHM 2211 with a minimum grade of C and (MCB 3020 or MCB 3023 with minimum grades of C) or equivalent.

MCB 6417 Microbial Metabolism and Energetics 1 Credit**Grading Scheme:** Letter Grade

Principles of energy and biosynthetic metabolism in aerobic and anaerobic microorganisms. Current biotechnology which incorporates these principles.

Prerequisite: MCB 4403 and BCH 4024 or CHM 3218 or equivalent.

MCB 6424 Probiotics 3 Credits**Grading Scheme:** Letter Grade

Covers the use of microorganisms to promote a healthy status in the host. This course will provide a conceptual background in microbiology and immunology for the use of microorganisms for the prevention or treatment of animal and human diseases.

MCB 6457 Metabolic Regulation 1 Credit**Grading Scheme:** Letter Grade

Environmental sensing and mechanisms of microbial response. Molecular signaling, regulation of genetic information at posttranscriptional and transcriptional levels, effects on metabolism and physiology.

Prerequisite: MCB 4403 and BCH 4024 or CHM 3218 or equivalent.

MCB 6458 Post Translational Modifications of Proteins in Microbiology 2 Credits**Grading Scheme:** Letter Grade

Students will learn about post-translational modifications (PTMs) in microbiology. Topics will include: i) the different types, functions, and mechanisms of PTM, ii) the methods used to identify PTMs, and iii) the impact PTMs have on cell biology, human health, and biotechnology.

MCB 6465 Microbial Metabolic Engineering 1 Credit**Grading Scheme:** Letter Grade

Principles of anaerobic fermentation and its role in production of fuels and chemicals from various feedstocks including lignocellulosic biomass. Evaluation of methods of depolymerization of complex carbohydrate feedstocks to simple sugars for fermentation.

Prerequisite: MCB 4403 and BCH 4024 or CHM 3218 or equivalent.

MCB 6485 Advanced Techniques in Microbiology and Cell Science 2-4 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Application of advanced techniques to experimental research in biochemistry, cell biology, and microbiology.

Prerequisite: consent of instructor.**MCB 6656 Environmental Microbiology 3 Credits****Grading Scheme:** Letter Grade

Overview of microorganisms in the environment including: occurrence, abundance, and distribution; current research methodologies to decipher microbial processes and activities, marine microbial ecology, microbial interactions with the environment and practices of applied environmental microbiology.

Prerequisite: MCB 3020 or MCB 3023 with a grade of C or better.**MCB 6670C The Microbiome 3 Credits****Grading Scheme:** Letter Grade

Increase knowledge, appreciation and use of genomics pertaining to the breadth of microbial diversity across a wide variety of organisms and habitats using methods that do not require culturing of the myriad of inhabitants. Students will use tools, practice analysis and interpretation of genomic data sets to analyze different microbiomes.

Prerequisite: MCB 3020 or MCB 3023 with minimum grades of C.**MCB 6772 Advanced Topics in Cell Biology 1 Credit****Grading Scheme:** Letter Grade

In each semester a specific topic in cell biology with microbiological interest will be considered in a comparative discussion of animal and plant systems.

MCB 6781 Extremophiles 3 Credits**Grading Scheme:** Letter Grade

Students will learn about the evolution, physiology, biochemistry and molecular biology of extremophiles with emphasis on archaea and their viruses. Principles of energy metabolism at the limits of life will be discussed. Research that incorporates cutting-edge techniques and biotechnology applications for using extremophiles to solve real world problems is highlighted

Prerequisite: CHM 2211 (C) & (MCB 3020 or 3023) (C) & (MCB 3020L or 3023L) (C).**MCB 6796 Analysis, Interpretation, and Visualization of Microbiological Data 3 Credits****Grading Scheme:** Letter Grade

Focuses on the analysis and interpretation of microbiological data using R language and other command line tools with a series of examples that range in complexity. Students will analyze various types of microbiological data, including RNAseq, 16SrRNA gene sequencing, direct and indirect microbial growth measurements, and microbial bioproducts, among others. Finally, students will use good practices for data reproducibility.

MCB 6900 Final Assessment - Literature Review 1 Credit**Grading Scheme:** Letter Grade

Critical presentation and synthesis of recent original articles in the microbiological literature. Specifically, this course will help students prepare and generate their literature review for the final MS program assessment. Please note that as this course will be offered in spring, summer and fall, the weekly contact hours may increase slightly during summer due to the shorter course timeline.

Prerequisite: Students must be in their final semester of coursework for the MS program.**MCB 6905 Experimental Microbiology 1-8 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Application of physical, chemical and biological techniques to experimental problems in microbiology. Individual laboratory study.

Prerequisite: eight credits in microbiology and cell science.**MCB 6930 Seminar 1 Credit, Max 8 Credits****Grading Scheme:** S/U

Attendance required of all graduate majors at all research presentations.

MCB 6937 Special Topics in Microbiology 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Contemporary research in a particular aspect of general microbiology.

MCB 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

MCB 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

MCB 7922 Journal Colloquy 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

Critical presentation and discussion of recent original articles in the microbiological literature. Attendance required.

MCB 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MCB 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PCB 5136L Techniques in Microbial and Cell Biology 3 Credits**Grading Scheme:** Letter Grade

A laboratory in experimental bacteriology and cell biology. Emphasis on experimental approaches and techniques used in study of cells and microorganisms. Experiments in microscopy, cell fractionation, metabolism, physiology, genetics, and regulation.

Prerequisite: B grade or higher in MCB 3020L, CHM 3120/3120L.**PCB 5235 Immunology 3 Credits****Grading Scheme:** Letter Grade

Immune system of vertebrate animals. The cellular and molecular events involved in immune responsiveness and resistance to infectious diseases.

Prerequisite: C grade or higher in MCB 3020L.**PCB 6667 Human Genomics 3 Credits****Grading Scheme:** Letter Grade

Increasingly, researchers and health care providers are mining the genome to uncover the basis of disease susceptibility and treatment. Genome-based strategies are used for the detection, treatment, and prevention of many diseases. This course will discuss the field of genomics, how genome sequence data is obtained and analyzed, and most importantly, what can be learned from an individual's genome.

Prerequisite: MS or PhD student in life sciences

Music

MUC 5315 Introduction to Electroacoustic Music 3 Credits

Grading Scheme: Letter Grade

Survey of techniques, history, literature, and materials of electroacoustic music.

Prerequisite: MUC 2102 or equivalent.

MUC 6444 Composition of Electronic Music 3 Credits

Grading Scheme: Letter Grade

Experimental electroacoustic art music composition using interactive software and digital recording.

Prerequisite: MUC 4311 or MUC 5315.

MUC 6445 Electroacoustic Music Composition: Digital I 3 Credits

Grading Scheme: Letter Grade

Introduction to direct-digital software synthesis systems through flowcharting, programming, and instrument design. Focuses on using Csound software.

Prerequisite: MUC 4401 or MUC 6444 or consent of instructor.

MUC 6446 Electroacoustic Music Composition--Digital II 3 Credits

Grading Scheme: Letter Grade

Continuation of MUC 6445. Composition and research in direct-digital software synthesis systems. Includes advanced instrument design, algorithmic composition, and interactive digital signal processing.

Prerequisite: MUC 6445 or consent of instructor.

MUC 6625 Jazz Composition and Arranging 3 Credits

Grading Scheme: Letter Grade

Provides graduate instruction in jazz composition and arranging and techniques for commercial song writing. Students will study chord movement, melodic development and composition techniques for various styles of music. Students will complete original compositions and arrangements, contra-facts, sax solis, big band chart and know the basics of string writing.

MUC 6930 Graduate Composition 3 Credits, Max 6 Credits

Grading Scheme: Letter Grade

Composition of chamber works for instrumental and/or vocal ensembles.

MUC 6932 Composition Seminar 1-3 Credits, Max 12 Credits

Grading Scheme: Letter Grade

Identifying problematic techniques in developing compositional craft for research, presentation, and discussion.

MUC 7447 Advanced Seminar in Electroacoustic Music 3 Credits

Grading Scheme: Letter Grade

Composition and research in advanced topics in computer music.

Prerequisite: MUC 6446 or consent of instructor.

MUC 7931 Advanced Graduate Composition 3 Credits, Max 18 Credits

Grading Scheme: Letter Grade

Composition for large instrumental and/or vocal ensembles.

MUC 7938 Seminar in Digital Sound Processing, Control, and Composition 3 Credits

Grading Scheme: Letter Grade

Topics in current research and digital audio theory, languages, algorithms, and applications for electroacoustic music.

Prerequisite: MUC 6446 or consent of instructor.

MUE 5336C Teaching Secondary Choral Music 3 Credits

Grading Scheme: Letter Grade

Develop techniques and skills necessary to build and sustain a successful and comprehensive choral program in a secondary school setting. Students will synthesize and apply previous knowledge and skills related to vocal physiology and pedagogy, lesson and curriculum planning, sight-singing and musicianship, and other topics. Field experience in schools.

Prerequisite: MUE 3311 and MUE 3330.

MUE 5338C Teaching Instrumental Music 3 Credits

Grading Scheme: Letter Grade

Develop musical and pedagogical knowledge, skills, and dispositions essential for teaching elementary, middle school, and high school instrumental music. Field work in schools.

Prerequisite: MUE 3311 and MUE 3330.

MUE 5941L Internship in Music Teaching 3 Credits

Grading Scheme: S/U

Students in this course build on the work done throughout their previous music education coursework to develop competence in applying the principles of learning in K-12 music classrooms.

Prerequisite: MUE 3311 & MUE 3330 & TSL 3323 & (MUE 4421/5XXX OR MUE 4422/5XXX). Three chosen from MUE 2440, MUE 2442, MUE 2470, MUE 2430, MUE 2450, MUE 2452, MUE 2460, MUE 2462. Certificate in Music Education students only; coreq: MUE 4140.

Corequisite: undefined

MUE 6080 Historical and Philosophical Foundations of Music Education 3 Credits

Grading Scheme: Letter Grade

Historical development and philosophy. Compares the U.S. with other countries and cultures. Individuals, associations and institutions that shape the music education program.

MUE 6385 Music in Higher Education 3 Credits

Grading Scheme: Letter Grade

Various aspects and programs of music in higher education for persons who intend to teach in or administer departments of music.

MUE 6399 Creative Thinking in Music 3 Credits

Grading Scheme: Letter Grade

Introducing the study of musical creativity by examining literature in and outside of music, emphasizing the process and its role in teaching/learning. The class explores how the mind works with music to produce creative results. Students engage in activities to explore the creative process and derive applications to K-12 music.

MUE 6444 Materials and Methods of String Class Teaching 2 Credits

Grading Scheme: Letter Grade

Survey of materials and methods suitable for public school string classes and orchestras.

MUE 6497 Public School Orchestral Literature 2 Credits

Grading Scheme: Letter Grade

Survey of materials suitable for various educational levels.

MUE 6647 Trends in Teaching and Learning Music 3 Credits

Grading Scheme: Letter Grade

Trends in Teaching and Learning Music

MUE 6696 Technology Assisted Music Learning 3 Credits**Grading Scheme:** Letter Grade

Exploring the role of technology in creating, performing, and responding to music, with applications to music learning/participation. A primary emphasis is the development of students' Musical Technological Pedagogical and Content Knowledge (M-TPACK). The technological focus includes notation software, MIDI, instructional programs, digital media, Internet resources, and productivity tools.

MUE 6747 Assessing Music Learning 3 Credits**Grading Scheme:** Letter Grade

Providing a foundation in all aspects of assessment in music teaching, from learning theory to practical application of assessment techniques, data management, critical thinking, progress reporting, and portfolio building. Assessment task design in the artistic response modes, item, and rubric development is covered. Students develop a series of assessments.

MUE 6785 Research in Music Education 3 Credits**Grading Scheme:** Letter Grade

Materials and specialized techniques of research in music education.

MUE 6790 Capstone Project for Music Education 3 Credits**Grading Scheme:** S/U

Completing an original research project that addresses an identified issue or need within the field of music education.

Prerequisite: Advanced standing in the graduate program; MUE 6785 ; permission of instructor

MUE 6931 Instructional Design in Music Education 3 Credits**Grading Scheme:** Letter Grade

Explores the ways in which artistic forms of understanding and reflection can be useful in designing and evaluating education programs.

MUE 7045 Seminar in Music Teacher Education 3 Credits**Grading Scheme:** Letter Grade

Examination of philosophical, historical, and contemporary practices in undergraduate and graduate music teacher education. Review of the research literature. Topics will include curricular frameworks, fieldwork models, development of teacher identity, teacher induction, teacher assessment, professional development, and the demands of policy stakeholders.

Prerequisite: Admission to the PhD in music education program.

MUE 7046 Sociology of Music Education 3 Credits**Grading Scheme:** Letter Grade

The purpose of this course is to gain knowledge and understanding of the social factors that impact music education in the United States and around the world.

Prerequisite: Admission to an MM, MME, or PhD program in music.

MUE 7746 Measurement and Evaluation of Music 3 Credits**Grading Scheme:** Letter Grade

Examines methods and techniques for measuring and evaluating learning in music.

Prerequisite: MUS 6685.

MUE 7784 Quantitative Research Methods 3 Credits**Grading Scheme:** Letter Grade

Intended to give students a thorough grounding in quantitative research methods appropriate for music education inquiry. Topics to be covered include quantitative research designs, survey design, data gathering, statistical analysis, and interpretation of results.

Prerequisite: MUE 6785.

MUE 7786 Qualitative Research in Music Education 3 Credits**Grading Scheme:** Letter Grade

The purpose of this course is to further understand and develop the skills required to design, conduct, and report music education research using qualitative approaches. Theoretical frameworks, data analysis procedures, and ethical considerations are examined.

Prerequisite: MUE 6785 or equivalent.

MUE 7924 Doctoral Colloquium in Music Education 0 Credits**Grading Scheme:** S/U

A forum for students to explore the role of research, research paradigms, critical issues, emerging events, scholarly writings, and professional organizations in music education through interaction with prominent speakers, faculty, and each other. A venue for sharing research and navigating the path to establish a scholarly identity and academic career.

MUE 7938 Music Education Seminar 3 Credits**Grading Scheme:** Letter Grade

Contemporary issues and problems in music education. Investigating and planning research relevant to selected problems.

MUG 6105 Graduate Conducting 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Conducting larger works from the standard repertoire for band, orchestra, and chorus.

MUG 6227 Advanced Choral Rehearsal Techniques 3 Credits**Grading Scheme:** Letter Grade

Provides the graduate conducting student with increased insight into, and advanced knowledge of, advanced choral techniques/methods for the purpose of preparing choral ensembles to present artistic performances. Information is disseminated via lecture, observation, and hands-on experience.

Prerequisite: intended for matriculating Master's or Doctoral students in choral/instrumental conducting.

MUG 7106 Advanced Graduate Conducting 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

For conducting emphasis. Conducting major works for band, orchestra, and chorus. Emphasizes analysis and interpretation.

MUH 5219 Graduate Music History Review 3 Credits**Grading Scheme:** Letter Grade

Credit earned will not apply to the credit-hour requirement of any graduate degree offered in the School of Music.

MUH 5505 Introduction to Ethnomusicology 3 Credits**Grading Scheme:** Letter Grade

Field research. Using oral, written, and media sources. Transcription and analysis. Interpretative techniques.

Prerequisite: consent of instructor.

MUH 5684 Introduction to Historical Musicology 3 Credits**Grading Scheme:** Letter Grade

Critical approaches to the history of the discipline, fundamental concepts and methodologies, and significant musicological writings representing style periods and conceptual issues.

Prerequisite: successful completion of the complete undergraduate music history sequence; graduate student status; and successful completion of the music history entrance exam or the review course.

MUH 6515 Musics of the World 3 Credits**Grading Scheme:** Letter Grade

Providing students with knowledge and experiences to allow them to accurately distinguish musical characteristics of musics from around the world, identify local examples of diverse musical traditions, explore the methods used in ethnomusicology, and develop approaches to world music pedagogy.

MUH 6526 American Vernacular Music 3 Credits**Grading Scheme:** Letter Grade

Introducing American vernacular music from the 1840s to the recent past, examining the cultural/social history and an analytic study of multiple musical styles. Processes used by vernacular musicians – playing, improvising, songwriting, collaboration, listening, facility on multiple instruments – will be explored, as will curricular implications for K-12 settings.

MUH 6535 African Popular Music and Globalization 3 Credits**Grading Scheme:** Letter Grade

This course engages with a wide variety of African popular musics in different contexts of transformation, with the main objective of developing and nuancing our understanding of what “popular music” means in Africa within histories of culture contact. The course will provide foundational understanding of the field of ethnomusicology and popular music studies, with particular attention to how African music has been impacted by globalization through its contact with the West.

Prerequisite: Graduate students in music.**MUH 6538 Jazz, Hip Hop, and African Connections 3 Credits****Grading Scheme:** Letter Grade

This course will consider how African music and culture have influenced African American musical expression since the beginning of the trans-Atlantic slave trade and up through the development of the blues, jazz, soul music, hip hop, and rb. We will consider how such cultural flows have moved in both directions, from the foundations of African American music in African aesthetics, to the ways that jazz and hip hop musicians have made explicit reference or taken inspiration from Africa.

Prerequisite: Graduate student in music.**MUH 6545 The Guitar in Latin American Culture 3 Credits****Grading Scheme:** Letter Grade

Cultural view of Latin American peoples through the sounds of the guitar, focusing on the history of modern classical guitar and its role in mediating Iberian and Latin American music.

MUH 6548 Seminar in Caribbean Music 3 Credits**Grading Scheme:** Letter Grade

Examines historical, social, and aesthetic dimensions of Caribbean music and music making.

MUH 6549 Seminar in Brazilian Music 3 Credits**Grading Scheme:** Letter Grade

Examines historical, social, and aesthetic dimensions of Brazilian music and music making.

MUH 6635 Seminar in American Music 3 Credits**Grading Scheme:** Letter Grade

History and literature of American music from the landing of the pilgrims to the present.

MUH 6665 History of Opera 3 Credits**Grading Scheme:** Letter Grade

Historical development of opera and its literature from the Florentine Camerata to the present.

MUH 6671 Seminar in Renaissance Music 3 Credits**Grading Scheme:** Letter Grade

Selected topics from the Renaissance era for research and study.

MUH 6672 Seminar in Baroque Music 3 Credits**Grading Scheme:** Letter Grade

Selected topics from the Baroque era for research and study.

MUH 6673 Seminar in Classical Music 3 Credits**Grading Scheme:** Letter Grade

Selected topics from the Classical era for research and study.

MUH 6674 Seminar in Nineteenth-Century Music 3 Credits**Grading Scheme:** Letter Grade

Selected topics from the nineteenth century for research and study.

MUH 6675 Seminar in Twentieth-Century Music 3 Credits**Grading Scheme:** Letter Grade

Selected topics from the 20th century for research and study.

MUH 6725 Timbre: Critical Discussions 3 Credits**Grading Scheme:** Letter Grade

This course critically examines timbre by engaging with the following questions: What is timbre, and how is it related to sound? What scholarship has addressed timbre and in what ways? How can we discuss and write about timbre effectively? By exploring timbre in classical and popular music genres, as well as in specific works, and by considering timbre through lenses such as music education and race, we seek to better understand what some scholars argue is a rather nebulous phenomenon.

Prerequisite: MUH 5219 with a minimum grade of C or passed music history entrance exams.**MUH 6726 Music and Audience 3 Credits****Grading Scheme:** Letter Grade

This course considers the role and function of the audience in conjunction with the symphony, opera, and ballet. Historical readings will cover what audiences were like in the Classical Period, Romantic Era, and the Twentieth Century, and we will discuss major masterworks of those time periods. We will also consider the modern audience by discussing recent publications in various mediums and attending two live concerts.

Prerequisite: MUH 5219 with a minimum grade of C or passed music history entrance exams.**MUH 6931 Nationalism in Music 3 Credits****Grading Scheme:** Letter Grade

Historical development of nationalist movements in music. Emphasizes the 19th and 20th centuries.

MUH 6935 Special Topics in Music History 3 Credits**Grading Scheme:** Letter Grade

Centering around topics of current interest or of special interest to students or instructors. Topics or focus may vary from semester to semester.

Prerequisite: MUH 5219 or passing grade on music history diagnostic exam.**MUH 7411 Medieval and Renaissance Notation 3 Credits****Grading Scheme:** Letter Grade

Practical, theoretical, and reportorial study of notation from ca. 1000-1600.

MUH 7938 Musicology Seminar 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Contemporary issues and selected topics in musicology.

Prerequisite: MUS 6716.

MUL 6486 Piano Literature 3 Credits**Grading Scheme:** Letter Grade

Survey of piano literature from Baroque to present.

MUL 6495 Graduate Organ Literature 3 Credits**Grading Scheme:** Letter Grade

An historical survey of the major trends and styles of organ composition from the Renaissance to the present.

MUL 6505 Symphonic Literature 3 Credits**Grading Scheme:** Letter Grade

Symphonic Literature

MUL 6555 Survey of Wind Literature 3 Credits**Grading Scheme:** Letter Grade

Literature for chamber and larger wind ensembles from Baroque to present.

MUL 6565 Chamber Music Literature 3 Credits**Grading Scheme:** Letter Grade

Survey of music literature for chamber ensemble from Baroque to present.

MUL 6645 Choral Literature 3 Credits**Grading Scheme:** Letter Grade

Survey of choral music from Renaissance to present.

MUM 6007 Strategic Music Entrepreneurship Development 3 Credits**Grading Scheme:** Letter Grade

Equips music students with a comprehensive foundation, resources, and skill set for improving marketability and success as a music entrepreneur upon graduation. Students will develop various skills for understanding and engaging in business, legalities, communication arts, innovative content creation, and niche development within music entrepreneurship.

Prerequisite: the course is intended for graduate students in music. Non-music majors may enroll with permission of the instructor.**MUM 6008 Foundations of Music Business 3 Credits****Grading Scheme:** Letter Grade

Fosters comprehensive and chronological understanding of major facets of the music business, and to observe how rapid changes in the global music industry challenge music professionals and music business organizations to become more entrepreneurial in their planning and practice.

Prerequisite: intended for graduate students in music, non-music majors may enroll with permission of the instructor.**MUM 6501 Music Production in Commercial Media 3 Credits****Grading Scheme:** Letter Grade

Covers a review of music for commercials, Programming Logos, jingles and radio station IDs. It covers the basics of home recording studios, techniques in Logic recording software and using a mixing board. Students will develop compilation tracks and sample media to demonstrate the concepts covered during the course.

MUM 6502C Music Production in Commercial Media 3 Credits**Grading Scheme:** Letter Grade

This course is intended to cultivate industry-standard skills in the recording arts and sciences for creating music that facilitates entrepreneurs' commercial media and marketing platforms. Students will cultivate audio engineering, microphone placement, production techniques to devise (1) original music and covers within various genres and (2) musical scores, foley FX, and voice-overs to support commercial media (i.e., albums, visual media, digital advertisements, and podcasts).

Prerequisite: Graduate student in the School of Music.**MUM 6565C Multimedia Production for the Music Industry 3 Credits****Grading Scheme:** Letter Grade

This course is intended to develop independent music professionals' skills for creating enthralling multimedia content and implementing strategic communication strategies for (1) applying effective target marketing via online platforms, (2) increasing employability for multimedia music presentations, and (3) expanding vocational opportunities within various sectors of the music industry.

Prerequisite: Graduate student in the School of Music.**MUN 6010 Graduate Ensemble 1 Credit, Max 3 Credits****Grading Scheme:** Letter Grade

For graduate students holding positions of leadership and participating in music ensembles.

MUN 6019 Ensemble Participation 0 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

An ensemble of variable instrumentation and/or voices performing traditional and contemporary repertoire. For upper-division students who have completed required hours of ensemble participation or elective credits for their degree program, this ensemble exists to allow them to continue performing in ensembles without impacting semester load credits, or excess hours credits. This course allows students from any degree to continue participation in ensembles in support of the University.

Prerequisite: Successful completion of Four (4) MUN Prefix Ensembles. Audition (where required), Permission of Instructor and completion of required Large Ensemble or Elective Credits. Departmental Consent Required.**MUN 6125 Concert Band 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

Performance of general and popular band literature.

MUN 6135 Symphonic Band 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Performance of traditional and contemporary band literature.

MUN 6145 Symphonic Wind Ensemble 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Performance of wind ensemble literature.

MUN 6215 University Orchestra 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Standard orchestra literature.

MUN 6315 Concert Choir 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Advanced choral ensemble providing specialized study and performance opportunities for vocally qualified students.

MUN 6325 Chorale 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Vocal training and public performance of varied treble chorus repertoire.

MUN 6335 Glee Club 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Vocal training and public performance of varied tenor-bass chorus repertoire.

MUN 6345 Chamber Singers 1 Credit, Max 10 Credits**Grading Scheme:** Letter Grade

Select ensemble of experienced singers that performs advanced choral literature. Students must possess a high degree of musicianship, artistry, and professionalism.

Prerequisite: Consent of instructor (successful audition).

MUN 6385 Choral Union 1 Credit, Max 10 Credits**Grading Scheme:** Letter Grade

Mixed choral ensemble open to students, faculty, staff, and local residents who have previous choral experience. Course literature is drawn from a variety of historical periods, cultures, and musical styles, presenting students with varied perspectives and experiences.

Prerequisite: Consent of instructor (successful audition).**MUN 6445 Percussion Ensemble 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

Study and performance of ensemble literature for percussion instruments.

MUN 6496 World Music Ensemble 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Rehearsal and performance of folk and traditional music of the world.

MUN 6497 New Music Ensemble 1 Credit, Max 15 Credits**Grading Scheme:** Letter Grade

Rehearsal and performance of repertoire for small ensembles written in the 20th and 21st centuries.

Prerequisite: consent of instructor.**MUN 6649 Musical Theatre Instrumental Ensemble 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

This course provides graduate students with an understanding of how an advanced theatre production is prepared. The student will engage in individual coaching with undergraduates, vocal preparation with the performers, and find opportunities to conduct. They will receive instruction in musical theatre styles/performance practices from the 1930s - present.

Prerequisite: Audition required or by recommendation of faculty.**MUN 6715 Jazz Band 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

Standard and experimental jazz ensemble. Jazz laboratory.

MUN 6816 Steel Drum Ensemble 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

Rehearsal, performance and historical aspects of steel drum.

Prerequisite: consent of instructor.**MUN 6835 World Music Ensemble - African Popular Music Ensemble 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

The African Popular Music Ensemble will specialize in the popular music of the African continent, with a special focus on Afrobeat, highlife, soukous, African jazz, and the brass band traditions of Africa and the diaspora.

Prerequisite: Permission of instructor.**MUR 6206 Survey of Hymnody 3 Credits****Grading Scheme:** Letter Grade

Historical development of hymns in liturgical use, the scope of hymnic literature, and the major trends in hymnal compilation and editing.

MUR 6705 Sacred Music Literature 3 Credits**Grading Scheme:** Letter Grade

The development of congregational and choral song from the early church to the present. Survey of instrumental forms in worship music.

MUS 6685 Psychology of Music 3 Credits**Grading Scheme:** Letter Grade

Cultural influences, learning conditions, biological constraints, psychoacoustical phenomena, and musical taste. Measuring and predicting musical taste and ability.

MUS 6716 Methods of Musical Research and Bibliography 3 Credits**Grading Scheme:** Letter Grade

Materials and specialized techniques of research in musicology.

MUS 6905 Projects and Problems 1-3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Approved problems for study and research.

MUS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

MUS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

MUS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

MUS 6973 Individual Project 1-10 Credits, Max 10 Credits**Grading Scheme:** S/U

Creative project or graduate recital in lieu of written thesis. Project or recital must be acceptable to the candidate's supervisory committee and to the Graduate School.

MUS 7656 Teaching Music and the Creative Process 3 Credits**Grading Scheme:** Letter Grade

Examines the creative process, appropriate pedagogical applications, and curricular implications.

Prerequisite: graduate composition major or consent of instructor.**MUS 7905 Projects and Problems 1-3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

For doctoral students. Approved problems for study and research.

MUS 7941 Internship 1-12 Credits, Max 18 Credits**Grading Scheme:** S/U

A supervised internship for doctoral students in music, arranged to support professional goals and/or the students' cognate studies. The internship provides an opportunity for each student to work in a professional setting in a position that carries responsibility and is of particular interest.

Prerequisite: Graduate standing in music.**MUS 7951 Individual Project 1-6 Credits, Max 12 Credits****Grading Scheme:** S/U

Individual projects for doctoral students in music.

Prerequisite: Graduate standing in music.**MUS 7955 Preparation for Doctoral Project 1-6 Credits, Max 6 Credits****Grading Scheme:** S/U

For individual capstone projects for Doctor of Musical Arts students who have not yet passed their comprehensive examination but wish to begin work on their project. The scope and focus of the project will be determined by the student in consultation with his/her supervisor and doctoral committee.

MUS 7956 Doctoral Project 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

For individual capstone projects for Doctor of Musical Arts (DMA) students in music who have passed their comprehensive examination. The scope and focus of the project will be determined by the student in consultation with his/her supervisor and doctoral committee.

MUS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

MUS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

MUT 6051 Graduate Music Theory Review 3 Credits**Grading Scheme:** Letter Grade

Review of core materials in preparation for graduate course in music theory.

MUT 6177 Graduate Jazz Theory 3 Credits**Grading Scheme:** Letter Grade

Provides graduate instruction in jazz fundamentals, harmony, chord symbols, scales and modes, piano voicings and techniques in memorizing standards. Through completing this course students will have a solid knowledge of how to efficiently teach jazz theory and understand how to operate and manage online jazz theory technology platforms.

MUT 6445 Advanced Counterpoint 3 Credits**Grading Scheme:** Letter Grade

Emphasizes advanced harmonic techniques and fugal writing.

Prerequisite: MUT 4411, 4421.**MUT 6531 Figured Bass and Continuo Performance 3 Credits****Grading Scheme:** Letter Grade

Theoretical principles and practical application of figured bass realization and continuo performance practice techniques.

MUT 6565 Late Nineteenth- and Twentieth-Century Styles 3 Credits**Grading Scheme:** Letter Grade

Analysis of exemplary works of the late 19th and 20th centuries.

Prerequisite: MUT 6629.**MUT 6576 Contemporary Styles 3 Credits****Grading Scheme:** Letter Grade

Recent trends in music through score study and analysis, composition exercises, and supplementary readings.

Prerequisite: MUT 6629.**MUT 6617 Approaches to Theoretical Analysis in Music Education 3 Credits****Grading Scheme:** Letter Grade

Developing and enhancing skills in analyzing Western classical music, with an emphasis on application to the field of Music Education. Students will synthesize the essential concepts of music theory and analysis through examining selections from the repertoire to expand upon and refine analytical approaches learned in the undergraduate theory curriculum. Course activities will include analysis of music using visual and aural processes.

MUT 6627 Seminar in Reductive Analysis 3 Credits**Grading Scheme:** Letter Grade

Advanced study in reductive approach to analysis of music.

Prerequisite: MUT 6629.**MUT 6629 Analytical Techniques 3 Credits****Grading Scheme:** Letter Grade

Study of analytical systems and methodology emphasizing style analysis and the integration of all elements of music.

MUT 6751 Pedagogy of Music Theory 3 Credits**Grading Scheme:** Letter Grade

Techniques and art of teaching music theory and conditions for effective learning.

Prerequisite: MUT 6629.**MUT 6936 Music Theory Seminar 1-3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Selected topics from current research for study, presentation, and discussion.

Prerequisite: MUT 6629.**MUT 7316 Advanced Orchestration 3 Credits****Grading Scheme:** Letter Grade

Analysis of 19th- and 20th-century compositions for full orchestra. Orchestration of original scores and arrangements for full orchestra.

MUT 7585 Seminar in Musical Style 3 Credits**Grading Scheme:** Letter Grade

Analysis of exemplary works from the Medieval period to the early 19th century.

Prerequisite: MUT 6629.**MUT 7760 History of Music Theory 3 Credits****Grading Scheme:** Letter Grade

The study of musical theories, primarily through readings, from ancient Greece to the present.

MVK 5156 Improvisational Keyboard Skills and Related Technology 2 Credits**Grading Scheme:** Letter Grade

Improvisational skills, electric keyboard technology, and musical styles outside the classical realm.

Prerequisite: upper-division and graduate keyboard majors and minors, or consent of instructor.

MVK 6605 Organ Pedagogy 3 Credits**Grading Scheme:** Letter Grade

Principles, methods, and practices currently used in the teaching of organ.

MVO 6250 Secondary Music Performance 1-3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Offered in piano, voice, organ, harpsichord, historical instruments, conducting, carillon, and all standard band and orchestral instruments.

MVO 6460 Music Performance-MM 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Offered in piano, voice, organ, harpsichord, historical instruments, conducting, carillon, and all standard band and orchestral instruments.

MVO 7461 Music Performance-DMA 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

For doctoral students. Offered in piano, voice, organ, harpsichord, historical instruments, conducting, carillon, and all standard band and orchestral instruments.

MVS 6651 String Pedagogy I 3 Credits**Grading Scheme:** Letter Grade

Survey of Suzuki violin pedagogy from Unit IA (Pre-Twinkle) through Unit IV (Vivaldi A Minor Concertos).

MVV 6651 Vocal Pedagogy 3 Credits**Grading Scheme:** Letter Grade

Study and teaching of vocal techniques.

Prerequisite: SPA 3101 or equivalent.

Nuclear and Radiological Engineering

EGN 6913 Engineering Graduate Research 0-3 Credits, Max 12 Credits

Grading Scheme: S/U

Course will provide the student with supervised research in a laboratory setting.

ENU 5005 Introduction to Nuclear Engineering 4 Credits

Grading Scheme: Letter Grade

Students will learn Atomic and Nuclear Physics, Interaction of Radiation with Matter, Detecting Nuclear Radiations, Neutron Diffusion and Moderation, Nuclear Reactor Theory, Time Dependent Reactor, and Two-Phase Flow and Heat Transfer at a level appropriate to begin graduate-level coursework in nuclear engineering sciences.

Prerequisite: NES_PHD or NES_MS.

ENU 5142 Risk Assessment and Economic Analysis of Nuclear Systems. 3 Credits

Grading Scheme: Letter Grade

Probabilistic risk assessment, including fault trees, event trees, reliability block diagrams, component reliability modeling; and economic analysis, including sensitivity studies, capital cost, levelized cost of electricity, of nuclear systems. .

Prerequisite: STA 3032 or ENU 5005 or (ENU 4104 & ENU 4134).

ENU 5176L Principles of Nuclear Reactor Operations Laboratory 1 Credit

Grading Scheme: Letter Grade

Principles of reactor operations applied to startup, operation, and control of the training reactor to include performing reactor physics measurements and instrumentation and control calibrations.

Prerequisite: ENU 4144 or equivalent and consent of instructor.

ENU 5186 Nuclear Fuel Cycles 3 Credits

Grading Scheme: Letter Grade

Fuel cycle from uranium mining through waste management. Reactor fuel cycle including economics and advanced fuel management. Nodal code evaluation of criticality, power peaking and power sharing through operating cycle, use of burnable poisons and reshuffle and reload for uranium and plutonium cycles.

Prerequisite: ENU 4104.

ENU 5516L Nuclear Engineering Laboratory II 2 Credits

Grading Scheme: Letter Grade

Laboratory practice in neutron and gamma detection and analysis. Determination of basic neutron parameters in nonmultiplying and multiplying media.

Prerequisite: ENU 4612L or ENU 5615L and 4104 or ENU 6106.

ENU 5615C Nuclear Radiation Detection and Instrumentation 4 Credits

Grading Scheme: Letter Grade

Interaction of radiation with matter, radiation-detection systems, pulse shaping, amplification, amplitude and time-analyzing circuitry; counting and measuring devices and control systems for nuclear reactors.

Prerequisite: ENU 3003 and EEL 3303L or equivalent. ;

Corequisite: ENU 6051 ; or prereq of ENU 4605 or equivalent.

ENU 6051 Radiation Interaction Basics and Applications I 3 Credits

Grading Scheme: Letter Grade

Interaction of X-rays, gamma rays, neutrons, and charged particles with matter; radioactive decay, nuclear moments, and nuclear transitions. Application to basic problems in nuclear engineering sciences.

ENU 6106 Nuclear Reactor Analysis I 3 Credits

Grading Scheme: Letter Grade

Nuclear criticality, neutron transport equation, multigroup neutron diffusion theory, and perturbation theory. Reactor kinetics: point model, reactivity feedback, and space-time models.

Prerequisite: ENU 6051.

ENU 6115 Power Plant Simulation 3 Credits

Grading Scheme: Letter Grade

Instruction and practical experience in the operation and interpretation of results from major nuclear reactor simulation codes such as TRACE, RELAP5, RETRAN, CATHARE, and SAM.

Prerequisite: EML 4140 or ENU 4133 or ENU 4134 or ENU 6135 or ENU 6136 or ENU 5005.

ENU 6126 Fundamentals of Reactor Kinetics 3 Credits

Grading Scheme: Letter Grade

Nuclear reactor kinetics, including mathematics, transport and diffusion considerations, steady state and time dependent reactor physics, delayed neutron properties, photoneutrons, and neutron reactions, approximations and solutions to the kinetics equations, numerical solution methods using explicit, implicit, integral, marching, and finite difference solution methods.

Prerequisite: ENU 4001, ENU 4605, ENU 4103.

ENU 6135 Nuclear Thermal Hydraulics 4 Credits

Grading Scheme: Letter Grade

Treatment of nuclear thermal sciences: thermodynamics, fluid mechanics, heat transfer, two-phase flow, boiling; sub-channel thermal hydraulics, steam generator design, balance of plant analysis.

Prerequisite: EML 4140 and (ENU 4133 or EGN 3353C)

ENU 6136 Advanced Nuclear Thermal Hydraulics 3 Credits

Grading Scheme: Letter Grade

Topics in advanced nuclear thermal hydraulics, fluid mechanics, and heat transfer including areas of ongoing research and applications to current and future nuclear fission reactors.

Prerequisite: ENU 4134 or EGM 6812 or EML 6155 or ENU 6135

ENU 6143 Advanced Nuclear Reactor Concepts 3 Credits

Grading Scheme: Letter Grade

Covers modern concepts for nuclear fission reactor systems, including advanced light-water reactors, gas-cooled reactors, and liquid-metal reactors. Topics covered for each type of reactor system will include thermal modeling, reactor safety, licensing, reactor physics, materials selection, and fuel cycles.

Prerequisite: (ENU 4134 or ENU 6135) & (ENU 4103 or ENU 6106).

ENU 6305 Radiochemistry 3 Credits

Grading Scheme: Letter Grade

Fundamental behavior of radionuclides, use and application of radioanalytical techniques, and applications to nuclear fuel cycle.

Prerequisite: A course or two course sequence in introductory undergraduate chemistry, such as CHM 2045/2046 or CHM 2095/2096.

ENU 6375 Nuclear Security Science 3 Credits

Grading Scheme: Letter Grade

The nuclear fuel cycle from the perspective of nuclear forensics, security, nonproliferation, and safeguards and in the context of international nuclear policies. Nuclear threats are balanced with the past history of nuclear weapons use, current nonproliferation technology, and the growth of the international nuclear industry. Signatures including radiological and morphological characteristics of nuclear material is introduced as well as the techniques for the detection of special nuclear mater.

Prerequisite: ENU 6051.

ENU 6616C Advanced Radiation Measurement Laboratory 3 Credits**Grading Scheme:** Letter Grade

Advanced radiation detection methods and applications in the fields of nuclear safeguards, dosimetry, and nuclear medicine. Coverage of radiological non destructive assay methods for materials control and accountability. Hands-on experience on state-of-the-art radiation detection instrumentation.

Prerequisite: ENU 6051.**ENU 6715 Plasma and Fusion 3 Credits****Grading Scheme:** Letter Grade

Introduction to the concepts underlying plasma confinement in fusion devices.

Prerequisite: PHY 2049.**ENU 6835 Nuclear Fuels 3 Credits****Grading Scheme:** Letter Grade

Survey of the nuclear fuels from ore to waste, including mining, pin design, fabrication, in-core performance, storage, disposal and fuel economics.

ENU 6845L Nuclear Fuels and Materials Laboratory 3 Credits**Grading Scheme:** Letter Grade

Design of irradiation experiments and post-irradiation examinations (PIE) needed to understand the behavior of nuclear fuels and materials. Hands-on experience on state-of-the-art characterization instrumentation, sample preparation and handling, and safe radiological work practices.

Prerequisite: ENU 6805 or ENU 4800.**ENU 6905 Individual Work 1-6 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Supervised study or research in areas not covered by other graduate courses.

ENU 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ENU 6935 Nuclear and Radiological Engineering Seminar 1 Credit, Max 8 Credits**Grading Scheme:** S/U

Discussion of research, current trends in the nuclear related industry, government, and research establishments.

ENU 6936 Special Projects in Nuclear and Radiological Engineering Sciences 1-9 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Nonthesis research projects.

ENU 6937 Special Topics in Nuclear and Radiological Engineering Sciences 1-9 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Special Topics in Nuclear and Radiological Engineering Sciences

ENU 6940 Supervised Teaching 2 Credits, Max 5 Credits**Grading Scheme:** S/U

This is a practicum course to provide students with supervised teaching experience on developing effective instructional methods and materials in engineering education as well as effective mentoring skills in a professional setting.

Prerequisite: NES_PHD.**Corequisite:** EGS 6056.**ENU 6941 Professional Development for Nuclear Engineering Sciences 1 Credit****Grading Scheme:** S/U

Students will learn strategies and sound practices in proposal research, creation, and defense.

Prerequisite: NES_PHD.**ENU 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ENU 6972 Research for Engineer's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Engineer's Thesis

ENU 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ENU 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Occupational Therapy

OTH 6539 Occupational Therapy Theory 3 Credits**Grading Scheme:** Letter Grade

Preparation for entry-level position through introduction of basic principles of management and systems.

OTH 6636 Principles of Occupational Therapy Screening and Evaluation II 4 Credits**Grading Scheme:** Letter Grade

Builds on OTH 6635. Application of screening and evaluation principles to evaluation process and learning to administer tools to adult population.

Prerequisite: OTH 6635.**OTH 6641 Occupational Therapy Interventions I 4 Credits****Grading Scheme:** Letter Grade

Occupational therapy theory and treatment as it relates to infants, children, adolescents, and their families.

OTH 6642 Occupational Therapy Interventions II 6 Credits**Grading Scheme:** Letter Grade

Basic interventions for adults through elders using ICDH systems as framework. Planning and applied treatment approaches including acquisition, restorative, and compensatory strategies.

Prerequisite: OTH 6641.**OTH 6708 Issues in Occupational Therapy Practice I 2 Credits****Grading Scheme:** Letter Grade

Current health care issues.

OTH 6709 Issues in Occupational Therapy Practice II 2 Credits**Grading Scheme:** Letter Grade

Forum for debating viewpoints regarding current practice issues relevant to occupational therapy.

OTH 6819 Occupational Therapy Competency 1 Credit**Grading Scheme:** S/U

The purpose of this course is for students to demonstrate competence for entry-level occupational therapy practice prior to commencement of level 2 fieldwork.

Prerequisite: OTH 6816.**Corequisite:** OTH 6818.

OTH 6861 Specialty Internship 2-10 Credits**Grading Scheme:** S/U

Prereq or coreq: OTH 6780 . Field experience in clinical, community, educational, and administrative settings approved by the department.

OTH 6905 Individual Work 1-10 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Project related to teaching, research, administration, or clinical practice.

OTH 6907 Professional Development Project 6 Credits**Grading Scheme:** Letter Grade

Concepts and strategies for assessment of practice outcomes and program evaluation. Independent design, implementation, and reporting of an independent project.

OTH 6933 Special Topics in Occupational Therapy 2-4 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Selected topics in theory and research in occupational therapy.

Packaging Science

PKG 5003 Advanced Distribution and Transport Packaging 3 Credits**Grading Scheme:** Letter Grade

Containment, protection, and preservation related to transporting and distributing packaging products. Methods for efficient scheduling and directing transport and delivery of packages.

PKG 5006 Advanced Packaging Principles 3 Credits**Grading Scheme:** Letter Grade

Modern lab instruments and procedures employed for packaging used to solve problems from packaging industry.

Prerequisite: chemistry, physics, or biology.

PKG 6100 Advanced Computer Tools for Packaging 3 Credits**Grading Scheme:** Letter Grade

Label design, bar code technology, spreadsheets, visual basic programming, 3D package design, and distribution efficiency analysis.

PKG 6905 Individual Work in Packaging 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Special problems in packaging sciences.

PKG 6932 Special Topics in Packaging Sciences 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Lectures, laboratory, and/or special projects.

Pharmacy—Medicinal Chemistry

PHA 6242 Artificial Intelligence in Clinical Toxicology 3 Credits**Grading Scheme:** Letter Grade

Provides an in-depth exploration of artificial intelligence (AI) and its applications in clinical toxicology. Students learn the fundamentals of AI, machine learning and programming, deep learning and large language model evaluation and validation, focusing on real-world applications in clinical toxicology. Includes theoretical knowledge and practical skills, preparing students to integrate AI into clinical toxicology practice.

PHA 6354 Natural Medicinal Products 3 Credits**Grading Scheme:** Letter Grade

Chemistry of compounds derived from plants and animals.

PHA 6356 Structure Determination of Complex Natural Products 3 Credits**Grading Scheme:** Letter Grade

Rigorous structure determination of natural products, using modern spectroscopic methods. Become able to elucidate the structure of any organic small molecule.

Prerequisite: CHM 5235 or consent of instructor.

PHA 6357 Herbal & Dietary Supplements 3 Credits**Grading Scheme:** Letter Grade

Herbal Dietary supplements are extensively used by consumers. This course provides an overview of commonly used supplements to assist healthcare practitioners in providing patients with adequate counseling to avoid drug interactions and false claims.

PHA 6416 Pharmaceutical Analysis I 3 Credits**Grading Scheme:** Letter Grade

Theory and applications of relevant analytical techniques for analysis of drugs in biological samples. Offered spring term in odd-numbered years.

PHA 6417 Pharmaceutical Analysis II 3 Credits**Grading Scheme:** Letter Grade

Absorption, fluorescence, phosphorescence, and spectroanalysis of drugs and related compounds.

PHA 6425 Drug Biotrans and Molecular Mechanisms of Toxicity 3 Credits**Grading Scheme:** Letter Grade

Enzymology and mechanisms of drug biotransformation pathways. Examples of drugs and other xenobiotics that exhibit toxicity related to biotransformation.

Prerequisite: introductory organic chemistry, biochemistry.

PHA 6432 Fundamentals of Pharmaceutical Chemistry 1 Credit**Grading Scheme:** Letter Grade

This is a foundation course whose aims are providing an introduction to the principles of Pharmaceutical chemistry, including an understanding of drug structure-activity relationships, prediction of the physico-chemical properties of a drug, basic knowledge of the major pathways of drug metabolism, and factors that can contribute to drug-drug interactions.

PHA 6435 Biosynthetic Logic of Medicinal Natural Products 3 Credits**Grading Scheme:** Letter Grade

Covers topics of biosynthesis of the major families of medical natural products, structural and biochemical understanding of their biosynthetic logic, gene cluster identification, genome mining, and production of bioactive "unnatural products" for drug discovery and development.

Prerequisite: Students are expected to have the background of Biochemistry, Enzymology, and Bioorganic Chemistry. Or permission of instructors.

PHA 6444 Pharmaceutical Chemistry I 3 Credits**Grading Scheme:** Letter Grade

Students are shown how to predict the solubilities, structure-activity relationships, basic synthesis routes for selected structures, metabolism and pharmacological activity/potency of various drug classes. In particular, anticoagulants, ACE inhibitors, glucocorticoid steroids, nitrate esters, adrenergics, cholinergics, diuretics, anesthetics, antihyperlipidemics, muscle relaxants, anxiolytics, antidepressants, sedative hypnotics and vitamins are covered.

PHA 6447 Drug Design 3 Credits**Grading Scheme:** Letter Grade

Relevant disciplines and their effect on new drug development, from discovery of a new active lead compound to final refinement as a commercial product.

Prerequisite: organic chemistry, biochemistry, pharmacology, or consent of instructor.

PHA 6452 Metabolic Biochemistry 3 Credits**Grading Scheme:** Letter Grade

This course will introduce students to the principles of anabolic and catabolic pathways and cellular energy efficiency. The course also provides an understanding of the biological, physical, and chemical processes for each reaction pathway.

PHA 6460 Principles of Drug Action & Development I 3 Credits**Grading Scheme:** Letter Grade

Exploration of the pre-clinical drug development process, including the prediction of solubilities, structure-activity relationships, basic synthesis routes, metabolism and pharmacological activity/potency of select drug classes and individual members of classes based on the contribution of their functional groups to their structures.

PHA 6461 Principles of Drug Action & Development II 3 Credits**Grading Scheme:** Letter Grade

Expands on the discussion of the pharmacology and structure-activity relationship of drugs established in PHA 6460. Blockbuster drug classes such as antibiotics, antidiabetic, antiviral, and antineoplastic drugs are covered to illustrate future directions for structural modifications and new applications.

PHA 6467C Drug Design II 3 Credits**Grading Scheme:** Letter Grade

Outline of how relevant disciplines impact on the development of a new drug product from the discovery of a new active lead compound to its final refinement as a commercial product. Contributions of Organic Chemistry, Biochemistry, Metabolic Chemistry, Physical Chemistry, Analytical Chemistry, and Pharmacological Chemistry are discussed.

Prerequisite: PHA 6447 Drug Design I.

PHA 6468 Biotransformation Considerations in Drug Design 2 Credits**Grading Scheme:** Letter Grade

Explores the importance of considering biotransformation in the process of drug design and discovery. Topics include the major pathways of biotransformation of various functional groups present in drugs and the enzymes involved, including their regulation and factors affecting metabolism and enzyme activity. Other topics are the role of metabolism in drug toxicity and examples from the literature of metabolic activation of drugs and naturally occurring toxic chemicals.

Prerequisite: PHA 6447 and PHA 6467C and an additional undergraduate chemistry or biochemistry class with permission of instructor..

PHA 6471 Synthetic Medicinal Chemistry 3 Credits**Grading Scheme:** Letter Grade

Review of acid and base properties of pharmacologically active molecules. Review of mechanisms of synthetic reactions, and their applications.

PHA 6472 Organic Synthesis of Drug Molecules 3 Credits**Grading Scheme:** Letter Grade

Covers advanced topics in drug molecule synthesis, including: organic reaction mechanisms, retrosynthetic analysis, asymmetric synthesis, heterocyclic chemistry, natural product synthesis, drug design and synthesis, structure-activity relationships. Secondary topics that will be included in this course include: anticancer/antibacterial agents, screening approaches.

Prerequisite: CHM 5224 or permission of instructor.

PHA 6532 Occupational Toxicology 3 Credits**Grading Scheme:** Letter Grade

Focuses on the growing field of occupational toxicology, the specific toxicants encountered in various work environments, and how both acute and chronic exposure can impact health. Symptom presentation, differential diagnosis, and treatment are covered as well as preventive measures that can be implemented to reduce or prevent such exposures.

PHA 6533 Epidemiology & Biostatistics in Clinical Toxicology 3 Credits**Grading Scheme:** Letter Grade

Covers principles and applications of epidemiology and biostatistics as they apply to clinical toxicology. Students will learn to critically evaluate and understand data analyses and results presented in the medical literature. Upon completion of this course, students will have the basic knowledge of epidemiological analysis and biostatistical techniques to aid in the interpretation and treatment of the poisoned or overdosed patient.

PHA 6534 Toxicology of Chemical Weapons 3 Credits**Grading Scheme:** Letter Grade

Providing healthcare providers, first responders, and others that may be exposed to chemical weapons with an understanding of their toxicology and treatment approaches.

PHA 6535 Principles of Nucleotide Activity 2 Credits**Grading Scheme:** Letter Grade

This course will be introducing the students to the chemical structure of DNA and RNA; the synthetic processes for DNA and RNA synthesis; biochemical reactions and pathways for nucleotide synthesis; DNA replication, transcription and translation; covalent and reversible interactions of nucleic acids with small molecules and proteins and an overview of techniques for the analysis of nucleic acids.

PHA 6537 The Toxicology of Licit & Illicit Drugs of Abuse 3 Credits**Grading Scheme:** Letter Grade

Recognizing the symptoms of toxidromes early, providing adequate intervention and treatment to the patient, and ensuring the safety of those delivering care are critical components of this course. Following a brief recap of the basics of medical toxicology and toxidromes, the course will focus on the different classes of drugs, their commonly encountered abuse, treatment approaches, and legal components such as drug testing.

PHA 6543 Pharmaceutical Chemistry II 3 Credits**Grading Scheme:** Letter Grade

Showing students how to predict the solubilities, structure-activity relationships, basic synthesis routes for selected structures, metabolism and pharmacological activity/potency of various drug classes. In particular antidiabetics, anticonvulsants, H1 and H2 antagonists, analgetics, nonsteroidal antiinflammatory drugs, hormones, antibiotics, antiviral agents, and antineoplastic agents are covered.

PHA 6556 Introduction to Clinical Toxicology 3 Credits**Grading Scheme:** Letter Grade

Introducing the basic methods and procedures commonly employed in Clinical Toxicology as well as the concept of Clinical Toxicology as an interdisciplinary science within the field of healthcare.

PHA 6557 Clinical Toxicology 1 3 Credits**Grading Scheme:** Letter Grade

Providing students with an understanding of the toxic effects and clinical applications of various therapeutic drug classes including cardiovascular, CNS, analgesic, anesthetic, antineoplastic, and antibiotic drugs.

Prerequisite: VME 6602**PHA 6840 Medicinal Chemistry of Drugs of Abuse 3 Credits****Grading Scheme:** Letter Grade

Pharmacological effects of commonly encountered licit and illicit pharmaceutical compounds.

PHA 6850 Principles of Forensic Science 3 Credits**Grading Scheme:** Letter Grade

Introducing the basic disciplines of forensic science. The course is composed of twelve modules.

PHA 6851 Forensic Analysis of DNA 3 Credits**Grading Scheme:** Letter Grade

Techniques for isolation of DNA from cells. Spectroscopic techniques. Hydrodynamic and electrophoretic separation methods. Sequence determination. Statistical analysis and forensic significance.

PHA 6852 Mammalian Molecular Biology 3 Credits**Grading Scheme:** Letter Grade

Focus on the principles of modern molecular biology and biochemistry and expand on the concepts you may have already encountered in other classes in this program. The content will also include the applications of experimental techniques and procedures routinely used in this field.

PHA 6853 Biological Evidence and Serology 3 Credits**Grading Scheme:** Letter Grade

Overview of crime scene investigation as it pertains to biological evidence. Crime scene safety. Collecting and preserving evidence. Identifying, analyzing, and interpreting biological stains.

PHA 6854 Forensic Immunology 3 Credits**Grading Scheme:** Letter Grade

Antibody formation, antigen structure. Complement mediated reactions. Hypersensitivity. Immuno-electrophoretic techniques in forensic science.

PHA 6855 Forensic Genetics 3 Credits**Grading Scheme:** Letter Grade

Principles of inheritance. Genetic polymorphisms and forensic implications, population genetics and paternity testing.

PHA 6856 Bloodstain Pattern Analysis 3 Credits**Grading Scheme:** Letter Grade

Blood spatter creation and interpretation. Recording, collection, and processing of bloodstains and blood spatter evidence.

PHA 6857 Forensic Analysis of DNA 2 3 Credits**Grading Scheme:** Letter Grade

This course covers how to interpret DNA data to include mixture deconvolution and the statistics that apply to DNA matches/inclusions. Modules guide the student through the basis of Y-STR and Kinship testing statistical applications. Students will learn the report writing, review and testimony skills required of a DNA analyst.

Prerequisite: PHA6851 - Forensic Analysis of DNA**PHA 6861 Intro to Forensic Medicine 2 4 Credits****Grading Scheme:** Letter Grade

Forensic medicine is the application of medical knowledge to the investigation of crime. This course gives knowledge and understanding of the application of scientific knowledge to medico-legal problems and legal proceedings, specifically as related to investigating medical crimes as well as the causes of sudden and unexpected deaths.

Prerequisite: VME 6582.**PHA 6905C Research Procedures in Pharmaceutical Sciences 1-4 Credits****Grading Scheme:** Letter Grade

Research Procedures in Medicinal Chemistry

PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

PHA 6934 Seminar in Medicinal Chemistry 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Weekly presentation and discussion of research reports based on college programs or literature.

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

PHA 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

PHA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Pharmacy—Pharmaceutical Outcomes and Policy

PHA 5270 Health Care and Patient Safety 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of applicable federal, state, local, and health and safety laws relevant to the practice of health care risk management and patient safety.

PHA 5271 Health Care Risk Management 3 Credits**Grading Scheme:** Letter Grade

Introduction to the concept of risk management in health care settings, describing its development, role of the health care risk manager, and connection between risk management, quality improvement and corporate compliance.

PHA 6041 Principles of Peer-Reviewed Biomedical Publications 3 Credits**Grading Scheme:** Letter Grade

Students will learn principles fundamental to the ethical and responsible publication of peer-reviewed biomedical content. Skills gained will relate to the purpose and importance of best practices and ethical standards in the conduct and reporting of research, the roles and responsibilities involved in peer-reviewed publishing, and the principles and practices of sound publication planning, development, publication, and post-publication.

PHA 6186 Pharm Outcomes/Policy Found 1 3 Credits**Grading Scheme:** Letter Grade

This course is part of a two-course series, designed to provide students with an overview of drug discovery, development, approval, marketing, regulation, and use in the United States. Course I focuses on drug discovery, clinical trials, and the FDA approval process.

Prerequisite: Status as a Graduate Student, PharmD student or Post Baccalaureate student.

PHA 6187 Pharm Outcomes/Policy Found 2 3 Credits**Grading Scheme:** Letter Grade

This course is part of a two-course series, designed to provide students with an overview of drug discovery, development, approval, marketing, regulation, and use in the United States. Course II focuses on drug marketing, use, and public policy.

Prerequisite: Status as a Graduate Student, PharmD student or Post Baccalaureate student.

PHA 6211 Applied Pharmacy Benefit Design 3 Credits**Grading Scheme:** Letter Grade

Students will apply principles learned in PHA 6276 to advance their understanding of the fundamentals of pharmacy benefit practice. Using real-world pharmacy benefit trend data, students will take a stepwise approach to examining various components of trend and understanding how those may be influenced by tools used in pharmacy benefit design and management, external market forces, and other factors.

Prerequisite: PHA 6276.

PHA 6213 Advanced Case Studies in Managed Care Pharmacy 3 Credits**Grading Scheme:** Letter Grade

This course probes deeply into the most complex problems facing managed care pharmacy. Students will complete case study assignments that illustrate a real and current challenge facing managed care pharmacy programs today. This process will simulate situations encountered by professionals working within managed care organizations, consultancies, and the biopharmaceutical industry.

Prerequisite: PHA 6276.

PHA 6227 Institutional Pharmacy Leadership I 3 Credits**Grading Scheme:** Letter Grade

Addresses leadership topics relevant to institutional pharmacy with an emphasis on case study analysis. Topics include leading people, leading the pharmacy enterprise, leading change and innovation, providing leadership in safety and quality, and information technology and systems.

PHA 6228 Institutional Pharmacy Leadership II 3 Credits**Grading Scheme:** Letter Grade

Addresses leadership topics relevant to institutional pharmacy with emphasis on case-study analysis. Topics include leadership in effective financial management, building presence with executive leadership, leading for results, and gaining leadership skills through self-development.

PHA 6246 Medication Safety & Technology 3 Credits**Grading Scheme:** Letter Grade

This course provides an overview of medication safety technology used in healthcare today, including barcode medication administration, computerized provider order entry, automated dispensing cabinets, infusion smart pumps, clinical decision support, robots and IV workflow technology. Discussions will surround the function and purpose of the technology, how it improves safety, how people circumvent the safety features, and real-world medication events that occurred while using the technology.

PHA 6264 Pharmaceutical Health Technology Assessment 3 Credits**Grading Scheme:** Letter Grade

This course covers the essentials of health technology assessment (HTA) as applied to pharmaceuticals. The purpose of HTA is to assess a pharmaceutical treatment's comparative benefits, costs, and value. Students will explore how to structure an evaluation question, systematically identify relevant clinical and economic evidence, and interpret the results of an HTA. Finally, students will learn how HTA is applied to pricing, reimbursement, and coverage decisions in the US and abroad.

Prerequisite: Permission of instructor.

PHA 6265 Introduction to Pharmaceutical Outcomes and Policy I 3 Credits**Grading Scheme:** Letter Grade

Introduces students to the breadth of research issues in Pharmaceutical Outcomes and Policy, including legal, educational, regulatory and financial aspects of medication use; patient and provider behavior in medication use; the structure of pharmaceutical supply chain; and patient safety and risk management.

PHA 6268 Pharmacoepidemiology and Patient Safety 3 Credits**Grading Scheme:** Letter Grade

Exposure to research methodologies in pharmacoepidemiology relevant to drug safety, drug effectiveness, and outcome assessment.

Emphasizing observational study designs, including patient follow-up studies, case-control and cohort designs.

PHA 6269 Pharmaceutical Products and Public Policy 3 Credits**Grading Scheme:** Letter Grade

Relationships among pharmaceutical manufacturers, institutions, managed care, professions, and the public. The government's role in assuring high quality pharmaceutical products and services. Quality controls managed by the public and by industry. Congressional oversight of medication development, production, and use.

PHA 6273 Structure, Process, and Outcomes of Regulation 3 Credits**Grading Scheme:** Letter Grade

Emphasizes the role of the legislative, executive and judicial branches of state and federal government in the establishment of standards for pharmacy practice and drug distribution. It also places special emphasis on the administrative rule making process. Additionally, the course focuses on the purpose of government agencies, the approach to standards setting by each type of agency, and the effects of regulation on public health.

PHA 6274 Federal Regulations of Drugs and Pharmacy 3 Credits**Grading Scheme:** Letter Grade

The Federal Food, Drug and Cosmetic Act, regulations promulgated by the Food and Drug Administration, and judicial interpretations of controversies in this area. Federal regulation of drug research, new drug approval, drug marketing and drug distribution. The balance sought by the FDA and other federal agencies in the protection of the public from unsafe and/or ineffective drugs, without unnecessarily restricting access to therapies.

PHA 6275 Federal Regulations of Controlled Substances 3 Credits**Grading Scheme:** Letter Grade

The Federal Controlled Substances Act, regulations promulgated by the Drug Enforcement Administration, and judicial interpretations of controversies in this area. The "closed-system" of controlled substance distribution created under federal law. Federal restrictions on the manufacture, distribution and use of drugs that are subject to abuse. Treatment programs for the disease of addiction.

PHA 6276 Pharmacy Benefit Design & Management 3 Credits**Grading Scheme:** Letter Grade

An overview of managed care pharmacy, focusing on the structure and function of the prescription benefits management within health plans and PBMs and the role of pharmacists with a managed care pharmacy department.

PHA 6277 Ethics in Drug Development Production and Use 3 Credits**Grading Scheme:** Letter Grade

Governments, health professionals, patients and research institutions look to the field of ethics for guidance on how decisions should be made in the treatment of patients and in research. A process for ethical decision making. Basic theories and principles of biomedical ethics, with emphasis on utilitarianism. Application of principles to subjects such as informed consent, abortion/contraception, physician-assisted dying, experimentation with human subjects, and confidentiality.

PHA 6278 State Regulation of Drugs and Pharmacy 3 Credits**Grading Scheme:** Letter Grade

State, federal, and nongovernmental regulation of health care professions and practice sites. Regulatory responses to professional misconduct. Role of professional self-regulation. Consumerism and state regulation.

PHA 6279 Pharmaceutical Outcomes and Policy Capstone 3 Credits, Max 6 Credits**Grading Scheme:** S/U

This graduate capstone course is the culminating learning experience in the Master of Pharmacy, Pharmaceutical Outcomes and Policy program. Students will recall information and synthesize what they have learned in prerequisite courses to apply pharmaceutical research to project the impact of pharmaceutical policies on outcomes. At the end of this course, students will be able to prepare an oral and written evidence based pharmaceutical policy brief that policymakers can use.

PHA 6280 Medicare and Medicaid 3 Credits**Grading Scheme:** Letter Grade

Costs and financing of Medicare and Medicaid. Eligibility, program administration, benefits, and relationships between state and federal agencies.

PHA 6283 Introduction to Pharmacoeconomics 3 Credits**Grading Scheme:** Letter Grade

Fundamental methods of pharmacoeconomic analysis. Focuses on the theory, methods, and application of technology assessment in health care. Applications will be drawn from a variety of health care settings, including pharmaceuticals.

PHA 6286 Pharmaceutical Microeconomics 3 Credits**Grading Scheme:** Letter Grade

Introduction to basic microeconomic principles as they are applied to pharmaceuticals. Elucidation of the economic tools and the fundamental concepts of choice, opportunity costs, supply and demand, elasticity, utility maximizing behavior, competition, monopolies and oligopolies in the healthcare market.

PHA 6287 Pharmaceutical Health Economics 3 Credits**Grading Scheme:** Letter Grade

Examines economic principles and issues of health care and pharmaceuticals in the United States. Topics examined include health care structure and financing, market failures, human capital, and producer and consumer behavior.

PHA 6288 Critical Review of Research Methods 3 Credits**Grading Scheme:** Letter Grade

Research design and methodology utilized in clinical research with a focus on understanding each component of the research process, including how to formulate a research question, develop hypotheses, analyze instruments, collect relevant data, data analysis, and critically interpret the results, while preserving the ethical guidelines for human subject research.

PHA 6289 Regulating Clinical Research 3 Credits**Grading Scheme:** Letter Grade

Introduces history and current regulatory environment of human subjects research as a background to regulatory frameworks and contemporary issues structuring the development of clinical medical research, including federal regulations of Departments of Health and Human Services and those of the Food and Drug Administration, as well as non-federal sources of regulation.

PHA 6717 Measurement in Pharmaceutical Outcomes and Policy Research 3 Credits**Grading Scheme:** Letter Grade

This course covers measurement of health outcomes as ascertained from real-world data, including patient-reported outcomes and clinical and administrative databases. Additionally, we address strategies for identifying biases arising from misclassification of exposure, outcomes and confounders, as well as approaches to mitigate such biases, including missing data problems and time-related biases in measurement and study design.

Prerequisite: PHC 6053 or equivalent and PHA 6891 or equivalent.**PHA 6741 Writing for Pharmaceutical Outcomes and Policy 3 Credits****Grading Scheme:** Letter Grade

Communication entails control: crafting a message such that a reader understands what a writer intends. We will use the pharmacy literature to identify how texts are made for different audiences, then use the literature to write evidence-based prose. The ultimate goal of the class is to develop (or polish) a suite of literacy skills useful for professional communication.

PHA 6791 Systematic Reviews and Meta-Analyses for Pharmaceutical Interventions 3 Credits**Grading Scheme:** Letter Grade

The purpose of this course is to enable students to be able to participate in and complete systematic reviews for pharmaceutical interventions and to complete meta-analyses. Students will learn how to build a team, formulate research questions and hypotheses, develop search strategies, and abstract, collect and report data. Students who complete this course will understand the importance of systematic reviews in making clinical and policy decisions in health care.

Prerequisite: PHA 6793 (or its equivalent) and prior graduate-level statistics coursework or undergraduate level applied statistics. Students without prior statistics courses may be required to take PHA 6935 Quantitative Methods in Evidence-Based Pharmacy.

PHA 6793 Evidentiary Basis of Pharmaceutical Use 3 Credits**Grading Scheme:** Letter Grade

The overall goal of the course is to familiarize students with methods and tools to evaluate the medical literature. Students will be exposed to an array of study designs and analytic methods. In clinical cases, students evaluate strengths and weaknesses of the published literature and use evidence to support their recommendations about the appropriate use of pharmaceuticals.

PHA 6795 Quantitative Methods in Evidence-Based Pharmacy 3 Credits**Grading Scheme:** Letter Grade

This course introduces a range of quantitative methods used in the pharmacy and medical literature. The course topics include study designs, hypothesis testing, sampling, between group comparisons, correlations, regressions, and more. In this course, students develop the ability to critically evaluate methods used in quantitative research; thus, enabling students to apply evidence to the practice of pharmaceutical outcomes and policy.

PHA 6796 Study Design in Pharmaceutical Outcomes & Policy Research 3 Credits**Grading Scheme:** Letter Grade

Methods for evaluation and improvement of drug therapy outcomes including critical appraisal of drug and clinical service literature with special focus on patient and medication safety.

PHA 6797 Applied Pharmaceutical Research Communications 3 Credits**Grading Scheme:** Letter Grade

This course will describe the concept of pharmaceutical value from the viewpoint of the health care provider, the consumer, and the payer. Students will learn about various types of medical research communications for each audience and their applicable rules and regulations. This is an applied class where students will produce portions of a variety of medical research communications, culminating in a portfolio of work suitable for sharing in a job interview.

PHA 6799 Medication Safety & Quality Program Evaluation 3 Credits**Grading Scheme:** Letter Grade

Explores the methodologies through which patient safety data are collected and evaluated. The use of existing databases on patient safety will be examined. The course includes design of a patient safety study, the evaluation of data, and the use of results from program evaluation to implement improvements to ongoing programs.

PHA 6805 Applied Data Interpretation and Reporting of Findings in Pharmacy 3 Credits**Grading Scheme:** Letter Grade

Develops research skills including generation of questions; hypotheses testing; and testing, interpretation, and reporting of findings.

PHA 6806 Pharmacoeconomic Modeling 3 Credits**Grading Scheme:** Letter Grade

Providing an introduction to methods and techniques for conducting pharmacoeconomic studies, including classifying disease, identifying pharmaceutical products from prescription claims, risk adjustment, practical decision analysis, Markov modeling, and indirect treatment comparisons.

Prerequisite: PHA 6283**PHA 6891 Introduction to Pharmacoepidemiology 3 Credits****Grading Scheme:** Letter Grade

Explores basic epidemiology principles with a particular focus on how they are applied to pharmaceuticals. Provides a basic understanding of causation, measure disease occurrence and causal effect, biases in study design, data analysis and use of epidemiology in clinical settings.

PHA 6892 Practices and Procedures of the IRB 3 Credits**Grading Scheme:** Letter Grade

Describes the nuts and bolts of how Institutional Review Boards operate. Topics discussed include IRB membership, IRB authority, criteria for IRB approval of research or exemption from review, and suspension or termination of IRB approved research. The process of risk/benefit decision making is reviewed. The constituencies served by the IRB are examined. Current issues in IRB practice are discussed. Practical information about the week-to-week management of an IRB is explained.

PHA 6893 Research Ethics 3 Credits**Grading Scheme:** Letter Grade

Introduce the student to the ethical issues that must be addressed in clinical research with human subjects. It will include an introduction to the primary theories and methods of ethical reflection and analysis, the conceptual distinctions and continuities between ethical and legal / policy questions, and illustrate the background to current issues with selected cases from the history of human subjects research.

PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6937 Topics in Pharmaceutical Administration 2 Credits**Grading Scheme:** Letter Grade

Analysis of special topics and recent developments in pharmaceutical administration, including innovations in the distribution of drugs and health-care services.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

PHA 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

PHA 7807 Advanced Pharmacoepidemiology 3 Credits**Grading Scheme:** Letter Grade

Structured as an interactive discussion of selected readings based on topics in contemporary pharmacoepidemiology and the application of advanced pharmacoepidemiology techniques.

Prerequisite: STA 6166 and STA 6167 and PHA 6717 and PHA 6805 and PHA 6268, or equivalents.

PHA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Pharmacy—Pharmaceutics

PHA 5729 Intentional Living: Developing a Wellness Mindset (AKA, The Happiness Course) 1 Credit**Grading Scheme:** S/U

This course will explore the concept of happiness and examine evidence-based practices that support personal growth, meaningful relationships and contentment. Through participation in class discussion, experiential activities and independent learning, students will gain knowledge and skills promoting a wellness mindset. Students will increase self-awareness around resilience, growth mindset, and professional burnout mitigation strategies.

PHA 6116 In Vivo and In Vitro Stability of Drugs 3 Credits**Grading Scheme:** Letter Grade

Effects of various disease states, age, genetic differences, stress, nutrition, and drug interactions on drug metabolism. Offered fall term in even-numbered years.

PHA 6122 Population Pharmacokinetics and Pharmacodynamics 3 Credits**Grading Scheme:** Letter Grade

Offers a comprehensive exploration of theoretical concepts in population Pharmacokinetics/Pharmacodynamics modeling with practical applications using continuous and noncontinuous data. There are two assigned lectures weekly, available online. Half of the lecture series consists of live, hands-on active learning sessions with recordings posted afterward. Assignments related to active learning sessions will be provided. Students have the flexibility to watch the lectures at their convenience.

Prerequisite: PHA 6125.

PHA 6123 Quantitative Systems Pharmacology (QSP) Modeling 3 Credits**Grading Scheme:** Letter Grade

Provides a comprehensive overview of Quantitative Systems Pharmacology (QSP) modeling and its applications across the drug development process. This course mimics a real world QSP project by integrating theory, practice, and the experience of working in multidisciplinary groups. Students will gain a foundational understanding of QSP principles, develop and evaluate models based on disease pathophysiology and drug mechanisms of action, and explore QSP's role in RD.

Prerequisite: PHA 6125.

PHA 6125 Introduction to Quantitative Pharmacology 3 Credits**Grading Scheme:** Letter Grade

Compartmental analysis with computers. Offered spring term in even-numbered years.

PHA 6131 Physiologically-Based Modeling 3 Credits**Grading Scheme:** Letter Grade

Provides students and trainees with the theoretical concepts as well as hands-on applications in physiologically-based modeling and its use in drug development and regulatory evaluation with focus on physiologically-based pharmacokinetic (PBPK) modeling.

PHA 6133 Translational Clinical Pharmacology 3 Credits**Grading Scheme:** Letter Grade

Provides Pharm.D. and Ph.D. students with an in-depth understanding of experimental, basic and advanced modeling simulation methodologies and their application to optimize patient dosing and rationally develop drugs.

Prerequisite: completion of an intro course on pharmacokinetic or pharmacodynamic principles such as PHA5132 (or equivalent). Documentation of course content (incl. contact hours) should be provided. The final decision will be made by the course director.

PHA 6170C Pharmaceutical Product Formulation 3 Credits**Grading Scheme:** Letter Grade

Rationale and design of pharmaceutical dosage forms. Offered fall term in odd-numbered years.

PHA 6183 Pharmaceutical Gene Delivery 3 Credits**Grading Scheme:** Letter Grade

Designed for graduate students researching gene delivery. Lectures on vector design and construction including review of related molecular biology and cell biology. Lectures on gene delivery systems (both viral and nonviral vectors) and their applications. Recent progress of gene therapy for human diseases including student presentations. Offered in odd-numbered years.

PHA 6185 Life Cycle of a Drug 1 Credit**Grading Scheme:** Letter Grade

This foundational course in the Pharmaceutical Sciences provides an introduction to and conceptual basis for research across the "life cycle of a drug;" from design and discovery through preclinical studies to clinical trials and post-marketing assessment of drug safety and efficacy, leading to re-design and restart of the cycle.

Prerequisite: Students should have completed their first year of the graduate program in pharmaceutical sciences or have completed the first two years of the PharmD curriculum.

PHA 6416 Pharmaceutical Analysis I 3 Credits**Grading Scheme:** Letter Grade

Theory and applications of relevant analytical techniques for analysis of drugs in biological samples. Offered spring term in odd-numbered years.

PHA 6418 Model-Informed Drug Development 3 Credits**Grading Scheme:** Letter Grade

Prepares students to become experts in systems-level modeling of various diseases and therapeutics. Trainees will learn the effect of drugs on major physiological-systems and how these effects can be beneficial or detrimental. Various computational tools are introduced. Problem-based-learning exercises will enable trainees to design experiments and interpret data quantitatively.

Prerequisite: The ideal prerequisite would be completion of an introductory course in basic pharmacology and or pharmacokinetics and pharmacodynamics. Equivalent courses are acceptable. Courses such as PHA5132 and PHA6125 are recommended but not required.

PHA 6449 Pharmacogenomic and Genomic Data Analysis 3 Credits**Grading Scheme:** Letter Grade

Contemporary experimental approaches in pharmacogenomic and genomic research design. This course will focus on pharmacogenomics and human genomics, particularly disease genomics; including utilization of key knowledge from the central dogma of molecular biology, the human genome, genomic, transcriptomic, and metabolomics approaches, and approaches to defining functional effects of candidate biomarkers.

Prerequisite: biochemistry, PHA 6425, or consent of instructor.**PHA 6630 Foundations of Medication Management: Pharmacotherapy of Chronic Disease 3 Credits****Grading Scheme:** Letter Grade

This course will introduce the core elements of comprehensive medication management (CMM), communication techniques, and documentations strategies needed for the successful provision of CMM services. Content will focus on incorporating precision medicine and pharmacogenomics into CMM care and business models.

PHA 6631 Foundations of Medication Management: Patient Care and Practice 3 Credits**Grading Scheme:** Letter Grade

This course will introduce the core elements of comprehensive medication management (CMM), communication techniques, and documentations strategies needed for the successful provision of CMM services. Content will focus on incorporating precision medicine and pharmacogenomics into CMM care and business models.

PHA 6632 Foundations of Medication Therapy Management II 3 Credits**Grading Scheme:** Letter Grade

Business elements of medication therapy management (MTM), MTM practice models, documentation systems, business plan development, and basic financial principles needed for the successful provision of MTM.

Prerequisite: All students have a prior pharmacy degree.**PHA 6633 Foundations of Medication Management: Individualized Pharmacotherapy I 3 Credits****Grading Scheme:** Letter Grade

Prepare the student to utilize a comprehensive medication therapy management (CMM) and precision medicine approach in patients with chronic health conditions that range from common to complex focusing on select cardiovascular, respiratory, neurological, mental health, and gastrointestinal disorders.

Prerequisite: GMS 6224 and PHA 6134 and PHA 6935.**PHA 6634 Foundations of Medication Management: Individualized Pharmacotherapy II 3 Credits****Grading Scheme:** Letter Grade

Prepares the student to utilize a comprehensive medication therapy management (CMM) and precision medicine approach in patients 2235 with chronic health conditions that range from common to complex focusing on select women's health, men's health, hematology, endocrine, and renal disorders.

Prerequisite: GMS 6224 and PHA 6134 and PHA 6935.**PHA 6635 Medication Therapy Management: A Renal Focus 3 Credits****Grading Scheme:** Letter Grade

Principles of medication therapy management in patients with renal disorders.

Prerequisite: PHA 6631 and PHA 6632**PHA 6636 Medication Therapy Management: A Gastrointestinal Focus 3 Credits****Grading Scheme:** Letter Grade

Principles of medication therapy management in patients with gastrointestinal disorders.

Prerequisite: Foundations of MTM I and Foundations of MTM II**PHA 6637 Medication Therapy Management: A Psychiatric Focus 3 Credits****Grading Scheme:** Letter Grade

Introducing the student to principles of medication therapy management in patients with psychiatric disorders.

Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632)**PHA 6638 Medication Therapy Management: A Neurologic Focus 3 Credits****Grading Scheme:** Letter Grade

Introducing the student to principles of medication therapy management in patients with neurologic disorders.

Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632)**PHA 6639 Medication Therapy Management: A Respiratory Focus 3 Credits****Grading Scheme:** Letter Grade

Introducing the student to principles of medication therapy management in patients with respiratory disorders.

Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632).**PHA 6740 Fundamentals of Grant Writing in the Pharmaceutical Sciences 2 Credits****Grading Scheme:** Letter Grade

This course is designed to teach the fundamentals of grantsmanship, which will be applied in real-time as the student writes their proposal.

Prerequisite: Students must have completed two years of study in the Pharmaceutical Sciences graduate program. Exemptions to this must be approved by the concentration graduate coordinator.**PHA 6830 Nanomedicine-based Immunotherapy 3 Credits****Grading Scheme:** Letter Grade

Covers the whole spectrum of nanomedicine drug development through the lens of immunology and immunotherapy, by integrating nanomedicine formulation with Drug Delivery, Pharmaceutical Analysis, and Pharmacokinetics. The topics covered in this course include nanomedicine formulation and characterization, pharmacology (PKPD), and their clinical translation.

Prerequisite: Permission of instructor.**PHA 6894 Introduction to Graduate Studies 1 Credit****Grading Scheme:** Letter Grade

time management, intellectual property, research notebooks, laboratory leadership, grantsmanship, preparing presentations, publishing and professionalism.

Prerequisite: consent of instructor.**PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

PHA 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

PHA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Pharmacy—Pharmacodynamics

MCB 5252 Microbiology, Immunology, and Immunotherapeutics 4 Credits**Grading Scheme:** Letter Grade

Microbiology and immunology for pharmacy students. Microorganisms and infection, control with antimicrobials, host immune response, immune disorders.

Prerequisite: CHM 2210, 2211, and consent of instructor.**PHA 6189 CNS Drug Discovery 3 Credits****Grading Scheme:** Letter Grade

An exploration of drug design concepts and preclinical assays used in CNS drug discovery in addition to the drug approval process. Topics include rational drug design, targets and receptors, small and large molecule drugs, blood brain barrier, in vitro assays, in vivo assays, and clinical trials.

Prerequisite: PHA 6185 and PHA 6508 and PHA 6509.**PHA 6508 Systems Physiology and Pathophysiology I 3 Credits****Grading Scheme:** Letter Grade

Systems Physiology and Pathophysiology-I is the first of a two-course sequence that aims to provide graduate students with an integrated knowledge base in the physiological functions of the human body and pathological changes pertinent to the development and progression of various diseases. As an integral component of the Ph. D. curriculum, the two courses will provide students with a solid understanding of human pathophysiology in preparation for their dissertation research.

Prerequisite: Upper level undergraduate Anatomy and Physiology**PHA 6509 Systems Physiology and Pathophysiology II 3 Credits****Grading Scheme:** Letter Grade

Systems Physiology and Pathophysiology-II is the second of a two-course sequence that aims to provide graduate students with an integrated knowledge base in the physiological functions of the human body and pathological changes pertinent to the development and progression of various diseases. As an integral component of the Ph. D. curriculum, the two courses will provide students with a solid understanding of human pathophysiology in preparation for their dissertation research.

Prerequisite: Upper level undergraduate Anatomy and Physiology**PHA 6512L Experiential Research Training in Pharmacodynamics 1-4 Credits****Grading Scheme:** Letter Grade

Research rotations. Practical overview of hypothesis development and testing, research design and application of statistical analysis.

Prerequisite: PHA 6521C.**PHA 6521C Research Techniques in Pharmacodynamics 1 Credit****Grading Scheme:** Letter Grade

Research Techniques in Pharmacodynamics

PHA 6563 Pathophysiology of Diseases I 3 Credits**Grading Scheme:** Letter Grade

Provides students with an integrated understanding of pathological changes pertinent to the development and progression of various diseases. The basics of cellular function, cardiovascular system, renal system and respiration system will be discussed in addition to the relevant disease states that caused by Pathophysiological abnormalities.

Prerequisite: Anatomy and Physiology I & II and General Biology I & II.**PHA 6564 Pathophysiology of Diseases II 3 Credits, Max 3 Credits****Grading Scheme:** Letter Grade

The Pathophysiology of Disease II is a 3 credit course pertinent to the development and progression of various diseases. The basics of immunology, gastrointestinal system, neurological system and endocrine system will be discussed in addition to the relevant disease states that caused by pathophysiological abnormalities.

Prerequisite: Anatomy and Physiology I and II, General Biology I and II.**PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

PHA 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

PHA 7900 Journal Club in Pharmaceutical Research 1 Credit, Max 8 Credits**Grading Scheme:** S/U

Critical presentation and discussion of recent original research articles in Pharmaceutical Sciences.

PHA 7939 Journal Club in Pharmaceutical Sciences 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

Critical presentation and discussion of recent original articles.

PHA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Pharmacy—Pharmacy Practice

GMS 6951 Teaching Biomedical Science 2 Credits**Grading Scheme:** Letter Grade

Acquire the skills necessary for creating and modifying courses through a combination of self-awareness activities and information drawn from the field of curriculum that informs teaching across content areas.

Learning skills to write a teaching philosophy, draft components of their own course syllabus, add these components to their portfolio. Learning platform-online;Canvas

GMS 6952 Curricular Models for Biomedical Science 3 Credits**Grading Scheme:** Letter Grade

Students are introduced to various models of teaching and instructional strategies. Models of teaching give instructors the tools they need to build strong learning environments and interactions that accelerate learning. Models provide a blueprint, structure, direction for teaching. Students will learn to develop curriculum, analyze structure and identify the teaching models.

GMS 6953 Art and Science of Mentoring 1 Credit**Grading Scheme:** Letter Grade

Learn to mentor other professionals who are in early stages of career development. Develop knowledge and skills through provision of didactic information and experiential learning activities. Complete an individual development plan, identify ethical dilemmas in mentoring and describe strategies to prevent them, and articulate their own mentoring philosophy.

GMS 6954 Assessing Effectiveness of Biomedical Science Teaching and Curricula 3 Credits**Grading Scheme:** Letter Grade

Overview of the models of evaluation within contrasting paradigms as it relates to biomedical science education. Topics address concerns while adhering to the professional, scholarly and ethical roles the evaluator must uphold. Develop rubrics, select assessments, use peer observations for assessment of teaching methods, products and outcomes in clinics/laboratories, learning environments.

PHA 6042L Literature Survey in Pharmacy 1-3 Credits**Grading Scheme:** Letter Grade

This course involves the completion of a term paper on a topic related to forensic sciences, pharmaceutical chemistry, or clinical toxicology. Research scientific literature available online, through the UF e-journals, and other relevant sources. Prepare a fully referenced term paper in no less than 5000 words on a related subject approved by the course instructor for the 2-credit class and a paper in no less than 3500 words for the 1 credit class.

Prerequisite: Must be taken in your final term as a MS student.**PHA 6051 Principles of Community Engagement Research for Health Equity 2 Credits****Grading Scheme:** Letter Grade

An introduction to Community engagement research (CEnR) to address health disparities. Students will explore the concept of community engagement to identify appropriate partners for, and conducting CEnR through self-learning, active learning, and real life experiences in developing a research objective, study design, recruitment, instrument design, data collection, analysis, and dissemination.

PHA 6120 Foundations of Precision Medicine: Pharmacogenomics 3 Credits**Grading Scheme:** Letter Grade

Covers the foundational concepts underpinning pharmacogenomics research and implementation. Topics include the pharmacogenomics of drug metabolizing enzymes, drug transporters, adverse drug reactions, and drug interactions. Students will gain familiarity with pharmacogenomics database tools and learn about real-world examples of pharmacogenomic test implementation.

PHA 6134 Foundations in Precision Medicine: Genomic Technologies 1 Credit**Grading Scheme:** Letter Grade

Focuses on current developments and emerging trends in genomic testing, clinical and research applications of emerging genomic tests, role of computing and data science, and applications of bioinformatics in genomics.

Prerequisite: Students must have basic knowledge of genetics and molecular biology.**PHA 6135 Clinical Applications of Precision Medicine: Pharmacogenomics 2 Credits****Grading Scheme:** Letter Grade

Focuses on how pharmacogenomic and genomic data can be used in patient care. Students can opt to participate in personal genotyping and use their own genetic data for class assignments or work with a de-identified genotype dataset.

Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.**PHA 6136 Clinical Applications of Precision Medicine: Oncology 3 Credits****Grading Scheme:** Letter Grade

This course will provide an overview of the relevant genomic and somatic mutations within each main oncology tumor subtype and explore ways to use genomic and somatic mutation information to improve clinical and therapeutic decision making.

Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.

PHA 6137 Clinical Pharmacogenomics Implementations 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of the use of pharmacogenomic data to inform clinical and therapeutic decision making for gene-drug pairs across a range of conditions.

Prerequisite: PHA 6134 and GMS 6224 and PHA 6138 and PHA 6120.**PHA 6138 Foundations in Precision Medicine: Genetic Epidemiology 1 Credit****Grading Scheme:** Letter Grade

Provides an exposure to fundamental concepts, terminologies and principles in human population genetics and applied molecular biology relevant to design, conduct and interpretation of genetic epidemiologic studies.

Prerequisite: GMS 6224 and PHA 6134.**PHA 6139 Personal Genomics and Your Health 3 Credits****Grading Scheme:** Letter Grade

Provide a comprehensive learning experience that mimics real-life situations involving the decision-making process of ordering pharmacogenetic testing, deciphering results, and applying them to inform pharmacotherapy choices. Students will incorporate their personal pharmacogenetic test outcomes into the diverse case studies provided.

PHA 6140 Quality Control and Assurance in the Pharmaceutical Industry 3 Credits**Grading Scheme:** Letter Grade

The two most important elements of quality assurance in the pharmaceutical industry are good laboratory practices (GLP) and good manufacturing practices (GMP) since they directly address the quality of the drug product. The basis for the understanding of GLP and GMP in the pharmaceutical and related industries will be covered as well as an overview of the accreditation process for several regulatory agencies including the US Food Drug Administration (FDA) and the European Medicines Agency (EMA).

PHA 6184 Pharmaceutical Research & Development: Foundations and Impact on Individualized Medicine 3 Credits**Grading Scheme:** Letter Grade

This elective course provides a through introduction to the way modern pharmaceuticals (drugs) are discovered, developed, regulated, and marketed. It is intended to give the student an overview of how the pharmaceutical industry operates and the various functional roles of the people involved.

PHA 6232 Forensic Ethics 2 Credits**Grading Scheme:** Letter Grade

Provide a background on the unique ethical considerations that forensic scientists face; students will explore what the guiding principles are for ethics in forensic science, the culture of the criminal justice system, and how to consider ethics both scientifically and in the courtroom.

PHA 6241 Introduction to Artificial Intelligence in Pharmacy 3 Credits**Grading Scheme:** Letter Grade

Provide an introductory background in the applications of artificial intelligence (AI) and machine learning (ML) techniques that are commonly used in pharmacy practice covering all phases from drug discovery to the post-approval assessment of drug safety, effectiveness and value in real-world settings.

Prerequisite: GMS 6224 and PHA 6134 and PHC 6598.**PHA 6247 Principles of Pharmacy Informatics 3 Credits****Grading Scheme:** Letter Grade

Introduces the theory and concepts of pharmacy informatics and health informatics. Develop the knowledge to discuss the nature of health informatics as an important discipline; and recognize different methods used to analyze fundamentals of workflow process analysis, system redesign, usability, and human factors.

Prerequisite: GMS 6224 and PHA 6935 and PHC 6598.**PHA 6427 Pharmacogenetics of Drug Metabolism 3 Credits****Grading Scheme:** Letter Grade

Examination of factors that affect drug disposition and response including genetics, as well as, additional factors such as environment, diet, age, and concurrent drug therapy and health status. Students will acquire an understanding of pharmacogenetics/pharmacogenomics in the context of variability in drug disposition and the application of pharmacogenetics to drug development and drug treatment.

PHA 6443 Case Studies in Clinical Pharmacogenomics 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of the use of pharmacogenomic data to inform clinical and therapeutic decision making for gene-drug pairs across a range of conditions.

Prerequisite: PHA 6134 and GMS 6224 and PHA 6935.**PHA 6449 Pharmacogenomic and Genomic Data Analysis 3 Credits****Grading Scheme:** Letter Grade

Contemporary experimental approaches in pharmacogenomic and genomic research design. This course will focus on pharmacogenomics and human genomics, particularly disease genomics; including utilization of key knowledge from the central dogma of molecular biology, the human genome, genomic, transcriptomic, and metabolomics approaches, and approaches to defining functional effects of candidate biomarkers.

Prerequisite: biochemistry, PHA 6425, or consent of instructor.**PHA 6462 Drug Development Strategies 3 Credits****Grading Scheme:** Letter Grade

A wide range of drugs enter the market, especially effective anticancer drugs are in high demand. Using cancer as an example, students will gain an understanding of the hallmarks of cancer, the process of finding a potential hit using bioinformatics tools, and the necessary drug development strategy needed before entering the clinical phase.

Prerequisite: PHA 6432.**PHA 6539 Evidence-Based Applications in Clinical Toxicology 3 Credits****Grading Scheme:** Letter Grade

Introduces students to the evidence-based best practice applications associated with the discipline of clinical toxicology. Learners will be exposed to clinical applications through case studies and evidence-based approaches to the diagnosis and management of the poisoned patient. This course focuses on the development of critical thinking and literature evaluation skills in the field of clinical toxicology.

Prerequisite: PHA 6557 with a minimum grade of C.**PHA 6613 Clinical Applications Precision Medicine: Precision Health 3 Credits****Grading Scheme:** Letter Grade

Clinical Applications Precision Medicine: Precision Health

Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.

PHA 6630 Foundations of Medication Management: Pharmacotherapy of Chronic Disease 3 Credits**Grading Scheme:** Letter Grade

This course will introduce the core elements of comprehensive medication management (CMM), communication techniques, and documentations strategies needed for the successful provision of CMM services. Content will focus on incorporating precision medicine and pharmacogenomics into CMM care and business models.

PHA 6631 Foundations of Medication Management: Patient Care and Practice 3 Credits**Grading Scheme:** Letter Grade

This course will introduce the core elements of comprehensive medication management (CMM), communication techniques, and documentations strategies needed for the successful provision of CMM services. Content will focus on incorporating precision medicine and pharmacogenomics into CMM care and business models.

PHA 6632 Foundations of Medication Therapy Management II 3 Credits**Grading Scheme:** Letter Grade

Business elements of medication therapy management (MTM), MTM practice models, documentation systems, business plan development, and basic financial principles needed for the successful provision of MTM.

Prerequisite: All students have a prior pharmacy degree.**PHA 6633 Foundations of Medication Management: Individualized Pharmacotherapy I 3 Credits****Grading Scheme:** Letter Grade

Prepare the student to utilize a comprehensive medication therapy management (CMM) and precision medicine approach in patients with chronic health conditions that range from common to complex focusing on select cardiovascular, respiratory, neurological, mental health, and gastrointestinal disorders.

Prerequisite: GMS 6224 and PHA 6134 and PHA 6935.**PHA 6634 Foundations of Medication Management: Individualized Pharmacotherapy II 3 Credits****Grading Scheme:** Letter Grade

Prepares the student to utilize a comprehensive medication therapy management (CMM) and precision medicine approach in patients 2235 with chronic health conditions that range from common to complex focusing on select women's health, men's health, hematology, endocrine, and renal disorders.

Prerequisite: GMS 6224 and PHA 6134 and PHA 6935.**PHA 6635 Medication Therapy Management: A Renal Focus 3 Credits****Grading Scheme:** Letter Grade

Principles of medication therapy management in patients with renal disorders.

Prerequisite: PHA 6631 and PHA 6632**PHA 6636 Medication Therapy Management: A Gastrointestinal Focus 3 Credits****Grading Scheme:** Letter Grade

Principles of medication therapy management in patients with gastrointestinal disorders.

Prerequisite: Foundations of MTM I and Foundations of MTM II**PHA 6637 Medication Therapy Management: A Psychiatric Focus 3 Credits****Grading Scheme:** Letter Grade

Introducing the student to principles of medication therapy management in patients with psychiatric disorders.

Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632)**PHA 6638 Medication Therapy Management: A Neurologic Focus 3 Credits****Grading Scheme:** Letter Grade

Introducing the student to principles of medication therapy management in patients with neurologic disorders.

Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632)**PHA 6639 Medication Therapy Management: A Respiratory Focus 3 Credits****Grading Scheme:** Letter Grade

Introducing the student to principles of medication therapy management in patients with respiratory disorders.

Prerequisite: The student must have successfully completed Foundations of MTM I (PHA 6631) and Foundations of MTM II (PHA 6632).**PHA 6725 Ethics in Genetics 3 Credits****Grading Scheme:** Letter Grade

Engagement, critical discussion, and reflection on relevant topics pertaining to ethics, law, and social policy of issues posed by the development of genetic technology in scientific research, clinical practice, and social impact.

Prerequisite: GMS 6224, PHA 6935, AND PHC 6598.**PHA 6746 Patient Education and Communication in the Era of Precision Medicine 3 Credits****Grading Scheme:** Letter Grade

Focuses on emerging issues in patient education and communication in precision medicine.

Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.**PHA 6821 Risk Management & Assessment in Clinical Trials 3 Credits****Grading Scheme:** Letter Grade

Designed for professionals working in clinical trial research, either directly with patients, in the monitoring of clinical trials at every stage, its conception, conduct, and analysis. The course provides students with the knowledge to monitor the design and implementation of a clinical trial, assess patients throughout the clinical trial, and document adverse signs and symptoms.

PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

PHA 6946 Practicum in the Pharmaceutical Sciences 2 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

The course will provide real-world experience, in which the skills and knowledge gained in the classroom are applied in an academic, industrial, or government regulatory setting. Each practicum setting will differ based on the students' concentration and intended career field.

Prerequisite: Students must have completed the first year graduate courses required by their concentration and have a cumulative GPA of 3.0 or higher. Exemptions to this must be approved by the concentration graduate coordinator.PHA6946**PHA 6950 Precision Medicine Conference 1 Credit****Grading Scheme:** Letter Grade

Attendance or viewing of proceedings at this conference develops knowledge related to the latest strategies and technologies for bringing genomic medicine and pharmacogenomics into a clinic. Provides opportunity to learn from clinicians, researchers and thought leaders from medicine and pharmacy on implementing genomic medicine and pharmacogenomics in clinic settings.

Prerequisite: GMS 5224 - Foundations in Precision Medicine: Medical Molecular Genetics & PHA 6134 - Foundations in Precision Medicine: Genomic Technologies & PHC 6598 - Foundations in Precision Medicine: Genetic Epidemiology.**PHA 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

PHA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Philosophy

PHH 5405 Modern Philosophy I 3 Credits**Grading Scheme:** Letter Grade

Close reading of central text of the rationalists in the early modern period, especially Descartes, Spinoza, and Leibniz.

PHH 5406 Modern Philosophy II 3 Credits**Grading Scheme:** Letter Grade

Close reading of central texts of the empiricists in the modern period, especially Locke, Berkeley, and Hume.

PHH 5605 Studies in Continental Philosophy 3 Credits**Grading Scheme:** Letter Grade

Close reading of central texts of the major figures in the European continental tradition, such as Husserl, Heidegger, and Sartre.

PHH 6105 Seminar in Ancient Philosophy 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Advanced study of particular topics or themes in the philosophy of Greek and Roman antiquity.

Prerequisite: PHP 5005 or PHP 5015, depending on topic.**PHH 6425 Seminar in Modern Philosophy 3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Advanced study of particular topics or themes in philosophy of the seventeenth and eighteenth centuries. S/U option only if admitted to candidacy.

Prerequisite: PHH 5406 or consent of instructor.**PHI 5135 Graduate Logic 3 Credits****Grading Scheme:** Letter Grade

Propositional calculus, quantificational logic through completeness, and an introduction to modal logic.

PHI 5225 Philosophy of Language 3 Credits**Grading Scheme:** Letter Grade

Advanced survey of central issues in contemporary philosophy of language, such as the theory of meaning, compositionality, reference, truth, and logical form.

PHI 5325 Philosophy of Mind 3 Credits**Grading Scheme:** Letter Grade

Advanced survey of central issues in contemporary philosophy of mind, such as approaches to the mind-body problem, theories of mental content and consciousness, mental causation, and methodology in psychology.

PHI 5365 Epistemology 3 Credits**Grading Scheme:** Letter Grade

Advanced survey of central issues in contemporary epistemology such as major theories of knowledge, justification, and truth.

PHI 5405 Philosophy of Science 3 Credits**Grading Scheme:** Letter Grade

Advanced survey of central issues in the philosophy of science, such as the nature of the scientific method, and the differences between the natural and social sciences.

PHI 5425 Philosophy of Social Science 3 Credits**Grading Scheme:** Letter Grade

Advanced survey of the central issues in the philosophy of social science, such as reduction, covering laws, rational reconstruction, interpretation, and causation.

PHI 5505 Metaphysics 3 Credits**Grading Scheme:** Letter Grade

Advanced survey of issues in contemporary metaphysics, such as existence, identity, universals and abstract objects, the nature of particulars, modalities, and causation.

PHI 5665 Ethical Theory 3 Credits**Grading Scheme:** Letter Grade

Advanced survey of central issues in ethical theory, such as consequentialism and deontology, theories of justice, and moral skepticism.

PHI 5696 Ethics and Emerging Technology 3 Credits**Grading Scheme:** Letter Grade

A foundational course introducing students to important interactions between ethics, economics, and public policy in assessing the social value of emerging technologies.

Prerequisite: student in the College of Liberal Arts and Sciences.**PHI 5905 Individual Work 1-6 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Problem, author, or topic not treated in available courses.

Prerequisite: Consent of instructor, graduate coordinator, and chair.**PHI 5934 Topics in Philosophy 3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Rotating topics may focus upon any area of philosophy not covered by other 5000-level courses.

Prerequisite: Admission to the graduate program in philosophy or approval of instructor.**PHI 5935 Proseminar 3 Credits****Grading Scheme:** S/U

Mandatory for entering students. Methods of inquiry and research.

PHI 6105 Seminar in Logic 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Advanced seminar in logic, covering topics in model theory and recursion theory, beyond level of PHI 5135, including a careful treatment of Godel's incompleteness theorems and a modest study of undecidability. S/U option available if student admitted to Ph.D. candidacy.

Prerequisite: PHI 5135.**PHI 6226 Seminar in Philosophy of Language 3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Advanced study of particular topics or themes in the philosophy of language, such as compositionality, pragmatics, speech act theory, semantics of attitude reports or deflationary theories of truth. S/U option available if student admitted to Ph.D. candidacy.

PHI 6306 Seminar in Epistemology 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Advanced study of particular topics in epistemology, such as epistemic justification, skepticism, or foundationalism. S/U option available if student admitted to Ph.D. candidacy.

Prerequisite: PHI 5365 or PHP 5785.**PHI 6326 Seminar in Philosophy of Mind 3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Advanced study of particular topic or theme in philosophy of mind, such as theories of mental representation, the mind-body explanatory gap, nativism, or the problem of mental causation. S/U option available if student admitted to Ph.D. candidacy.

PHI 6406 Seminar in Philosophy of Science 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Advanced study of particular topics or themes in the philosophy of science, such as the scientific explanation, laws, and theories of space and time. S/U option available if student admitted to Ph.D. candidacy.

Prerequisite: PHI 5136 and PHI 5405.**PHI 6506 Seminar in Metaphysics 3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Advanced study of particular topics or themes in contemporary metaphysics, such as identity, Platonism and nominalism, the nature of particulars, necessity and possibility, events and facts, and the nature of causation. S/U option available if student admitted to Ph.D. candidacy.

PHI 6639 Topics in Ethics of Technology 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Variable topic seminar focusing on the ethical dimensions of one or more central areas of emerging technology.

Prerequisite: PHI 5696 or instructor permission.**PHI 6667 Seminar in Ethics 3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Advanced study of particular topics or themes in ethical theory, such as noncognitivism, moral realism, virtue ethics, and consequentialism. S/U option available if student admitted to Ph.D. candidacy.

PHI 6698 Bioethics and Biotechnology 3 Credits**Grading Scheme:** Letter Grade

An introduction to bioethics, with a strong emphasis on the ethical dimensions of biotechnology.

PHI 6699 Ethics, AI, and Data 3 Credits**Grading Scheme:** Letter Grade

Provides a foundation for addressing ethical issues arising from technological advances in Artificial Intelligence and Big Data, with a focus on the social value and liabilities of these technologies.

PHI 6905 Individual Work 1-9 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Advanced study of author or topic not treated in available courses.

Prerequisite: Consent of instructor, graduate coordinator, and chair.**PHI 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

PHI 6934 Special Topics 1-4 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Special research topics falling outside of the scope of other research seminars. S/U option available if student admitted to Ph.D. candidacy.

PHI 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

PHI 7979 Advanced Research 1-6 Credits, Max 12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

Prerequisite: consent of the graduate committee.**PHI 7980 Research for Doctoral Dissertation 1-15 Credits****Grading Scheme:** S/U

Research for Doctoral Dissertation

PHP 5005 Ancient Philosophy I 3 Credits**Grading Scheme:** Letter Grade

Examination of central themes in Plato's thought through close reading of several major dialogues.

PHP 5015 Ancient Philosophy II 3 Credits**Grading Scheme:** Letter Grade

Historical and critical study of major aspects of Aristotle's logic, epistemology, physics, metaphysics, and philosophy of mind, through a close reading of central texts.

PHP 5785 Foundations of Analytic Philosophy 3 Credits**Grading Scheme:** Letter Grade

Foundational readings in analytic philosophy from Frege to Quine.

PHP 6415 Seminar in Kant 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Intensive examination of the first Critique and selections from other major works. S/U option available if student admitted to Ph.D. candidacy.

Prerequisite: PHH 5406 or consent of instructor.**PHP 6795 Seminar in Analytic Philosophy 3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Advanced study of the work of a particular philosopher or philosophical problem from the analytic perspective. S/U option available if student admitted to Ph.D. candidacy.

PHP 6930 Seminar in School or Thinker 3 Credits, Max 18 Credits**Grading Scheme:** Letter Grade

Advanced study of the work of one or more, usually pre-twentieth century, thinkers. S/U option available if student admitted to Ph.D. candidacy.

Physical Therapy

Physics

PHY 5905 Individual Work 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Assigned reading and problems program, special topics, or development of special experimental or theoretical problems. Work selected according to student's needs and interests.

Prerequisite: consent of instructor.**PHY 6246 Classical Mechanics 3 Credits****Grading Scheme:** Letter Grade

Review of Lagrangian formulation and special relativity. Hamiltonian mechanics, canonical transforms and Hamilton-Jacobi theories, action angle variables, rigid rotators, normal modes, mechanics of continuous media. Fluid mechanics.

PHY 6346 Electromagnetic Theory I 3 Credits**Grading Scheme:** Letter Grade

Electrostatics, special function expansions, magnetostatics, linear media, time dependent Maxwell theory, wave propagation and dispersion, diffraction, scattering, radiation, relativistic covariance, applications.

PHY 6347 Electromagnetic Theory II 3 Credits**Grading Scheme:** Letter Grade

Continuation of PHY 6346.

Prerequisite: PHY 6346.**PHY 6536 Statistical Mechanics I 3 Credits****Grading Scheme:** Letter Grade

Equilibrium ensembles for classical and quantum systems, fluctuations, applications to normal fluids, phase transitions and critical phenomena, plasmas.

Prerequisite: PHY 6645 and PHY 6246.**PHY 6555C Cryogenics 4 Credits****Grading Scheme:** Letter Grade

Production and use of cryogenic fluids; temperature measurement and control; use of cryogenics in science and industry, superconducting magnet and power generator, and electronics. Hands-on experience.

Prerequisite: PHY 3101 and consent of instructor.**PHY 6645 Quantum Mechanics I 3 Credits****Grading Scheme:** Letter Grade

Hilbert space, Heisenberg and Schrodinger dynamics, invariance properties and symmetry operations, spin, perturbation, and variational methods.

Prerequisite: MAP 5304, PHY 4605.**PHY 6646 Quantum Mechanics II 3 Credits****Grading Scheme:** Letter Grade

Time dependent perturbation theory, scattering theory, identical particles and second quantization, Dirac equation.

Prerequisite: PHY 6645.**PHY 6648 Quantum Field Theory I 3 Credits****Grading Scheme:** Letter Grade

The Poincare group; the Dirac equation; quantization of free fields; the scattering matrix; applications.

Prerequisite: PHY 6646.**PHY 6905 Individual Work 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Treatment of an experimental or theoretical problem or topic assigned on the basis of student's needs and interests.

PHY 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

PHY 6920 Departmental Colloquium 1 Credit, Max 14 Credits**Grading Scheme:** S/U

Summary presentation of contemporary topics by visiting and local researchers.

PHY 6932 Seminar in Molecular and Computational Physics 1 Credit, Max 10 Credits**Grading Scheme:** S/U

Invited speakers on topics of current interest in computation and theory in dynamics, and molecular and solid state physics.

Prerequisite: senior or graduate standing.**PHY 6943 Internship in College Teaching 2-4 Credits****Grading Scheme:** Letter Grade

Required for Master of Science in Teaching students, but available for students needing additional practice and direction in college-level teaching.

Prerequisite: graduate standing.**PHY 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

PHY 7097 Advanced Topics in Theoretical Physics 3 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Special studies in mathematical methods and applications of current interest at the forefront of one or more specialties in theoretical physics.

PHY 7669 Quantum Field Theory II 3 Credits**Grading Scheme:** Letter Grade

Path integral quantization; perturbation theory; renormalization; quantization of gauge fields; applications.

Prerequisite: PHY 6648.**PHY 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHY 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PHZ 5155C Physical Modeling and Simulation 3 Credits**Grading Scheme:** Letter Grade

Principles and applications of physical modeling and computer simulation. Fundamental interactions among particles such as atoms, molecules, condensed matter, and planets. Introduction to variety of simulation techniques in modern research.

PHZ 5354 Introduction to Particle Physics 3 Credits**Grading Scheme:** Letter Grade

Descriptive survey of particle and nuclear phenomena and states: conserved quantities and quantum numbers, invariance principles.

Prerequisite: consent of instructor.**PHZ 6355 Elementary Particle Physics I 3 Credits****Grading Scheme:** Letter Grade

Dirac and Klein-Gordon equations, Feynman diagrams, scattering amplitudes; the standard model of weak, electromagnetic, and strong interactions; phenomenology of high energy physics.

Prerequisite: PHY 6646.**PHZ 6358 Standard Model of Elementary Particles I 3 Credits****Grading Scheme:** Letter Grade

Nonabelian gauge theory, Glashow-Weinberg-Salam model of electromagnetic and weak interactions. Spontaneous symmetry breaking and Higgs mechanism, theory of weak processes focusing on quantum corrections and their physical consequences.

PHZ 6391 Seminar in Astrophysics 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Seminar in Astrophysics

PHZ 6392 Seminar in Particle Physics 1 Credit, Max 12 Credits**Grading Scheme:** S/U

Seminar in Particle Physics

PHZ 6426 Solid State I 3 Credits**Grading Scheme:** Letter Grade

Quantum theory of crystalline solids: Bloch theorem, electronic structure, thermodynamic and transport properties of metals, lattice dynamics, electronic interactions in solids, semiconductors and insulators.

Prerequisite: PHY 6536.**PHZ 6493 Seminar in Condensed Matter Physics 1 Credit, Max 12 Credits****Grading Scheme:** S/U

Seminar in Condensed Matter Physics

PHZ 6607 Special and General Relativity 3 Credits**Grading Scheme:** Letter Grade

Special relativity, tensor analysis, covariant electromagnetism and hydrodynamics; general relativity, Riemannian geometry, gravity as curvature, exact solutions; relativistic astrophysics, cosmology.

Prerequisite: PHY 6246.**PHZ 7357 Elementary Particle Physics II 3 Credits****Grading Scheme:** Letter Grade

Continuation of PHZ 6355. Extensions of the standard model. Calculations of QCD corrections.

Prerequisite: PHZ 6355.**PHZ 7359 Standard Model of Elementary Particles II 3 Credits****Grading Scheme:** Letter Grade

Strong interactions, perturbation study of quantum chromodynamics (QCD) of quarks and gluons. Chiral description of long-range QCD, supersymmetric extensions of standard model, grand unification

Prerequisite: PHZ 6358.**PHZ 7427 Solid State II 3 Credits****Grading Scheme:** Letter Grade

Physics of collective phenomena in condensed matter systems: electron-electron and electron-phonon interactions, magnetism, superconductivity, and quantum transport.

Prerequisite: PHZ 6426.**PHZ 7428 Modern Condensed Matter Physics 3 Credits****Grading Scheme:** Letter Grade

Green's functions and many-body perturbation theory, with applications to topics in modern condensed matter physics. Superconductors, quantum magnetism, quantum transport, quantum hall effect. Other modern techniques and numerical methods.

Prerequisite: PHZ 6426.**PHZ 7429 Phases of Condensed Matter 3 Credits****Grading Scheme:** Letter Grade

Focus on structural properties, transitions and properties of topological defects in crystalline solids, liquid crystals, incommensurate crystals, quasicrystals, magnetically ordered systems, and random fractals.

Prerequisite: PHZ 6426 or consent of instructor.**PHZ 7608 Special and General Relativity II 3 Credits****Grading Scheme:** Letter Grade

Relativistic stars, black holes, gravitational radiation; advanced topics in general relativity and cosmology.

Prerequisite: PHZ 6607.

Plant Pathology

ALS 5932 Special Topics 1-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Special Topics

ALS 6925 Integrated Plant Medicine 4 Credits**Grading Scheme:** Letter Grade

Review and synthesis of the principles of plant-problem prevention, diagnosis, and management.

Prerequisite: all core courses for DPM degree.**ALS 6931 Plant Medicine Program Seminar 1 Credit, Max 3 Credits****Grading Scheme:** S/U

On-going seminar series involving presentations on plant-health management.

Prerequisite: DPM student or consent of instructor.**PLP 5005C General Plant Pathology 4 Credits****Grading Scheme:** Letter Grade

Microorganisms and environmental factors that cause disease in plants. Symptoms and losses caused by plant diseases. Principles of plant disease development, diagnosis, and control. Genetics and epidemiology of plant diseases. Offered fall semester.

Prerequisite: Course in biology or botany.**PLP 5115C Citrus Pathology 3 Credits****Grading Scheme:** Letter Grade

Symptoms, disease cycles, and control measures for major citrus diseases; emphasis on diagnosis using biological, chemical, and biochemical techniques. Offered at CREC, Lake Alfred, fall semester in even-numbered years.

Prerequisite: PLP 3002C/PLP 5005C.

PLP 6105 Applied Plant Disease Management 3 Credits**Grading Scheme:** Letter Grade

Summarizes the methods and strategies used to manage plant disease by targeting vulnerable points in the pathogen life cycle and disease epidemic. Students utilize knowledge of organismal biology, epidemiology, management chemistry, and economics to develop strategies for managing plant diseases.

PLP 6223C Viral Pathogens of Plants 3 Credits**Grading Scheme:** Letter Grade

Principles of plant virology; symptomatology, transmission, insect vector relationships, properties of viruses, purification, electron microscopy, morphology, serology, and control of viral diseases.

Prerequisite: PLP 3002C/PLP 5005C, BCH 5045, and a course in plant pathology, which may be taken as a corequisite.

PLP 6235C Applied Bioinformatics in Plant Pathology 2 Credits**Grading Scheme:** Letter Grade

Bioinformatics training for practical research applications in plant pathology. Analysis of omics data on viral, fungal, and oomycete plant pathogens, developing customized pipelines for large dataset analysis supported by real case studies.

PLP 6241C Bacterial Plant Pathogens 3 Credits**Grading Scheme:** Letter Grade

Relationships of bacterial plant pathogens and interactions with their hosts. Offered spring semester in even-numbered years.

Prerequisite: PLP 3002C/PLP 5005C, MCB 3020.

PLP 6245 Fastidious Bacteria and Plant Diseases 3 Credits**Grading Scheme:** Letter Grade

Provides in-depth explanations of the complicated and varied cycles of plant diseases caused by insect-transmitted, vascular-colonizing fastidious bacteria including mollicutes, *Candidatus Liberibacters*, and *Xylella fastidiosa*, including their classification, biology, symptomatology, epidemiology, transmission, plant responses, insect-vector interactions, and management strategies.

PLP 6262C Fungal Plant Pathogens 3 Credits**Grading Scheme:** Letter Grade

History, ecology, genetics, physiology, taxonomy, and management of plant pathogenic fungi.

Prerequisite: PLP 3002C/PLP 5005C or PLP 6656C.

PLP 6291 Plant Disease Diagnosis 3 Credits**Grading Scheme:** Letter Grade

Methods used in diagnosing plant diseases caused by fungi, bacteria, viruses, and abiotic conditions. Offered fall semester.

Prerequisite: PLP 3002C/PLP 5005C, PLP 6262C.

PLP 6303 Host-Parasite Interactions II 3 Credits**Grading Scheme:** Letter Grade

Genetic and molecular interactions of hosts and parasites with emphasis on plant disease resistance. Offered spring semester of even-numbered years.

Prerequisite: PLP 6502.

PLP 6404 Epidemiology of Plant Disease 4 Credits**Grading Scheme:** Letter Grade

Principles of ecology of plant diseases with emphasis on the effects of the climatic environment on the development of disease in populations of plants and the implications with regard to the strategy of disease control. Offered spring semester in odd-numbered years.

Prerequisite: PLP 3002C/PLP 5005C.

PLP 6502 Host-Parasite Interactions I 3 Credits**Grading Scheme:** Letter Grade

Genetics and molecular biology of host-parasite interactions with emphasis on mechanisms of pathogenesis. Offered fall semester in odd-numbered years.

Prerequisite: PLP 3002C/PLP 5005C and one course each in biochemistry and genetics.

PLP 6621C Applied Population Genetics of Microbes 3 Credits**Grading Scheme:** Letter Grade

Students will learn to use DNA sequence or marker data to describe population genetic variation and infer evolutionary processes, with emphasis on plant pathogen populations. Topics to be covered include: sampling strategies, marker types, genealogical inference, defining population and geographic structure, and coalescent-based methods for inferring demographic processes.

Prerequisite: PLP 5005C, or SWS 5305C, or PCB 4674 or equivalent, or PCB 3063 or equivalent, or consent of instructor.

PLP 6636 Frontiers in Plant Biotechnology 3 Credits**Grading Scheme:** Letter Grade

Focuses on presenting advanced genetic tools that recently have become available for use in the biotechnology field to make new products in plants, improve existing plant characteristics or generate plants with resistance or tolerance to certain pathogens.

Prerequisite: Graduate standing and general knowledge of Genetics, Organic Chemistry and Biochemistry

PLP 6656C Fungal Biology 4 Credits**Grading Scheme:** Letter Grade

Introducing groups of fungi and fungi-like organisms. Discussion of the structure, development, physiology, genetics, ecology and systematics of fungi.

Prerequisite: BSC 2010 and BSC 2011 or PLP 3002C/PLP 5005C.

PLP 6701 Impact through Networks 2 Credits**Grading Scheme:** Letter Grade

Focuses on networks and the impact of system changes in agriculture, natural ecosystems, and health care, with an introduction to network science in the R programming environment, and review of applications in biological and social sciences. Students develop projects that apply network analysis to their own study systems.

PLP 6905 Problems in Plant Pathology 1-4 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Study of any field of plant pathology including diseases of all major crop groups.

PLP 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

PLP 6921 Colloquium in Principles of Plant Pathology 1 Credit, Max 8 Credits**Grading Scheme:** Letter Grade

Colloquium in Principles of Plant Pathology

PLP 6932 Seminar in Plant Pathology 1 Credit, Max 7 Credits**Grading Scheme:** S/U

Discussion of the literature, techniques, and research pertaining to plant pathology.

PLP 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

PLP 6942 Professional Internship in Plant Disease Clinic 3 Credits**Grading Scheme:** S/U

Practical training, under supervision of faculty member, in diagnosing plant diseases and formulating recommendations for their management or control.

Prerequisite: PLP 6262C and PLP 6291.**PLP 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

PLP 7946 Plant Pathology Internship 1-10 Credits, Max 10 Credits**Grading Scheme:** S/U

Off-campus internship.

PLP 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PLP 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Political Science

CPO 5935 Advanced Topics in Comparative Politics 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Advanced Topics in Comparative Politics

Prerequisite: departmental approval.**CPO 6077 Social Movements in Comparative Perspective 3 Credits****Grading Scheme:** Letter Grade

Examines major classical and contemporary theoretical approaches to the field of collective action and social movements.

CPO 6091 Introduction to Comparative Political Analysis 3 Credits**Grading Scheme:** Letter Grade

Introduction to major theoretical and methodological approach to study of comparative politics.

CPO 6096 Comparative Qualitative and Mixed Methods 3 Credits**Grading Scheme:** Letter Grade

Critically analyzes comparative and mixed methods from concept formation, qualitative measurement, dimensionality, single, comparative, longitudinal-historical and mixed case study approaches from the perspective of multiple causal ontologies and causal assessment.

CPO 6107 West European Politics 3 Credits**Grading Scheme:** Letter Grade

Western European politics with emphasis on Britain, France, Spain, and Scandinavia. Addresses major themes in the politics of these nation-states or sub-regions. Addresses key relevant theories.

CPO 6206 Seminar in African Politics 3 Credits**Grading Scheme:** Letter Grade

Study of African politics in comparative perspective.

CPO 6307 Latin American Politics I 3 Credits**Grading Scheme:** Letter Grade

Latin American Politics I

Prerequisite: knowledge of Spanish or Portuguese; French may be substituted with consent of instructor.

CPO 6407 Modern Middle East Politics 3 Credits**Grading Scheme:** Letter Grade

An historical institutionalist approach to the development of the modern Middle East in the move from empire to nation-state, addressing several important themes in 20th and 21st century Middle East politics. Readings include top-down as well as bottom-up analyses.

CPO 6719 Comparative Gender Politics 3 Credits**Grading Scheme:** Letter Grade

Addresses gender in "high" and "low" politics, women as subjects and objects of state policies, women as social and political actors, and social constructions of gender around notions of femininity and (to some degree) masculinity in cases around the globe.

Prerequisite: Graduate student status in the Department of Political Science, or permission of instructor.

CPO 6728 Ethnicity and Nationalism 3 Credits**Grading Scheme:** Letter Grade

Introducing the main approaches to the study of how ethnic and national identities are formed, and how they are activated in politics. Exploration of various forms of ethnic politics: peace, rioting, and the most extreme forms, genocide and secession.

Prerequisite: CPO 6091**CPO 6732 Democratization and Regime Transition 3 Credits****Grading Scheme:** Letter Grade

Review of structural, institutional, and cultural dimensions of democratization, with special attention to Latin America, Africa, and Eastern Europe.

Prerequisite: CPO 6091.**CPO 6736 Post-Communist politics 3 Credits****Grading Scheme:** Letter Grade

Analysis of problems associated with democratic transition and market reform in the post-communist countries of Eastern Europe and the former Soviet Union.

CPO 6756 Comparative Elections and Party Systems 3 Credits**Grading Scheme:** Letter Grade

Major issues related to the study of elections and political parties in the comparative context. Specifically, we will discuss the relationship between political parties and electoral institutions in authoritarian, democratic, and transitioning political systems.

Prerequisite: CPO 6091**CPO 6757 The European Union In Comparative Perspective 3 Credits****Grading Scheme:** Letter Grade

Graduate level introduction to the study of the European Union from a comparative perspective. Assuming familiarity with graduate level comparative politics (CPO 6091), but no previous knowledge of the EU is required. The EU is analyzed as a comparative case through an institutionalist perspective.

Prerequisite: CPO 6091 (B or better)**CPO 7415 Topics in Israeli Politics 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Addresses Israeli politics from either a Comparative Politics or International Relations perspective, depending upon instructor. May address Israeli politics at the grassroots, elite, societal, domestic, international, and/or micro-levels. Themes may include social movements, institutional configuration, religious-secular dynamics, immigration, ethnic politics, gender, foreign relations, international organizations, etc.

Prerequisite: POS 6736 Conduct of Inquiry and POS 6716 Scope and Epistemologies.

INR 6039 International Political Economy 3 Credits

Grading Scheme: Letter Grade
International Political Economy

INR 6208 Advanced International Relations Theory 3 Credits

Grading Scheme: Letter Grade
Examination of contemporary debates about power, sovereignty, anarchy, order and conflict in international relations theory.
Prerequisite: INR 6607

INR 6305 Politics of American Foreign Policy Making 3 Credits

Grading Scheme: Letter Grade
Interaction between foreign policy and domestic political variables.

INR 6337 Survey of International Security 3 Credits

Grading Scheme: Letter Grade
Principal problems and issues in the area of international security, considered by examining samples of scholarly literature in the subfield.

INR 6409 The Politics of International Law 3 Credits

Grading Scheme: Letter Grade
Graduate seminar on the sources of international law, the relationships between domestic and international law, the law of recognition, the law of territorial sovereignty, the law of the environment, the international law of business transactions, jurisdiction, nationality, responsibility, the protection of individuals and groups, disputes, and the law of war.

INR 6507 International Organization 3 Credits

Grading Scheme: Letter Grade
Advanced reading and research. Special focus on international norms, regimes, formal intergovernmental and supranational organizations, and global constitutions.
Prerequisite: INR 6607.

INR 6605 Feminist International Relations 3 Credits

Grading Scheme: Letter Grade
Investigates the history and growth of feminist theory in international relations through analyses of gender in global conflict, peace processes, human rights, foreign policy, political economy, and more. Appropriate for graduate students of varied epistemological and methodological backgrounds interested in better understanding feminist research in international relations.
Prerequisite: INR 6607.

INR 6607 International Relations Theory 3 Credits

Grading Scheme: Letter Grade
Basic forces, problems, and developments in international politics and organization.

INR 6938 Seminar in Culture and World Politics 3 Credits

Grading Scheme: Letter Grade
Exploration of the interplay between culture and power in contemporary world politics. Special focus on concepts such as identity, representation and difference and their relation to international conflict and/or order.

PAD 6108 Public Administration Theory 3 Credits

Grading Scheme: Letter Grade
Public administration, with emphasis on the units of analysis and contributions of each approach to general understanding of the field.

PAD 6227 Public Budgeting and Finance 3 Credits

Grading Scheme: Letter Grade
Decision making; budget planning and formulation.

PAD 6434 Leadership and Ethics in Public Agencies 3 Credits

Grading Scheme: Letter Grade
Examining the complexities and the ways in which new demands are changing the way leadership is exercised and others evaluated.

PAD 6946 Internship in Government 3 Credits

Grading Scheme: S/U
Internship in Government
Prerequisite: departmental approval.

POS 5935 Advanced Topics in Political Science 3 Credits, Max 6 Credits

Grading Scheme: Letter Grade
Advanced Topics in Political Science
Prerequisite: departmental approval.

POS 6015 Professional Development in Political Science 0 Credits, Max 4 Credits

Grading Scheme: S/U
Professional development for a graduate career in Political Science. Covers the research process, emerging issues, developing a professional scholarly identity, and careers. Required course for graduate students in their first year.
Prerequisite: Political Science graduate student.

POS 6045 Seminar in American Politics 3 Credits

Grading Scheme: Letter Grade
Introduction to major conceptual approaches to the American political system and to the history of the study of American politics.

POS 6127 State Government and Politics 3 Credits

Grading Scheme: Letter Grade
The bibliography, methodology, and research topics of American state and local governments.

POS 6146 Urban Politics 3 Credits

Grading Scheme: Letter Grade
Explores processes, actors, and institutions in local U.S. politics. Briefly examines significant issue areas including fiscal crisis, racial conflict, and education.

POS 6157 Community Analysis 3 Credits

Grading Scheme: Letter Grade
Development of social, economic, and political profiles in understanding trends, projections, and public policy alternatives.

POS 6196 Patrons, Clients, Corruption, and Accountability 3 Credits

Grading Scheme: Letter Grade
Examining how communities, associations, organizations, political parties, or states are governed.
Prerequisite: CPO 2001

POS 6207 Political Behavior 3 Credits

Grading Scheme: Letter Grade
Examines participation, political culture, and public opinion including classic and current research.

POS 6259 Political Participation 3 Credits

Grading Scheme: Letter Grade
This seminar will review the scholarly literature on political participation and provide students with the theoretical background and empirical tools to write a research paper about the subject.
Prerequisite: POS 6736.

POS 6274 Political Campaigning 3 Credits

Grading Scheme: Letter Grade
Overview of tasks and challenges, including strategy, uses of campaign polls, organization, management, communication, and mobilization.

POS 6278 Advanced Campaign Strategy 3 Credits

Grading Scheme: Letter Grade
Strategy implications of media production on campaigns, party management, direct mail, polling, and fundraising.
Prerequisite: POS 6274.

POS 6279 The Politics of Direct Democracy 3 Credits**Grading Scheme:** Letter Grade

Theory and practice of direct democracy in American states, including processes of initiative, referendum, and recall.

POS 6292 Religion and Politics 3 Credits**Grading Scheme:** Letter Grade

Interplay between religion and politics from the perspective of relevant social science approaches.

POS 6336 Case Study, Culture, and Politics 3 Credits**Grading Scheme:** Letter Grade

Examines exemplary fieldwork-based case study research as relates to cultural, political-ethnographic, discursive, social, and other qualitative political research and analysis. Addresses these in terms of foundational methods and theories, as well as strategies, substance, and approaches to linking case study observations and insights with scientific method and social theory.

Prerequisite: POS 6736 & POS 6716 & POT 6502, or second-year status.**POS 6427 Legislative Process 3 Credits****Grading Scheme:** Letter Grade

Examines the role of legislative institutions in American government.

POS 6455 Political Parties and Interest Groups 3 Credits**Grading Scheme:** Letter Grade

Examines the structure and functions of political parties and interest groups in the United States.

POS 6465 Interest Groups & Lobbying 3 Credits**Grading Scheme:** Letter Grade

Examines the theory, structure, and behavior of interest groups, alongside lobbying strategies for legislative and executive branches at various government levels.

POS 6476 Bureaucratic Politics in the U.S. 3 Credits**Grading Scheme:** Letter Grade

Examining how public bureaucracies in the U.S. relate to one another and their political environments. Topics include the growth of the administrative sector, regulatory federalism, representative bureaucracy, and political control of the bureaucracy.

POS 6707 Qualitative Research Methods for Political Science 3 Credits**Grading Scheme:** Letter Grade

Survey of methods focusing on concept formation, case selection, and data collection suitable for research designs based on small number of case studies.

POS 6716 Scope and Epistemologies of Political Science 3 Credits**Grading Scheme:** Letter Grade

Overview of development of political science as discipline and pluralistic introduction to epistemological perspectives that characterize field.

POS 6736 The Conduct of Inquiry 3 Credits**Grading Scheme:** Letter Grade

Empirical research methodology in political science.

POS 6737 Political Data Analysis 3 Credits**Grading Scheme:** Letter Grade

Introduction to quantitative methods and techniques.

POS 6747 Topics in Political Research Methodology 3 Credits**Grading Scheme:** Letter Grade

Review of recent applications of advanced research methods to different types of political science data.

POS 6757 Survey Research 3 Credits**Grading Scheme:** Letter Grade

Methods of survey research in context of field investigation: formulating research hypotheses, constructing measurement instruments, and collecting and analyzing data.

POS 6766 Election Data Science 3 Credits**Grading Scheme:** Letter Grade

Introduction to basics of data science including programming for data analytics, file management, relational databases, visualizations, geographic information systems, and web development with application to large-scale election databases.

Prerequisite: Permission of Instructor.**POS 6909 Individual Work 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Individual Work

POS 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

POS 6933 Special Topics 1-3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Special Topics

POS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

POS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

POS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

POS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

POT 6016 Ancient Political Thought 3 Credits**Grading Scheme:** Letter Grade

Intensive exploration of Classical Greek and Roman thinkers and texts.

POT 6056 Modern Political Thought 3 Credits**Grading Scheme:** Letter Grade

Close reading of political theorists and themes from the Renaissance through the 19th century. Emphasizes thinkers regarded as central to the development of republicanism, absolutism, liberalism, democracy, conservatism, and feminism.

POT 6067 Contemporary Political Theory 3 Credits**Grading Scheme:** Letter Grade

Close reading of one or more twentieth-century contemporary political philosophers whose works have made major impacts on field (e.g. Arendt, Foucault, Habermas).

POT 6306 Liberalism and Its Critics 3 Credits**Grading Scheme:** Letter Grade

Close reading of selected texts by leading defenders of liberalism and influential theoretical standpoints questioning liberal orthodoxy. Communitarianism, multiculturalism, Marxism, democratic theory, feminism, and critical race theory.

POT 6315 Democratic Theory 3 Credits**Grading Scheme:** Letter Grade

Brief look at some classical theorists and critics of democracy (Plato, Rousseau, Tocqueville, Marx). Focus on contemporary debates in democratic theory. Participation, deliberation, representation, and multiculturalism.

POT 6505 Politics and Theory 3 Credits**Grading Scheme:** Letter Grade

Investigation of the nature of political theory and normative issues in politics.

PUP 6006 Policy Evaluation 3 Credits**Grading Scheme:** Letter Grade

Examines methodologies appropriate for analyzing public policies.

PUP 6007 Policy Process 3 Credits**Grading Scheme:** Letter Grade

General examination of public policy formulation and implementation. Special emphasis upon political and economic determinants and relationship to social theory.

PUP 6009 Public Policy Analysis 3 Credits**Grading Scheme:** Letter Grade

Analytic approach to understanding economic and political tools used to formulate solutions to public problems such as environmental quality, business regulation, public education, health care, and welfare.

PUP 6315 Race, Gender, and Politics 3 Credits**Grading Scheme:** Letter Grade

Politics and cultural discrimination, political power, political behavior, and public policy.

Portuguese

POR 5132 Graduate Introduction to Portuguese and Brazilian Culture 3 Credits**Grading Scheme:** Letter Grade

An accelerated complete introduction to the Portuguese language and Brazilian culture for graduate students. Preparation for graduate level coursework in Portuguese and/or field work in Brazil.

POW 6276 Twentieth-Century Brazilian Novel 3 Credits**Grading Scheme:** Letter Grade

Readings in narrative from 1920s avant-garde and 1930s neoregionalism to 1950s and 1960s instrumentalism. Various manifestations of late-century prose fiction.

POW 6385 Brazilian Lyric 3 Credits**Grading Scheme:** Letter Grade

Theory and practice of poetry including Modernist legacy, experimental trends, political verse, song, youth movements, and contemporary phenomena.

POW 6386 Brazilian Drama 3 Credits**Grading Scheme:** Letter Grade

Theory of dramatic literature and theatre, from its origins in the 19th century through Modernism and contemporary practices.

POW 6905 Individual Work 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Available only by special arrangement with program coordinator or graduate adviser.

POW 6930 Rotating Topics in Brazilian or Portuguese Literature 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Diverse themes of the Lusophone world, including Portuguese Modernism, Brazilian northeast, Afro-Brazilian world, culture of dictatorship, popular music, science fiction, postmodernism, or focus on major authors (Machado de Assis, Guimaraes Rosa, Clarice Lispector).

Psychology

DEP 6057 Advanced Developmental Psychology I 3 Credits**Grading Scheme:** Letter Grade

Surveys research literature on developmental changes during infancy and cognitive development during childhood.

DEP 6058 Advanced Developmental Psychology II 3 Credits**Grading Scheme:** Letter Grade

Theories and current literature in social development, focusing on the period of infancy through adolescence.

DEP 6059 Seminar: Special Topics in Developmental Psychology 1-3 Credits, Max 30 Credits**Grading Scheme:** Letter Grade

Examination of theory and research in selected topic.

DEP 6099 Survey of Developmental Psychology 2-3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Empirical, theoretical, and methodological foundations of developmental psychology.

Prerequisite: graduate status.**DEP 6406 Advanced Adulthood and Aging 3 Credits****Grading Scheme:** Letter Grade

Overview of major theories and research in psychology in relation to aging.

DEP 6409 Seminar: Adult Development and Aging 3 Credits, Max 30 Credits**Grading Scheme:** Letter Grade

Topics in the psychology of aging, with emphasis on theory, research, and methodology.

DEP 6799 Current Research Methods in Developmental Psychology 3 Credits**Grading Scheme:** Letter Grade

Methods for study of development, including experimental and observational techniques.

EAB 6099 Survey of Behavior Analysis 2-3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Survey of basic learning and motivational processes including operant and classical conditioning. Introduction to individual-subject research methods and to applied behavior analysis.

Prerequisite: admission to graduate status or consent of instructor.**EAB 6118 Theoretical Foundations of Behavior Analysis 3 Credits****Grading Scheme:** Letter Grade

Examination of current theoretical issues in behavior analysis, with emphasis upon systematic integration of behavior principles into general behavior theory.

Prerequisite: consent of instructor.**EAB 6707 Applied Behavior I 3 Credits****Grading Scheme:** Letter Grade

Research methods. Measurement, reliability, experimental design, extension of basic research to applied settings.

EAB 6712 Experimental Psychopathology 3 Credits**Grading Scheme:** Letter Grade

Examining historical and contemporary research on the functional analysis of problem behavior. Assessment models, methodological variations, intervention strategies.

Prerequisite: A previous course in experimental or applied behavior analysis

EAB 6716 Behavior Analysis in Developmental Disabilities 3 Credits**Grading Scheme:** Letter Grade

Behavioral approaches to study and treatment of mental retardation and developmental disabilities. Acquisition techniques, assessment, and treatment of behavior disorders, program evaluation, and management.

Prerequisite: EAB 3764 and consent of instructor.

EAB 6719 Seminar: Strategies and Tactics of Human Behavioral Research 3 Credits**Grading Scheme:** Letter Grade

Advanced study of a scientific approach to investigating human behavior in applied settings.

Prerequisite: EAB 6707.

EAB 6744 Behavioral Approaches to Performance Management and Supervision 3 Credits**Grading Scheme:** Letter Grade

Introduction to applying behavior analysis to a variety of performance concerns in organizational settings. Topics include measurement, assessment, training, workplace interventions, behavioral safety, supervision, and burnout.

EAB 6750 Quantitative Methods 3 Credits**Grading Scheme:** Letter Grade

Introduction to quantitative methods in single-case research.

EAB 6780 Ethics and Professional Issues 1-3 Credits**Grading Scheme:** Letter Grade

Examines ethical decision making and regulatory standards in applied behavior analysis, ethics in research and publication, and professional issues arising in various settings.

EAB 6937C Seminar: Special Topics in Experimental Analysis of Behavior 1-4 Credits**Grading Scheme:** Letter Grade

Current research, theory, and instructional techniques.

EAB 6939 Seminar: Special Topics in Applied Behavior Analysis 1-3 Credits, Max 30 Credits**Grading Scheme:** Letter Grade

Current research, technological developments, and professional issues.

EAB 7089 Advanced Seminar: Experimental Analysis of Behavior 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Restricted areas of experimental analysis of behavior such as schedules of reinforcement, stimulus control, current issues in research methods, and complex repertoires.

Prerequisite: consent of instructor.

EAB 7090 Verbal Behavior 3 Credits**Grading Scheme:** Letter Grade

Current empirical and theoretical issues relevant to functional analysis of verbal behavior.

Prerequisite: EAB 6118.

EXP 6667 Methods and Research in Cognitive Neuroscience 3 Credits**Grading Scheme:** Letter Grade

Material covers contemporary theory and knowledge about brain systems and mechanisms underlying higher level human brain functions such as perception and attention, and their change across the lifespan.

Prerequisite: PSB6087 or equivalent.

EXP 6939 Seminar: Current Issues in Cognition and Sensory Processes 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Seminar: Current Issues in Cognition and Sensory Processes

Prerequisite: consent of instructor.

GEY 6905 Independent Study in Gerontology 1-3 Credits, Max 4 Credits**Grading Scheme:** Letter Grade

Independent Study in Gerontology

PCO 6057 Psychology of Counseling I 3 Credits**Grading Scheme:** Letter Grade

Theory, research, and skills in therapeutic approaches to counseling psychology.

Prerequisite: graduate status in the counseling psychology program.

PCO 6169 Diagnosis and Treatment Planning 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Introduces categories of diagnosis and their application in psychotherapy and treatment planning. Analyzes diagnosis processes and diagnostic categories in sociocultural context.

PCO 6278 Diversity and Multiculturalism in Counseling Psychology 3 Credits**Grading Scheme:** Letter Grade

Overview of development of multicultural counseling theory, research, and practice. Historical background, multicultural counseling competencies, cultural identity development and worldview, spiritual issues, understanding oppression (e.g., racism, sexism, heterosexism, able-ism), case conceptualization, MCC organizational development, ethical guidelines for working with diverse populations, and MCC skills development.

PCO 6316C Psychological Assessment I 3 Credits**Grading Scheme:** Letter Grade

Consideration of basic assessment theory and of fundamental theories of intelligence and intellectual assessment, including practicum-type administration of intelligence tests.

Prerequisite: consent of instructor.

PCO 6317C Psychological Assessment II 3 Credits**Grading Scheme:** Letter Grade

Fundamental theories of personality and individual assessment of personality, including practicum-type administration of personality tests.

Prerequisite: consent of instructor.

PCO 6931 History and Contemporary Issues in Counseling Psychology 3 Credits**Grading Scheme:** Letter Grade

Introduction to foundations of counseling psychology and its research. Contemporary literature of discipline.

PCO 6939 Seminar: Current Topics in Counseling Psychology 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Emphasis on theoretical background and implications for applied work.

Prerequisite: MHS 6401 or consent of instructor.

PCO 7217 Professional Ethics and Skills in Counseling Psychology 3 Credits**Grading Scheme:** Letter Grade

Professional issues, ethics, relationships, and skills pertaining to practice of counseling psychology.

Prerequisite: graduate student status in counseling psychology or consent of instructor.**PCO 7537 Vocational Psychology 3 Credits****Grading Scheme:** Letter Grade

Examines major theories and research. Emphasizes vocational assessment.

Prerequisite: graduate student status and consent of instructor.**PCO 7944 Practicum in Counseling Psychology 1 Credit, Max 12 Credits****Grading Scheme:** S/U

For second-year doctoral students in counseling psychology, 12 hours per week of on-site clinical work plus individual and group supervision.

Prerequisite: PCO 7217.**PCO 7945 Advanced Practicum in Counseling Psychology 1 Credit, Max 12 Credits****Grading Scheme:** S/U

For advanced students in counseling psychology. On-site clinical work at approved mental health agencies: 12 to 15 hours per week of work including individual and group supervision.

Prerequisite: PCO 7217, 7947.**PCO 7949 Internship in Counseling Psychology 1 Credit, Max 12 Credits****Grading Scheme:** Letter Grade

Full-time or equivalent work in a university or community agency where counseling functions are carried out under supervision. Open only to students in the counseling psychology program.

Prerequisite: written application to the Counseling Psychology Internship Coordinator.**PSB 6076 Nobel Prizewinners in Neuroscience 1 Credit****Grading Scheme:** Letter Grade

Examination of biographies and select publications of Nobel Prize winners whose work encompassed brain function or behavior, providing an historical perspective of major advances in the field over the last century.

Prerequisite: PSB6087 or equivalent.**PSB 6087 Behavioral and Cognitive Neuroscience I 3 Credits****Grading Scheme:** Letter Grade

Advanced training in the neurobiological basis of behavior, emphasizing cellular and molecular neurobiology, neuroanatomy, neurophysiology, neurotransmission, neuroplasticity, and development of the nervous system.

PSB 6088 Behavioral and Cognitive Neuroscience II 3 Credits**Grading Scheme:** Letter Grade

Advanced training in the neurobiological basis of behavior, emphasizing sensory systems, neuromuscular organization and function, regulatory systems and homeostasis, autonomic function, emotions and feelings, and cognition.

Prerequisite: PSB 6087.**PSB 6099 Survey of Physiological and Comparative Psychology 2-3 Credits, Max 3 Credits****Grading Scheme:** Letter Grade

Empirical and theoretical foundations of physiological and comparative psychology.

Prerequisite: graduate status.**PSB 7249 Seminar in Neural Mechanisms and Behavior 3 Credits****Grading Scheme:** Letter Grade

Recent and specialized topics in brain-behavior relations.

Prerequisite: PSB 6087.**PSY 6608 History of Psychology 2-3 Credits, Max 3 Credits****Grading Scheme:** Letter Grade

History of Psychology

PSY 6826 Psychology of Eating and Obesity 3 Credits**Grading Scheme:** Letter Grade

A comprehensive examination of theory and application of psychological and brain science principles to understanding eating behavior and the contemporary problem of overweight and obesity.

Prerequisite: Graduate status.**PSY 6905 Individual Work 1-3 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Reading or research areas in psychology.

PSY 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

PSY 6930 Topics in Psychology 1-3 Credits, Max 30 Credits**Grading Scheme:** Letter Grade

Topics in Psychology

PSY 6939 Seminar: The Teaching of Psychology 1-3 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Examination of general techniques of teaching with emphasis on interpersonal nature of teaching, course planning, textbooks, testing and evaluation, and lecturing within the framework of general introductory psychology course. Videotaped lectures.

Prerequisite: consent of instructor.**PSY 6940 Supervised Teaching 0-3 Credits, Max 5 Credits****Grading Scheme:** S/U

Instruction in the teaching of psychology undergraduate courses while teaching a course. Information on test construction, effective teaching techniques, syllabi development, and feedback on teaching.

PSY 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

PSY 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PSY 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

SOP 6099 Survey of Social Psychology 2-3 Credits, Max 3 Credits**Grading Scheme:** Letter Grade

Empirical and theoretical foundations of social psychology.

Prerequisite: graduate status.**SOP 6219C Advanced Research Techniques in Social-Personality Psychology 3 Credits****Grading Scheme:** Letter Grade

Advanced Research Techniques in Social-Personality Psychology

Prerequisite: consent of instructor.

SOP 6409 Seminar: Current Topics in Social-Personality Psychology 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Seminar: Current Topics in Social-Personality Psychology

SOP 6419 Seminar: Attitudes and Social Cognition 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Seminar addressing topics such as attitude change, attribution, social perception, social cognition, etc.

Prerequisite: graduate status.**SOP 6929 Colloquium on Research in Social-Personality Psychology 1-3 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

On-going colloquium series intended for graduate students in social-personality psychology. Provides the opportunity for the presentation and discussion of research initiatives. Credit is variable and depends on the amount of supervised research and project preparation planned by the student and approved by the instructor.

Prerequisite: Graduate status & PSY Major.

Public Health—Clinical and Health Psychology

CLP 6189 Cultural Humility in Clinical and Health Psychology 3 Credits**Grading Scheme:** Letter Grade

Designed to introduce you to the theory, research, and practice of cultural humility, multiculturalism, and social justice in psychology. We will discuss topics related to identity, intersectionality, culture, power, privilege, and oppression. This course is experiential; therefore, we will reflect and articulate our personal values to support our professional identity development.

Prerequisite: CLP 4302 and CLP 6527.**CLP 6307 Human Higher Cortical Functioning 3 Credits****Grading Scheme:** Letter Grade

Models that explain linkages between brain and behavior. Focus on both functions and dysfunctions.

CLP 6407 Psychological Treatment I 3 Credits**Grading Scheme:** Letter Grade

Current dynamic and personality theories, practices, and related research in psychotherapy.

Prerequisite: admission to CLP or consent of instructor.**CLP 6430 Clinical Psychological Assessment 4 Credits****Grading Scheme:** Letter Grade

Introduction to concepts, theory, and practices in clinical psychological assessment across the lifespan.

Prerequisite: admission to the Clinical Psychology doctoral program.**CLP 6476 Lifespan Psychopathology 4 Credits****Grading Scheme:** Letter Grade

Diagnostic issues, theoretical formulas, clinical manifestations, and research related to child and adult psychopathology across the lifespan.

Prerequisite: admission to Clinical Psychology doctoral program.**CLP 6527C Measurement, Research Design, and Statistical Analysis in Clinical Psychology I 3-4 Credits****Grading Scheme:** Letter Grade

Integration and interaction among research design, tests and measurements, and statistics.

Prerequisite: admission to CLP.**CLP 6528C Measurement, Research Design, and Statistical Analysis in Clinical Psychology II 3-4 Credits****Grading Scheme:** Letter Grade

Continuation of CLP 6527C.

Prerequisite: CLP 6527C.**CLP 6529 Applied Multivariate Methods in Psychology 3 Credits****Grading Scheme:** Letter Grade

Application of multivariate methods (MANOVA, discriminant functions, factor analysis, SEM) to research problems in psychology.

Prerequisite: CLP 6528C or equivalent**CLP 6905 Individual Work 1-4 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Reading or research in areas in clinical psychology.

CLP 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

CLP 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

CLP 6943 Core Practicum in Clinical Psychology 1-4 Credits, Max 8 Credits**Grading Scheme:** S/U

Supervised training in appropriate work settings.

Prerequisite: consent of program director.**CLP 6945 Advanced Practicum in Neuropsychology 1-3 Credits, Max 12 Credits****Grading Scheme:** S/U

Supervised clinical experience in neuropsychological assessment and cognitive rehabilitation of patients with neurologic impairments.

Prerequisite: Consent of area head and program director.**CLP 6946 Advanced Practicum in Applied Medical Psychology 1-3 Credits, Max 8 Credits****Grading Scheme:** S/U

Supervised clinical experience in inpatient and outpatient consultation, assessment and intervention with psychosomatic, stress-related, and somatopsychic disorders.

Prerequisite: consent of area head and program director.**CLP 6947 Practicum in Intervention 1-4 Credits, Max 18 Credits****Grading Scheme:** S/U

Designed for individual with special interests and needs.

Prerequisite: consent of program director.**CLP 6948 Advanced Practicum in Clinical Child Psychology 1-3 Credits, Max 8 Credits****Grading Scheme:** S/U

Supervised clinical experiences working with children or adolescents in either inpatient or outpatient settings.

Prerequisite: CLP 6943, consent of area head and program director.**CLP 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

CLP 7317 Advanced Health Psychology and Behavior Medicine 3 Credits**Grading Scheme:** Letter Grade

Theory, research, and clinical applications related to core topic areas.

Special attention to pathophysiology, research methods, issues of diversity, and ethical concerns.

Prerequisite: CLP 7936.

CLP 7428C Neuropsychological Assessment of Adults 3 Credits**Grading Scheme:** Letter Grade

Research, theory, and basic procedures.

Prerequisite: PSB 6067 or consent of instructor.**CLP 7525 Best Methods for Studying Psychological Change 3 Credits****Grading Scheme:** Letter Grade

Application of change methods (longitudinal mixed effects, latent growth models, survival analysis) to research problems in psychology.

Prerequisite: CLP 6529**CLP 7934 Special Topics In Clinical Psychology 1-9 Credits, Max 30 Credits****Grading Scheme:** Letter Grade

Advanced seminar for in-depth examination of selected issues and topics.

Prerequisite: admission to CLP.**CLP 7949 Internship 1-2 Credits, Max 6 Credits****Grading Scheme:** S/U

Reading assignments and conferences. Must include 1500 work hours; designed as a 2-semester sequence.

Prerequisite: admission to candidacy for the doctorate, successful completion of the qualifying examination, and consent of the program director.**CLP 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

CLP 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PSB 6115C Clinical and Cognitive Neuroscience: Methods and Theory 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of methods in clinical and cognitive neuroscience with lab-based exposure to methodology. Methods covered will include, but are not limited to, structural and functional magnetic resonance imaging, electroencephalography, transcranial electrical stimulation, TMS, PET, etc.

Prerequisite: Must be a graduate student in Clinical and Health Psychology. All others must petition to Dr. Woods. Prior coursework in neuroanatomy will be an important precursor, but can be waived (e.g., CLP 6945, PSB 6088, GMS 6007, CLP 7428).

Public Health—Environmental and Global Health

PHC 6018 Environmental Ecology of Human Pathogens 3 Credits**Grading Scheme:** Letter Grade

This course covers major topic areas concerning ecological relationships of environmental pathogens that cause diseases in humans. The course will discuss environmental reservoirs of human pathogens and introduces microbiological techniques necessary to detect and identify the variety of pathogens present in the environment.

Prerequisite: PHC 6313 or permission of the instructor.**PHC 6037 Public Health Virology 3 Credits****Grading Scheme:** Letter Grade

Students will learn and explore key concepts of animal virology with a focus on viruses that have worldwide public health importance. Topics include understanding, analyzing, and applying knowledge gained about virus genomes and structure, mechanisms of pathophysiology, transmission and risk factors, vaccine development and efficacy, and mitigation strategies.

Prerequisite: Two semesters of General Biology (i.e. BSC 2005) and/or microbiology (i.e. MCB 3023). Email the instructor for evaluation of prerequisite coursework.**PHC 6046 Foundations of Environmental Epidemiology Methods 3 Credits****Grading Scheme:** Letter Grade

Students will gain a working knowledge of epidemiologic methods for assessing health effects of environmental exposures. Students will gain foundational environmental epidemiology research skills for specific types of environmental exposures in the following areas: evaluating literature and causal evidence, creating a study design, and performing an environmental epidemiological analysis.

Prerequisite: PHC 6001 Principles of Epidemiology in Public Health or with instructor permission.**PHC 6301 Aquatic Systems and Environmental Health 3 Credits****Grading Scheme:** Letter Grade

Physical and chemical nature of water, effects of contaminant and other stressors in different aquatic ecosystems. Taxonomic and ecological summary of aquatic biota, from algae and invertebrates to vertebrates and pathogens.

Prerequisite: PHC 6313**PHC 6304 Environmental Toxicology Applications in Public Health 3 Credits****Grading Scheme:** Letter Grade

Environmental toxicology examines exposure to chemical, biological, and physical agents and associated health effects in humans and wildlife. Students will analyze environmental fate of chemicals, exposure routes, mechanisms of toxicity, and critique common approaches used by public health professional when dealing with toxicants.

Prerequisite: BSC 2010, CHM 2045 preferred but not required.**PHC 6326 Environmental and One Health 3 Credits****Grading Scheme:** Letter Grade

Many health challenges face complex and inextricable links between human, animal, and environmental health, necessitating a systems approach to One Health. This course introduces concepts, theories, and applications of environmental health sciences in the context of one health. The course combines lectures, discussions, and a class project.

Prerequisite: BSC 2005, or EVS 3000, or consent of the instructor.**PHC 6424 Environmental Policy and Risk Management in Public Health 3 Credits****Grading Scheme:** Letter Grade

Provides students with an in depth understanding of the government's environmental health structure, environmental policy making processes, important environmental policies, and application of these policies through risk assessment and management techniques to protect the public and the environment.

Prerequisite: PHC 6313.

PHC 6445 Global Public Health and Development II 3 Credits**Grading Scheme:** Letter Grade

Second in series of two global public health and development courses created specifically for the new Master's in Development Practice (MDP) program. Practical approaches for identification, design, planning, monitoring, and evaluation of global public health interventions in their broader development context.

Prerequisite: PHC 6764**PHC 6446 Systems Thinking in One Health 3 Credits****Grading Scheme:** Letter Grade

The course is designed for students with diverse backgrounds who intend to expand their knowledge in One Health vision. Students will be exposed to a variety of lectures, which will be delivered by experts on specific topics related to One health. Lectures will be complemented with One Health convergence dialogues.

PHC 6512 Environmental Management of Vector-Borne Diseases 3 Credits**Grading Scheme:** Letter Grade

Planning, organization, implementation, and monitoring the activities for control of environmental factors or their interaction with man to prevent or minimize vector propagation and man-vector-pathogen contact.

PHC 6515 One Health: Applied Techniques in Public Health Entomology 3 Credits**Grading Scheme:** Letter Grade

This course introduces students to basic applied field techniques in the study of medical entomology and vector borne diseases. Students will learn about the entomology techniques used for collection and analysis the samples to understand vector borne disease transmission.

Prerequisite: General microbiology, principles of infectious diseases, or epidemiology of infectious diseases.**PHC 6520 Foodborne Diseases 3 Credits****Grading Scheme:** Letter Grade

Discussing major pathogens associated with foodborne diseases, their epidemiology, and approaches to outbreak investigation and control of foodborn illness. Teaching/learning methods include lectures, case studies, readings, and an individual project.

Prerequisite: PHC 6001 Principles of Epidemiology**PHC 6605 Social Determinants of Health 3 Credits****Grading Scheme:** Letter Grade

Using established conceptual frameworks on the Social Determinants of Health, students will map the interrelationships among the Social Determinants of Health (SDH) and Health Inequalities (HI) / Health Disparities (HD); and discuss the social origins of illness, disease, and suffering that contribute to HD in people's health.

Prerequisite: PHC 4101 or SYG 2000 or WST 2322 or instructor approval.**PHC 6643 Applying a One Health Framework to Public Health Issues 3 Credits****Grading Scheme:** Letter Grade

Provide students with critical thinking and integrative skills necessary to understand contemporary One Health problems. In this course, students will learn to apply the multidisciplinary One Health concepts taught in PHC 6326 and PHC 6446 to address wicked problems. Students will learn how multisector collaboration and communication can effectively take place to solve problems using the One Health framework. Furthermore, students will learn to address and overcome the barriers faced in multi-se

Prerequisite: PHC 6326 and PHC 6446 or by permission of the instructor.**PHC 6671 Emerging Infectious Diseases in One Health 3 Credits****Grading Scheme:** Letter Grade

Applies One Health (the intersection of animal and human health and the environment) to understand the emergence of disease-causing microbes and the critical drivers of microbial evolution. Extensive discussion of the global emergence of new infectious disease agents and how factors within One Health influence microbial evolution and disease emergence.

Prerequisite: MCB 3020; MCB 3023; MCB 4203; MCB 4304 or by permission of the instructor.**PHC 6702 Environmental Monitoring and Exposure Assessment 3 Credits****Grading Scheme:** Letter Grade

Exposure to hazardous chemical, physical and biological agents occurs through inhalation, ingestion, or contact with a variety of environmental media including air, water, food, or soil. Students will acquire and apply the key knowledge needed to perform environmental monitoring for exposure assessment in environmental health research and practice.

Prerequisite: at least one undergraduate course in biostatistics or statistics. ;**Corequisite:** access to a computer with Excel, SPSS, or SAS.**PHC 6706 Scientific Communication in Public Health 3 Credits****Grading Scheme:** Letter Grade

Scientific communication skills are critical to public health researchers and allied professionals. Multiple outreach approaches will be used to develop and deliver meaningful content targeted for different audience perspectives. The course consists of lectures, student presentation opportunities and intensive constructive critique.

Prerequisite: Current good standing in public health graduate program or permission of instructor.**PHC 6715 Public Health Research Methods 3 Credits****Grading Scheme:** Letter Grade

Provides students with fundamental principles of research methodologies relevant to public health research. We will review a range of methodologies, including randomized controlled trials, observational studies, mixed-method and experimental approaches to develop enhanced capacity to critically appraise data from scientific studies.

Prerequisite: PHC 6050 or PHC 6052 or PHC 6001 or permission from instructor.**PHC 6722 Environmental and Global Health Research Methods Rotation 1-4 Credits****Grading Scheme:** Letter Grade

Providing opportunities for PhD students to gain first-hand experience observing the implementation of research methods needed to employ during the course of their dissertation research. Upon completion, students will be required to write a detailed report of the experience.

PHC 6764 Global Public Health and Development I 3 Credits**Grading Scheme:** Letter Grade

First in series of two global public health and development courses. Public health and anthropologic principles, methods, and study designs.

PHC 6900 Environmental and Global Health Journal Club 0-1 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Provides students with fundamental skills for reading, understanding, and critically analyzing scientific research papers in environmental and global health. Students choose a paper and present the results of the scientific study to the class. Thus, both critical thinking and public speaking skills are developed through this course.

PHC 6905 Independent Study 1-6 Credits, Max 6 Credits

Grading Scheme: Letter Grade
Independent Study

Prerequisite: consent of instructor.

PHC 6931 Seminar in Global Public Health 1 Credit

Grading Scheme: S/U
Introduces key interdisciplinary, cross-cutting topics essential to the contemporary practice of public health. Written and oral reports.

PHC 6937 Special Topics in Public Health 1-6 Credits, Max 12 Credits

Grading Scheme: Letter Grade
Special Topics in Public Health

PHC 6947 Environmental and Global Health Capstone Experience 3-5 Credits

Grading Scheme: Letter Grade
Provides an opportunity for Master of Health Science (MHS) in One Health students to work in a public health, occupational health, agricultural health, or similar setting. The Capstone experience requires that each student develop a research project with the guidance of their advisor.

Prerequisite: PHC 6001 Principles of Epidemiology in Public Health.

PHC 7307 Quantitative Assessment of Environmental Health Impacts 3 Credits

Grading Scheme: Letter Grade
Introduces applied modeling of environmental health impact assessment for graduate students and health professionals by focusing on burden of diseases, transmission and control of environmentally-mediated infectious pathogens through the use of statistical and mathematical tools.

Prerequisite: PHC 6313 and PHC 6050

PHC 7636 Artificial Intelligence in Environmental and Global Health 3 Credits

Grading Scheme: Letter Grade
Discusses fundamental principles, methodology and applications of machine learning and artificial intelligence approaches in environmental and global health, including physiologically based pharmacokinetic (PBPK) modeling, quantitative structure-activity relationship (QSAR) modeling for toxicity prediction, air pollution, water pollution, human biomonitoring, infectious disease, antimicrobial resistance, and big data.

Prerequisite: PHC 6304 or PHC 6313 or PHC 6326 or with permission from the instructor.

PHC 7738C Physiologically Based Pharmacokinetic Modeling in Toxicology and Risk Assessment 3 Credits

Grading Scheme: Letter Grade
Discusses the fundamental principles, software, methodology and applications of physiologically based pharmacokinetic (PBPK) modeling in toxicology and human health risk assessment of environmental chemicals. Students will also learn how to integrate machine learning and artificial intelligence approaches with PBPK modeling to support PBPK model development and applications.

Prerequisite: One semester of pharmacokinetics (e.g., PHA 6125 Introduction to Quantitative Pharmacology or PHA 6131 Physiologically-Based Modeling), toxicology (e.g., PHC 6304 Environmental Toxicology Applications in PH) or with permission from the instructor

PHC 7935 Critical Thinking in Environmental and Global Health 1 Credit

Grading Scheme: Letter Grade
Providing students with the critical thinking and integrative skills necessary to understand contemporary environmental health problems, critically understand the existing literature, develop research and assessment questions, and identify appropriate methodological tools to address the questions. The course is offered as a weekly seminar that revolves around a focal reading, followed by additional background reading and discussion.

Prerequisite: PHC 6313 Environmental Health Concepts in Public Health and PHC 6702 Exposure Measurement and Assessment

PHC 7979 Advanced Research 1-12 Credits

Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHC 7980 Research for Doctoral Dissertation 1-15 Credits

Grading Scheme: S/U
Research for Doctoral Dissertation

Public Health—General

PHC 2100 Introduction to Public Health 3 Credits

Grading Scheme: Letter Grade
Overview of public health as a multifaceted field. Includes discussion of contemporary public health challenges with input from discipline experts.
Attributes: General Education - Social Science

PHC 3440 Global Public Health 3 Credits

Grading Scheme: Letter Grade
Critical links between global health and social and economic development. Discusses the burden of disease and how to measure this across countries. Focuses on low and middle income countries and the health of the poor.

Prerequisite: PHC 4101 & PHC 3603 both with a minimum grade of C & (PBH_BPH major or (PBH_UMN minor)).

PHC 3603 Critical Issues in Ph 3 Credits

Grading Scheme: Letter Grade
Critical Issues in Ph
Prerequisite: PHC 4101 with a minimum grade of C & (PBH_BPH major or (PBH_UMN minor)).

PHC 4024 Applied Epidemiology 3 Credits

Grading Scheme: Letter Grade
Principles and methods of epidemiological investigation focusing on both infectious and noninfectious diseases. Emphasizes outbreak investigations, field epidemiology and epidemiology careers.

Prerequisite: PHC 4101 & PHC 4094 both with a minimum grade of C & (PBH_BPH major or PBH_UMN minor).

PHC 4031 One Health and Emerging Infectious Diseases 3 Credits

Grading Scheme: Letter Grade
A pivotal elective in the One Health Program and the Bachelors of Public Health degree; introduces the concept of One Health in the context of how disease-causing microbes or pathogens emerge and the critical drivers of microbial evolution.

Prerequisite: Gen Ed Biology; academic level junior, senior and graduate or instructor approval

PHC 4094 Introduction to Biostatistics for Health Science and Public Health 3 Credits**Grading Scheme:** Letter Grade

Methods and public health applications for analysis of variance, correlation, simple linear regression, multiple linear regression, nonparametric and distribution-free statistical methods, and some basic concepts about survival analysis. Public health applications using statistical software. Writing data analysis reports.

Prerequisite: PHC 4101 & STA 2023 both with a minimum grade of C & (PBH_BPH major or PBH_UMN minor).

PHC 4101 Public Health Concepts 3 Credits**Grading Scheme:** Letter Grade

Introduces the basic tenets, applications and foci of public health, including integrating public health with other health professions.

Prerequisite: Sophomore standing and PSY 2012 with a minimum grade of C & STA 2023 with a minimum grade of C & (HES_BHS or PBH_BPH or CSD_BHS major or (PBH_UMN minor)).

PHC 4117 Public Health Management Leadership 3 Credits**Grading Scheme:** Letter Grade

Provides knowledge relevant to leading public health organizations while effectively managing and motivating employees. Includes organizational behavior and theories to examine management, leadership, and application of skills in delivering public health programs.

Prerequisite: HSA 3111 and PHC 4101 both with a minimum grade of C and (PBH_BPH major).

PHC 4320 Environmental Concepts in Public Health 3 Credits**Grading Scheme:** Letter Grade

Surveys major environmental health topics by examining sources, routes, media, and health outcomes associated with biological, chemical, and physical agents in the environment. Introduces the economic and legal frameworks associated with environmental health issues and public health.

Prerequisite: PHC 4101 with a minimum grade of C & (PBH_BPH major or (PBH_UMN minor)).

PHC 4930 Special Topics in Public Health 1-6 Credits**Grading Scheme:** S/U

Exploration of a general or a specific area of public health.

Prerequisite: junior or senior standing.

PHC 4943 Service Learning Practicum 3 Credits**Grading Scheme:** Letter Grade

Covers development of the role of a public health and human services provider in an agency setting.

Prerequisite: PHC 4101 & PHC 4320 & PHC 4024 & HSA 3111 all with a minimum grade of C & (PBH_BPH major) & senior standing.

PHC 6000 Epidemiology Methods I 3 Credits**Grading Scheme:** Letter Grade

Overview of epidemiology methods used in research studies that address disease patterns in community- and clinic-based populations.

Prerequisite: PHC 6001, PHC 6050 or PHC 6052, or departmental approval.

PHC 6001 Principles of Epidemiology in Public Health 3 Credits**Grading Scheme:** Letter Grade

Epidemiology methods frequently used to study disease patterns in community and clinic-based populations. Includes distribution and determinants of health-related states or events in specific populations and application to control of health problems.

PHC 6002 Epidemiology of Infectious Diseases 3 Credits**Grading Scheme:** Letter Grade

Epidemiology, prevention, and control of infectious diseases affecting local, national, and global community health; epidemiologic methods used in disease surveillance and measures used in slowing or preventing spread of disease.

Prerequisite: PHC 6001, and PHC 6052 or PHC 6050: Statistical Methods for Health Sciences Research I or departmental approval.

PHC 6003 Epidemiology of Chronic Diseases and Disability 3 Credits**Grading Scheme:** Letter Grade

Overview of epidemiology of chronic diseases and disabilities prevalent in various populations. Introduces contemporary methods for surveillance including risk factors, etiology, and changes over time.

Prerequisite: PHC 6001, and PHC 6052 or PHC 6050 or departmental approval.

PHC 6009 Biology and Epidemiology of HIV/AIDS 3 Credits**Grading Scheme:** Letter Grade

Examining the biological process by which HIV causes infection and AIDS, including the physiologic and cellular processes involved in HIV infection and treatment. Developing skills in finding and interpreting current epidemiologic data on HIV/AIDS, including risk factors, comorbid health issues, special populations, and health outcomes. Overview of HIV prevention strategies and their effectiveness. Special emphasis on epidemiology of HIV/AIDS in the rural south.

PHC 6011 Epidemiology Methods II 3 Credits**Grading Scheme:** Letter Grade

Analytic methods in epidemiology with a foundation in applied epidemiological analysis and experience in peer-review productivity based on secondary data analysis.

Prerequisite: PHC 6000 & PHC 6052 & PHC 6053, or approval of instructor

PHC 6016 Social Epidemiology in Public Health 3 Credits**Grading Scheme:** Letter Grade

Social determinants of population health, including acute and chronic disease outcomes, and health behavior. Introduces methodological approaches to the field of social epidemiology with specific attention to measurement issues.

Prerequisite: PHC 6000, PHC 6001, PHC 6410, or consent of instructor.

PHC 6018 Environmental Ecology of Human Pathogens 3 Credits**Grading Scheme:** Letter Grade

This course covers major topic areas concerning ecological relationships of environmental pathogens that cause diseases in humans. The course will discuss environmental reservoirs of human pathogens and introduces microbiological techniques necessary to detect and identify the variety of pathogens present in the environment.

Prerequisite: PHC 6313 or permission of the instructor.

PHC 6020 Clinical Trial Methods 3 Credits**Grading Scheme:** Letter Grade

Basic statistical concepts and methods used in clinical trials and the statistical principles and methods including phase I to IV clinical trials.

Prerequisite: STA 6208/STA 6209 , STA 6326/STA 6327, or equivalent

PHC 6022 Design and Conduct of Clinical Trials 3 Credits**Grading Scheme:** Letter Grade

Scientific evaluation of health care interventions by clinical trials and the ethics, principles, and conduct of clinical trials in an epidemiological context. Complex issues in analyzing and interpreting clinical trials.

Prerequisite: STA 2023 (Introduction to Statistics I) or equivalent, and permission of the instructors. Students are expected to have basic statistical knowledge.

PHC 6037 Public Health Virology 3 Credits**Grading Scheme:** Letter Grade

Students will learn and explore key concepts of animal virology with a focus on viruses that have worldwide public health importance. Topics include understanding, analyzing, and applying knowledge gained about virus genomes and structure, mechanisms of pathophysiology, transmission and risk factors, vaccine development and efficacy, and mitigation strategies.

Prerequisite: Two semesters of General Biology (i.e. BSC 2005) and/or microbiology (i.e. MCB 3023). Email the instructor for evaluation of prerequisite coursework.

PHC 6041 Landmarks in Psychiatric Epidemiology 2 Credits**Grading Scheme:** S/U

Landmarks in psychiatric epidemiology, including mental health and substance use disorders, are reviewed with emphasis on student discovery. The focus is on findings, methodology, and historical development of methods in case finding and diagnosis; cohort discovery; and geographical, social, and community risk factors. Topics include relevance to current methodological challenges.

PHC 6046 Foundations of Environmental Epidemiology Methods 3 Credits**Grading Scheme:** Letter Grade

Students will gain a working knowledge of epidemiologic methods for assessing health effects of environmental exposures. Students will gain foundational environmental epidemiology research skills for specific types of environmental exposures in the following areas: evaluating literature and causal evidence, creating a study design, and performing an environmental epidemiological analysis.

Prerequisite: PHC 6001 Principles of Epidemiology in Public Health or with instructor permission.

PHC 6050 Statistical Methods for Health Sciences Research I 3 Credits**Grading Scheme:** Letter Grade

Appropriate use of data summarization and presentation of basic statistical methods, including ANOVA, nonparametric methods, inference on discrete data, inference on survival data, and regression methods for continuous, binary, and survival data. SPSS statistical software. Required core course for students in public health management and policy and social and behavioral science concentrations.

PHC 6050C Biostatistical Methods I 3 Credits**Grading Scheme:** Letter Grade

Biostatistical data analysis using linear models; theory and practice of regression and analysis of variance in the health sciences.

Prerequisite: basic knowledge of data analysis, linear algebra, and calculus III, and consent of instructor.

PHC 6051 Biostatistical Methods II 3 Credits**Grading Scheme:** Letter Grade

Biostatistical data analysis using generalized linear models, generalized linear mixed models, semiparametric and nonparametric regression, and neural networks; theory and practice in the health sciences.

Prerequisite: consent of instructor and Biostatistical Methods I.

PHC 6052 Introduction to Biostatistical Methods 3 Credits**Grading Scheme:** Letter Grade

Introduction to the concepts and methods of biostatistical data analysis.

Topics include descriptive statistics, probability, standard probability distributions, sampling distributions, point and confidence interval estimation, hypothesis testing, power and sample size estimation, one- and two-sample parametric and non-parametric methods for analyzing continuous or discrete data, and simple linear regression.

SAS statistical software for data management, statistical analysis and power calculations. Required core course for students in biostatistics, environmental health, and epidemiology concentrations.

PHC 6053 Regression Methods for the Health and Life Sciences 3 Credits**Grading Scheme:** Letter Grade

Introduction to a wide range of regression methods. Primary topics are multiple linear regression, logistic regression, and Poisson regression.

Prerequisite: PHC 6052 or equivalent. For graduate students in fields other than statistics.

PHC 6059 Introduction to Applied Survival Analysis 3 Credits**Grading Scheme:** Letter Grade

Survival analysis is about the analysis of time-to-event data. The goal of this course is to help you understand the fundamental concepts of survival analysis and their applications in epidemiology and biomedical sciences. Basic concepts from probability and introductory statistics will be reviewed as needed.

Prerequisite: Prior training in statistics (PHC 6052 or equivalent) and knowledge of multiple regression (PHC 6053 or equivalent). R programming experience will also be helpful.

PHC 6063 Biostatistical Consulting 3 Credits**Grading Scheme:** Letter Grade

Providing training for M.S. and Ph.D students in Biostatistics on the statistical aspects of research problems.

Prerequisite: Biostatistical Methods I and II or consent of the instructor. ;

Corequisite: All faculty teaching this course have completed at least 18 graduate semester hours in the teaching discipline and hold at least a master's degree.

PHC 6064 Survey of Advanced Biostatistical Methods for the Health Sciences 3 Credits**Grading Scheme:** Letter Grade

Uniquely blends the fundamentals of biostatistical inference with an introduction to advanced statistical techniques critical for the analysis of the growing compendium of health-related data. Topics span the analysis of high-dimensional, categorical, and longitudinal data from the health sciences. Applications utilize the statistical software packages R and SAS.

Prerequisite: PHC 6052 or permission of instructor.

PHC 6075 Biostatistical Literacy 3 Credits**Grading Scheme:** Letter Grade

Research in the health sciences requires appropriate study design, statistical analysis and interpretation of results. This course introduces basic concepts and techniques, including types of data, inference, and regression, necessary to read, interpret, and critically evaluate statistical results in health science literature relevant to the interests of the student.

Prerequisite: graduate students in the health sciences and requires a basic knowledge of mathematics, including algebra (for example, MAC 1105 and MAC 1114, or MAC 1140, or equivalent).

PHC 6084 Bayesian Biostatistical Methods 3 Credits**Grading Scheme:** Letter Grade

Introduces students to Bayesian statistics with special emphasis on practical implementation in diverse areas such as clinical trials, survival analysis, longitudinal studies, disease mapping, and bioinformatics. Students will be able to fit Bayesian models to analyze real data sets using freely available software such as WinBUGS and R.

Prerequisite: PHC 6092 and PHC 6050C and PHC 6051 or equivalent.**PHC 6088 Statistical Analysis of Genetic Data 3 Credits****Grading Scheme:** Letter Grade

An introduction to statistical procedures for genetic studies. This class will emphasize the statistical theory behind methods for analyzing genetic data and its application in useful software tools. This course prepares students for potential research in statistical genetics but is also open to a wider community. \

Prerequisite: PHC 6092 and PHC 6050C or equivalent. Permission at the discretion of the instructor may be granted if the student is familiar with linear algebra, maximum likelihood, simple hypothesis testing, and linear regression.**PHC 6089 Public Health Computing 3 Credits****Grading Scheme:** Letter Grade

This course covers using SAS and R to manage and analyze public health data. Students will learn how to import, modify, visualize and perform common analyses of public health data using SAS and R.

Prerequisite: PHC 6052 or or approval of the instructor.**PHC 6092 Introduction to Biostatistical Theory 3 Credits****Grading Scheme:** Letter Grade

Concepts and principles of statistical theory, including probability and random variables, parameter estimation, confidence intervals, hypothesis testing, asymptotic analysis, Bayesian inference, statistical decision theory and linear models.

Prerequisite: Multivariable calculus or permission of the instructor.**PHC 6097 Statistical Learning with Applications in Health Sciences 3 Credits****Grading Scheme:** Letter Grade

Covers a broad range of methods that are useful for modern data analysis, specifically in the analysis of high-dimensional data. Many of these methods (e.g., deep learning) go far beyond the classical statistical methods and are developed for addressing various problems (e.g., nonlinearity) we encounter in real situations.

Prerequisite: PHC 6068 and PHC 6050C and PHC 6051, or the permission of the instructor.**PHC 6099 Programing Basics for Biostatistics 3 Credits****Grading Scheme:** Letter Grade

The Introduction to Biostatistical Computing course is intended to develop your programming skills to perform biostatistical computing. The course will include both R programming language using the RStudio interface and Python programming language using the Anaconda interface. Topics include data structure, file input/output, visualization, data manipulation, basic statistical inference, and reproducible reports using markdown languages.

Prerequisite: An introductory course in statistics that covers inference, such as PHC 6052.**PHC 6103 Systems Thinking for Public Health 3 Credits****Grading Scheme:** Letter Grade

Conceptual and empirical tools for understanding and managing complex organizations and interacting with other large systems that impact public health. Simulated work experiences show intended and unintended consequences of interventions in complex systems.

PHC 6104 Evidence-Based Management of Public Health Programs 3 Credits**Grading Scheme:** Letter Grade

Practical guidance on how to choose, administer, and evaluate evidence-based programs and policies in public health settings.

Prerequisite: PHC 6102 or equivalent.**PHC 6146 Public Health Program Planning and Evaluation 3 Credits****Grading Scheme:** Letter Grade

Second of two courses providing skills to develop and implement public health programs. Focuses on six steps in the rational planning process. Emphasizes evidence-based public health principles, organizational influences, and other contemporary themes of program planning.

PHC 6149 Public Health Leadership 1-2 Credits**Grading Scheme:** Letter Grade

Focuses on leadership and management within the Public Health field. Students acquire knowledge of management and leadership skills to grow as a public health professional, build collaborative professional relationships, develop strategies, and lead public health efforts as a team member and future leader.

Prerequisite: Permission of the Master's of Public Health program.**PHC 6183 Disaster Preparedness and Emergency Response 3 Credits****Grading Scheme:** Letter Grade

Online introduction to disaster preparedness and responding to disasters. Training on the Incident Command System (ICS), the National Incident Management System (NIMS), and the Federal Emergency Management Agency (FEMA) minimum responder credential requirements.

PHC 6193 Qualitative Data Analysis 3 Credits**Grading Scheme:** Letter Grade

Students will work intensively with their own qualitative data with feedback from instructors and classmates. Covers different ways of working with narrative data. Focuses on grant writing and publishing with qualitative research.

Prerequisite: Advanced masters students and PhD students with access to a qualitative data set.**PHC 6194 Spatial Epidemiology 3 Credits****Grading Scheme:** Letter Grade

Spatial Epidemiologic research methods, with major focus on Geographic Information Systems (GIS) and Exploratory Spatial Data Analysis (ESDA) applied to public health issues.

Prerequisite: All of the following courses: PHC 6000 , PHC 6011 , PHC 6052 , PHC 6053 (or equivalent).**PHC 6195 Health information for Diverse Populations: Theory & Methods 3 Credits****Grading Scheme:** Letter Grade

Social and behavioral science is a core area in public health. This is an introductory course that examines basic concepts and social scientific research in persuasive communication to gain an understanding how individuals process and respond to public health information.

Prerequisite: Graduate status or consent of instructor.**PHC 6251 Assessment and Surveillance in Public Health 3 Credits****Grading Scheme:** Letter Grade

Knowledge, skills, and methods for conducting community assessments and surveillance to inform design of social and behavioral interventions.

PHC 6301 Aquatic Systems and Environmental Health 3 Credits**Grading Scheme:** Letter Grade

Physical and chemical nature of water, effects of contaminant and other stressors in different aquatic ecosystems. Taxonomic and ecological summary of aquatic biota, from algae and invertebrates to vertebrates and pathogens.

Prerequisite: PHC 6313**PHC 6304 Environmental Toxicology Applications in Public Health 3 Credits****Grading Scheme:** Letter Grade

Environmental toxicology examines exposure to chemical, biological, and physical agents and associated health effects in humans and wildlife. Students will analyze environmental fate of chemicals, exposure routes, mechanisms of toxicity, and critique common approaches used by public health professional when dealing with toxicants.

Prerequisite: BSC 2010, CHM 2045 preferred but not required.**PHC 6313 Environmental Health Concepts in Public Health 2-3 Credits****Grading Scheme:** Letter Grade

Survey of major topics in environmental health. Sources, routes, media, and health outcomes associated with toxic agents in the environment. Effects of agents on disease, water and air quality, food safety, and land resources. Current legal framework, policies, and practices.

PHC 6326 Environmental and One Health 3 Credits**Grading Scheme:** Letter Grade

Many health challenges face complex and inextricable links between human, animal, and environmental health, necessitating a systems approach to One Health. This course introduces concepts, theories, and applications of environmental health sciences in the context of one health. The course combines lectures, discussions, and a class project.

Prerequisite: BSC 2005, or EVS 3000, or consent of the instructor.**PHC 6403 Adolescence, Risk Taking and Health 3 Credits****Grading Scheme:** Letter Grade

Introduction to primary determinants and outcomes associated with adolescent risk behaviors. Emphasis on substance use, sexual behaviors, injury, violence and the interactive nature of risk taking behaviors.

PHC 6404 Gender, Sexuality, and Health 3 Credits**Grading Scheme:** Letter Grade

Survey of the dynamics of sexual health issues through public health and gender health studies. Review of intervention strategies to improve sexual health.

PHC 6405 Theoretical Foundations of Public Health 3 Credits**Grading Scheme:** Letter Grade

Providing an in-depth review of social and behavioral science theories used in public health, includes systems and multi-level perspectives on health behavior. Prepares public health students to satisfy MPH competencies in social and behavioral sciences.

Prerequisite: PHC 6410 or instructor permission.**PHC 6406 Social Stigma and Public Health 3 Credits****Grading Scheme:** Letter Grade

Provides a theoretical and scientific foundation for understanding the relationship between stigma and health. This will include multilevel analysis of different forms of stigma, identifying biosocial mechanisms that link stigma to poor health outcomes, and designing a public health intervention to combat stigma. Engagement with first-person accounts of stigma will supplement a focus on population health.

Prerequisite: Open to graduate-level students in the Public Health and Clinical and Health Psychology programs. Students from other graduate programs require instructor approval.**PHC 6410 Designing & Implementing Public Health Solutions 3 Credits****Grading Scheme:** Letter Grade

Acquire knowledge of behavioral science theories and community mobilization strategies, including how to apply these theories along with evidence and ethics in creating culturally-concordant public health solutions. Identify, prioritize, and adapt evidence-based solutions to develop an intervention rationale, advocacy strategy, and implementation plan for an identified solution.

PHC 6421 Public Health Law and Ethics 3 Credits**Grading Scheme:** Letter Grade

Case study approach to legal foundations of American public health system and legal and ethical issues that arise from balancing individual liberties with the government's interest in protecting all citizens' well-being.

PHC 6424 Environmental Policy and Risk Management in Public Health 3 Credits**Grading Scheme:** Letter Grade

Provides students with an in depth understanding of the government's environmental health structure, environmental policy making processes, important environmental policies, and application of these policies through risk assessment and management techniques to protect the public and the environment.

Prerequisite: PHC 6313.**PHC 6441 Health Disparities in the United States 3 Credits****Grading Scheme:** Letter Grade

Determinants that influence health outcomes of the most disadvantaged populations in the U.S., with special attention to racial, ethnic, and gender status.

PHC 6445 Global Public Health and Development II 3 Credits**Grading Scheme:** Letter Grade

Second in series of two global public health and development courses created specifically for the new Master's in Development Practice (MDP) program. Practical approaches for identification, design, planning, monitoring, and evaluation of global public health interventions in their broader development context.

Prerequisite: PHC 6764**PHC 6446 Systems Thinking in One Health 3 Credits****Grading Scheme:** Letter Grade

The course is designed for students with diverse backgrounds who intend to expand their knowledge in One Health vision. Students will be exposed to a variety of lectures, which will be delivered by experts on specific topics related to One health. Lectures will be complemented with One Health convergence dialogues.

PHC 6447 Ecology of HIV/Aids in the Rural South 3 Credits**Grading Scheme:** Letter Grade

Casual factors, responses, and outcomes associated with HIV/AIDS in the rural south. Using ecological framework to explore and understand multilevel factors associated with (1) risk and protective behaviors; (2) testing and disclosure of HIV status; (3) availability and sources of social support; (4) need for and use of medical, psychological, and social services; and (5) the development and use of culturally appropriate interventions.

PHC 6512 Environmental Management of Vector-Borne Diseases 3 Credits**Grading Scheme:** Letter Grade

Planning, organization, implementation, and monitoring the activities for control of environmental factors or their interaction with man to prevent or minimize vector propagation and man-vector-pathogen contact.

PHC 6515 One Health: Applied Techniques in Public Health Entomology 3 Credits**Grading Scheme:** Letter Grade

This course introduces students to basic applied field techniques in the study of medical entomology and vector borne diseases. Students will learn about the entomology techniques used for collection and analysis the samples to understand vector borne disease transmission.

Prerequisite: General microbiology, principles of infectious diseases, or epidemiology of infectious diseases.

PHC 6517 Public Health Concepts in Infectious Diseases 3 Credits**Grading Scheme:** Letter Grade

Topics and methods used in modern infectious disease epidemiology.

Prerequisite: PHC 6001 and PHC 6002.

PHC 6519 Zoonotic Diseases in Humans and Animals 3 Credits**Grading Scheme:** Letter Grade

Introduction of graduate and professional students to major zoonotic diseases in both human and animal presentations. Epidemiology, means of prevention and control, available diagnostics, available treatments, and associated human and animal regulations for each disease. Delivered online in 15 modules.

PHC 6520 Foodborne Diseases 3 Credits**Grading Scheme:** Letter Grade

Discussing major pathogens associated with foodborne diseases, their epidemiology, and approaches to outbreak investigation and control of foodborn illness. Teaching/learning methods include lectures, case studies, readings, and an individual project.

Prerequisite: PHC 6001 Principles of Epidemiology

PHC 6521 Fundamentals of Public Health Nutrition 3 Credits**Grading Scheme:** Letter Grade

Introduces Public Health Nutrition and the role of the Public Health Nutrition professional. Emphasis will be on definition, identification and prevention of nutrition related disease, and improving health of a population by improving nutrition. Malnutrition, nutritional biochemistry, intervention, and program and policy review will be included.

PHC 6530 Public Health Issues of Mothers and Children 3 Credits**Grading Scheme:** Letter Grade

Maternal and child health problems, specific local, state, and federal programs and policies, health and health care access disparities. Emphasis on importance of evidenced-based public health practice.

PHC 6534 Trauma Informed Approaches for Individuals, Communities, and Public Health 3 Credits**Grading Scheme:** Letter Grade

Provides students (1) an overview of adverse childhood experiences (ACEs) and the trauma-informed approach; (2) the opportunity to design and implement public health interventions to prevent ACEs and treat trauma using the social ecological model; and (4) practical instruction in the grant writing process.

Prerequisite: PHC 6410.

PHC 6591 Maternal and Child Health Epidemiology 3 Credits**Grading Scheme:** Letter Grade

This is a 3-credit course offered on campus to graduate students on the epidemiology of maternal and child health. This course is designed to provide a graduate level understanding of how epidemiological principles can be applied to maternal and child mortality and morbidity.

Prerequisite: PHC 6001 and PHC (or equivalent research methods coursework). Students with no prior instruction in epidemiology but with methodological coursework from another related discipline may be admitted with permission from the instructor.

PHC 6598 Foundations in Precision Medicine: Genetic Epidemiology 1 Credit**Grading Scheme:** Letter Grade

Genetic epidemiology, a rapidly evolving field of research, utilizes specialized molecular and statistical methods to identify genetic factors that might be involved in disease etiology. This course provides an exposure to fundamental concepts, terminologies and principles in human population genetics and molecular biology relevant to understanding genetic epidemiologic approaches.

Prerequisite: Enrollment in the Certificate for Precision Medicine or permission of the instructor

PHC 6600 Foundations of Public Health 0-3 Credits**Grading Scheme:** Letter Grade

Introduces public health and healthcare within the US and globally, emphasizing the effect of positionality and the interconnectedness of population and individual health. Course topics include public health history and impact, the role of ethics and evidence, and the importance of health equity and human rights.

PHC 6601 Professional Series in Public Health 0-1 Credits, Max 1 Credits**Grading Scheme:** S/U

Prepares MPH students for their final semester and post-graduation public health careers through Capstone and Applied Practice Experience preparation, paper and presentation development, Institutional Review Board requirements, interviewing skills, and resume construction. Rotating professional development series offer insights into various public health fields.

PHC 6605 Social Determinants of Health 3 Credits**Grading Scheme:** Letter Grade

Using established conceptual frameworks on the Social Determinants of Health, students will map the interrelationships among the Social Determinants of Health (SDH) and Health Inequalities (HI) / Health Disparities (HD); and discuss the social origins of illness, disease, and suffering that contribute to HD in people's health.

Prerequisite: PHC 4101 or SYG 2000 or WST 2322 or instructor approval.

PHC 6635 Health, Artificial Intelligence, and Human Values 3 Credits**Grading Scheme:** Letter Grade

Evaluates the use of artificial intelligence in Healthcare, Public Health, and health research. Students will appraise predictive models used for making trustworthy health decisions, addressing ethical factors when using artificial intelligence in health research, and analyzing potential for bias, risk, and social inequity.

Prerequisite: PHC 6052 or equivalent course in statistics.

PHC 6641 Social Stratification & Health 3 Credits**Grading Scheme:** Letter Grade

Explores the extent, the causes, and the consequences of social and economic inequality in the U.S. on health. Examines these topics through the lens of two central concepts in social stratification: social inequality and social mobility, with a particular emphasis on intergenerational patterns of mobility within the U.S. as it relates to health, illness, and well-being. Provides students with an understanding of the following content areas: (1) theoretical foundations for understanding social stratification and health (2) research on social stratification and health and (3) social stratification and the social organization of medical care.

PHC 6643 Applying a One Health Framework to Public Health Issues 3 Credits**Grading Scheme:** Letter Grade

Provide students with critical thinking and integrative skills necessary to understand contemporary One Health problems. In this course, students will learn to apply the multidisciplinary One Health concepts taught in PHC 6326 and PHC 6446 to address wicked problems. Students will learn how multisector collaboration and communication can effectively take place to solve problems using the One Health framework. Furthermore, students will learn to address and overcome the barriers faced in multi-sector.

Prerequisite: PHC 6326 and PHC 6446 or by permission of the instructor.

PHC 6671 Emerging Infectious Diseases in One Health 3 Credits**Grading Scheme:** Letter Grade

Applies One Health (the intersection of animal and human health and the environment) to understand the emergence of disease-causing microbes and the critical drivers of microbial evolution. Extensive discussion of the global emergence of new infectious disease agents and how factors within One Health influence microbial evolution and disease emergence.

Prerequisite: MCB 3020; MCB 3023; MCB 4203; MCB 4304 or by permission of the instructor.

PHC 6700 Social and Behavioral Research Methods 3 Credits**Grading Scheme:** Letter Grade

Research methods and their specific applications to public health issues.

PHC 6702 Environmental Monitoring and Exposure Assessment 3 Credits**Grading Scheme:** Letter Grade

Exposure to hazardous chemical, physical and biological agents occurs through inhalation, ingestion, or contact with a variety of environmental media including air, water, food, or soil. Students will acquire and apply the key knowledge needed to perform environmental monitoring for exposure assessment in environmental health research and practice.

Prerequisite: at least one undergraduate course in biostatistics or statistics. ;

Corequisite: access to a computer with Excel, SPSS, or SAS.

PHC 6704 Community-Based Participatory Research 3 Credits**Grading Scheme:** Letter Grade

This course provides an overview of theories, principles, and strategies associated with Community-Based Participatory Research (CBPR). This course is intended for graduate students and community practitioners interested in adding CBPR to their repertoire of effective approaches to understanding and addressing social and health disparities in public health.

Prerequisite: PHC 6001 or PHC 6410 or equivalent research methods course.

PHC 6706 Scientific Communication in Public Health 3 Credits**Grading Scheme:** Letter Grade

Scientific communication skills are critical to public health researchers and allied professionals. Multiple outreach approaches will be used to develop and deliver meaningful content targeted for different audience perspectives. The course consists of lectures, student presentation opportunities and intensive constructive critique.

Prerequisite: Current good standing in public health graduate program or permission of instructor.

PHC 6707 Health Research Information and Communicating Science 1 Credit**Grading Scheme:** Letter Grade

Designed to refine knowledge of and facility with concepts, resources, and methods of searching for, assessing, storing, and disseminating health literature and data for quality research, publication, policy formulation, and grant-seeking. It is designed to develop critical thinking about topics including the formation of research questions, evidence, authorship, information resources, tools, and funding sources.

Prerequisite: PHC 6700 Public Health Research Methods OR HSA 7707 HSR Research Methods OR equivalent course.

PHC 6711 Measurement in Epidemiology and Outcomes Research 3 Credits**Grading Scheme:** Letter Grade

Major designs and principles of measurement for epidemiology and health services outcomes research, with emphasis on use of primary data collection.

Prerequisite: PHC 6001 and PHC 6050 or equivalent.

PHC 6715 Public Health Research Methods 3 Credits**Grading Scheme:** Letter Grade

Provides students with fundamental principles of research methodologies relevant to public health research. We will review a range of methodologies, including randomized controlled trials, observational studies, mixed-method and experimental approaches to develop enhanced capacity to critically appraise data from scientific studies.

Prerequisite: PHC 6050 or PHC 6052 or PHC 6001 or permission from instructor.

PHC 6716 Survey Research Methods 3 Credits**Grading Scheme:** Letter Grade

Introduction to population surveys typical in descriptive (surveillance) and analytic epidemiology research.

Prerequisite: PHC 6001, PHC 6050; and STA 6208 or equivalent, or permission of instructor.

PHC 6717 Public Health Surveillance 3 Credits**Grading Scheme:** Letter Grade

The purpose of this course is to prepare master's- and doctoral-level students to be able to design, evaluate, and operate epidemiological surveillance systems, and to be able to critically evaluate surveillance systems and reports.

Prerequisite: PHC 6001 and PHC 6000, or equivalent graduate-level coursework in epidemiologic methods, or instructor permission.

PHC 6722 Environmental and Global Health Research Methods Rotation 1-4 Credits**Grading Scheme:** Letter Grade

Providing opportunities for PhD students to gain first-hand experience observing the implementation of research methods needed to employ during the course of their dissertation research. Upon completion, students will be required to write a detailed report of the experience.

PHC 6724 Qualitative Research Methods for Public Health and Health Sciences 3 Credits**Grading Scheme:** Letter Grade

Explore and begin to learn qualitative research methods for public health and the health sciences. Students will learn the history, philosophical assumptions and interpretive frameworks, foundations of research design, data collection and data analyses of qualitative research in the health sciences. Students obtain an understanding how qualitative research is used in various fields of study and how to best apply it to public health and the health sciences.

Prerequisite: PHC 6700 or an introductory research methods course.

PHC 6726 Integrated Mixed Methods Research in Epidemiology 3 Credits
Grading Scheme: Letter Grade

Provides in-depth training on designing and implementing research studies that integrate qualitative and quantitative data in Epidemiology. Through assignments and practical activities, students will learn the strengths and challenges of mixed methods research, develop skills in creating robust research proposals, and explore strategies to effectively combine and analyze diverse data types while avoiding common pitfalls.
Prerequisite: PHC 6001 and PHC 6000 (or equivalent research methods coursework) or with instructor permission.

PHC 6736 Statistical and Computational Analysis of Genomic Data 3 Credits
Grading Scheme: Letter Grade

Focuses on statistical and computational methods/tools for next-generation sequencing data analysis. Topics include introduction and analysis of DNA-seq, RNA-seq, ChIP-seq, ATAC-seq, and single-cell genomics. In addition, the course will illustrate how to use R/Bioconductor R packages to handle common types of genomic data.

PHC 6740 Public Health Methods 1: Quantitative Foundations 3 Credits
Grading Scheme: Letter Grade

This is the first of two courses that focuses on public health/global health research and practice using quantitative and qualitative methods. This course, taken in conjunction with a lab, focuses on principles of epidemiology and biostatistics, emphasizing application of epidemiological methods, quantitative data collection, and quantitative data analysis and interpretation.
Corequisite: PHC 6741L.

PHC 6741L Public Health Methods Statistical Programming Lab 1 Credit
Grading Scheme: Letter Grade

Trains students to perform basic exploratory data analysis and biostatistical inference procedures using SAS or R software. This course, taken in conjunction with Public Health Methods I Quantitative Foundations, allows students to apply epidemiological and biostatistical concepts emphasized in both courses. Examples are drawn from public health, clinical, and biomedical settings.
Corequisite: PHC 6740.

PHC 6764 Global Public Health and Development I 3 Credits
Grading Scheme: Letter Grade

First in series of two global public health and development courses. Public health and anthropologic principles, methods, and study designs.

PHC 6790 Biostatistical Methods Using SAS 3 Credits
Grading Scheme: Letter Grade

This course is to introduce and prepare students for biostatistical computing using the SAS statistical software. It builds on the knowledge obtained in the Biostatistical Methods I and II courses by reinforcing the material and focusing on application within the SAS framework.
Prerequisite: PHC 6050C and PHC 6051, or Instructor determination of equivalent background.

PHC 6791 Data Visualization in the Health Sciences 3 Credits
Grading Scheme: Letter Grade

Students will learn the foundations of information visualization and sharpen their skills in communicating using health science data. Throughout the semester, we will primarily use R to explore concepts in graphic design, storytelling, data wrangling and plotting, biostatistics, and artificial intelligence as they apply to data-driven communication.
Prerequisite: A course in statistics such as PHC 6052 or equivalent. Some familiarity with R statistical software is recommended but not required.

PHC 6900 Environmental and Global Health Journal Club 0-1 Credits, Max 12 Credits
Grading Scheme: Letter Grade

Provides students with fundamental skills for reading, understanding, and critically analyzing scientific research papers in environmental and global health. Students choose a paper and present the results of the scientific study to the class. Thus, both critical thinking and public speaking skills are developed through this course.

PHC 6905 Independent Study 1-6 Credits, Max 6 Credits
Grading Scheme: Letter Grade

Independent Study
Prerequisite: consent of instructor.

PHC 6912 Special Project: Independent Research 1-9 Credits, Max 9 Credits
Grading Scheme: Letter Grade

Student must undertake significant responsibility for all or part of a research project of particular interest.
Prerequisite: consent of instructor.

PHC 6917 Supervised Research Project 1-6 Credits, Max 6 Credits
Grading Scheme: S/U

Supervised Research Project
Prerequisite: consent of instructor.

PHC 6931 Seminar in Global Public Health 1 Credit
Grading Scheme: S/U

Introduces key interdisciplinary, cross-cutting topics essential to the contemporary practice of public health. Written and oral reports.

PHC 6932 Psychiatric Epidemiology Online Seminar Series 1 Credit
Grading Scheme: S/U

Epidemiology seminars from the Department of Epidemiology and other epidemiology departments, and associated publications will be used to provide students with an understanding of new developments in the field of epidemiology as applied to psychiatric epidemiology.

PHC 6937 Special Topics in Public Health 1-6 Credits, Max 12 Credits
Grading Scheme: Letter Grade

Special Topics in Public Health

PHC 6939 CPE Psychiatric Grand Rounds 1 Credit
Grading Scheme: S/U

World-renowned experts are invited to address a wide spectrum of specialties and sub-specialties and often introduce new and interesting developments. Mental health care professionals and epidemiologists will receive up-to-date information on trends and techniques in psychiatry.
Prerequisite: Enrollment in Certificate in Psychiatric Epidemiology

PHC 6940 Master of Public Health Capstone 2 Credits
Grading Scheme: S/U

This course serves as the culminating integrative learning experience (ILE) for MPH students. In this course, through completion of ILE (i.e., Capstone Project), students demonstrate a synthesis of foundational and concentration competencies. The project serves as the basis of a formally written report and an oral or poster presentation.
Prerequisite: (PHC 6050 or PHC 6052) and PHC 6001, PHC 6313, HSA 6114, and PHC 6410.

PHC 6941 MPH Applied Practice Experience 1-6 Credits, Max 6 Credits
Grading Scheme: S/U

The MPH Applied Practice Experience (APE) provides an opportunity for students to work in a public health setting. APE encompasses internship and public health service (PHS) hours. Students in internship work with preceptor supervision to apply public health competencies acquired in the classroom to public health practice through experiential activities.

Prerequisite: (PHC 6050 or PHC 6052) and PHC 6001, PHC 6313, HSA 6114, and PHC 6410.

PHC 6945 Public Health Practicum 1-6 Credits, Max 6 Credits

Grading Scheme: S/U

Public Health Practicum

Prerequisite: approval of practicum site and consent of instructor.

PHC 6946 Public Health Internship 1-9 Credits, Max 9 Credits

Grading Scheme: S/U

Fieldwork at approved site. Focus on practical application of skills in student's concentration area.

Prerequisite: consent of instructor.

PHC 6947 Environmental and Global Health Capstone Experience 3-5 Credits

Grading Scheme: Letter Grade

Provides an opportunity for Master of Health Science (MHS) in One Health students to work in a public health, occupational health, agricultural health, or similar setting. The Capstone experience requires that each student develop a research project with the guidance of their advisor.

Prerequisite: PHC 6001 Principles of Epidemiology in Public Health.

PHC 6971 Research for Master's Thesis 1-4 Credits, Max 4 Credits

Grading Scheme: S/U

The thesis requires the student to formulate a research question, conduct relevant background research, generate hypotheses, gather and analyze appropriate data, interpret and discuss findings, and determine conclusions. Students submit a written thesis consistent with UF requirements, pass an oral defense of their research and submit their work for publication under the direction of a mentor.

Prerequisite: Satisfactory completion of the first semester of coursework and instructor's permission. All Human Subjects Participation/IRB required training must be completed prior to registering for this course.

PHC 7000 Epidemiology Seminar II: Critical Evaluation, Research Proposals, and Methods 2 Credits

Grading Scheme: Letter Grade

This course is taken in the second year of the epidemiology PhD program curriculum. Seminar series is designed to introduce students to a range of advanced epidemiologic concepts and research methods to help PhD students advance their dissertation ideas and help students obtain skills needed for a PhD in epidemiology.

Prerequisite: PHC 6001 and PHC 6000, one semester of biostatistics, and PhD student status in epidemiology or permission of the instructor

PHC 7007 Cancer Epidemiology 3 Credits

Grading Scheme: Letter Grade

Providing students with skills to evaluate the burden associated with cancers and develop public health interventions to reduce the burden of cancer worldwide. From the population perspective, the course will familiarize students with exposures associated with cancer risk. Practical applications of genome analysis and phenotypic profiling are included/

Prerequisite: PHC 6001 and PHC 6000 or equivalent. PhD student status required; other students need instructor permission. Students with no prior instruction in epidemiology but with methodological coursework from another related discipline may be admitted.

PHC 7017 Advanced Epidemiologic Methods III 3 Credits

Grading Scheme: Letter Grade

To expand the methodology inventory by introducing advanced and new statistical and modeling methods to address measurement, descriptive, comparative, associative and causal relations in modern epidemiology.

Prerequisite: GMS 6800, GMS 6810, consent of instructor.

PHC 7038 Psychiatric Epidemiology 3 Credits

Grading Scheme: Letter Grade

Concepts, history, measures, methods and analytical techniques to study the risks, prevalence and incidence, course, comorbidities, and consequences of major mental disorders, in general and specific populations internationally.

Prerequisite: PHC 6000 and PHC 6011

PHC 7056 Analysis of Longitudinal Data 3 Credits

Grading Scheme: Letter Grade

Likelihood-based and semiparametric methods for longitudinal data.

Methods to deal with missing data in both settings.

Prerequisite: STA 6326, STA 6327 (or equivalent), STA 6207, STA 6208 (or equivalent), and STA 6246 (or equivalent).

PHC 7065 Advanced Skills in Epidemiological Data Management 2 Credits

Grading Scheme: Letter Grade

Provides knowledge and skills in data manipulation for population science. Included are: data context, concepts; relational databases; data collection, extraction; parallel manipulation of massive datasets; NoSQL systems, concepts. The course is designed for advanced students to learn the "code of best practice" for data engineering in population science.

Prerequisite: PHC 6052 Introduction to Biostatistical Methods and PHC 6000 Epidemiology Methods I, or equivalents, or instructor permission.

PHC 7066 Large Sample Theory 3 Credits

Grading Scheme: Letter Grade

Detailed introduction to large sample theory and its application in univariate and multivariate parametric and nonparametric estimation.

Prerequisite: STA 6326 and STA 6327 (or equivalent).

PHC 7068 Biostatistical Computing 3 Credits

Grading Scheme: Letter Grade

In this course, students will learn key algorithms for advanced statistical computing and their applications in biomedical sciences. The course will cover fundamental computational techniques for advanced biostatistical data analysis as well statistical methods for random number generation, convex optimization algorithms, Monte Carlo integration, and stochastic optimization.

Prerequisite: PHC 6092, PHC 6050, and PHC 6051, or permission of the instructor.

PHC 7083 Artificial Intelligence and Data Science for Epidemiology and Population Health 3 Credits

Grading Scheme: Letter Grade

This computational epidemiology course blends methodological, practical, and translational aspects with emphasis on new data science methods. The course is not intended to provide statistical training, but rather to teach students to recognize suitable computational approaches to handle data. Practice sessions will acquaint students with statistical and machine learning software.

Prerequisite: PHC 6000, and at least one among PHC 6052, PHC 6053, PHC 7065 or PHC 6711 (or equivalent quantitative stats/programming course with permission of instructor).

PHC 7090 Advanced Biostatistical Methods I 3 Credits**Grading Scheme:** Letter Grade

Theory and application for estimation and hypothesis testing for independent data using linear models. Principles of Frequentist and Bayesian estimation and inference. Application using statistical software. Writing data analysis reports.

Prerequisite: PHC 6050, PHC 6051, STA 6326, and STA 6327, or permission of the instructor

PHC 7091 Advanced Biostatistical Methods II 3 Credits**Grading Scheme:** Letter Grade

Theory and application for independent and dependent data using generalized linear models and generalized linear mixed models. Bayesian and Frequentist inference. Application using statistical software. Writing data analysis reports.

Prerequisite: PHC 7090 Advanced Biostatistical Methods I or equivalent

PHC 7095 Advanced Statistical Learning for Biostatistics 3 Credits**Grading Scheme:** Letter Grade

This is an advanced course in statistical learning, which covers a broad range of methods and their applications in high-dimensional data analysis. Many of these methods go far beyond classical statistical methods and are developed for addressing modern problems we encounter in public health and medical science settings.

Prerequisite: PHC 7090 and PHC 7091 or permission of instructor.

PHC 7199 Topics in Precision Medicine and Public Health Informatics 1 Credit**Grading Scheme:** Letter Grade

The course introduces methodological and translational topics in precision medicine and public health informatics and provides knowledge and skills for planning and managing such research.

Prerequisite: Epidemiology Methods I and II and a SAS course, or graduate statistical and quantitative research courses in any relevant department, or permission from the instructor.

PHC 7307 Quantitative Assessment of Environmental Health Impacts 3 Credits**Grading Scheme:** Letter Grade

Introduces applied modeling of environmental health impact assessment for graduate students and health professionals by focusing on burden of diseases, transmission and control of environmentally-mediated infectious pathogens through the use of statistical and mathematical tools.

Prerequisite: PHC 6313 and PHC 6050

PHC 7427 Ethics in Population Science 2 Credits**Grading Scheme:** S/U

Covering federally mandated topics in the Responsible Conduct of Research: Data Acquisition, Management, Sharing, Ownership; Conflict of Interest/Commitment; Human Subjects; Animal Welfare; Research Misconduct; Publication Practices and Responsible Authorship; Mentor/Trainee Responsibilities; Peer Review; and Collaborative Science. This ethics course is for those enrolled in research intensive graduate programs.

Prerequisite: Advanced degree or PhD candidacy or permission of the instructor.

PHC 7587 Theory Development and Testing in Behavioral & Community Public Health 2 Credits**Grading Scheme:** Letter Grade

The purpose of this class will be allowing students the opportunity to review and orally present on a psychosocial construct that is relevant to their own public health research goals and familiarize students with the process of theory development.

Prerequisite: Doctoral student in Public Health.

PHC 7594 Genetic Epidemiology 3 Credits**Grading Scheme:** Letter Grade

Covers fundamental concepts and principles in genetic epidemiology. At the completion of this course, students are expected to critically discuss literature, design and conduct basic genetic analysis, and interpret research finding. Advanced methods course for PhD program.

Prerequisite: PHC 6000, PHC 6011 (can be taken concurrently), and PHC 6050C. Talk to the instructor for a prerequisite waiver or further information. For PhD students; MS/MPH students may contact the instructor for permission.

PHC 7595 Introduction to Molecular Epidemiology 3 Credits**Grading Scheme:** Letter Grade

Covering the theoretical concepts in molecular epidemiology and use of biomarkers in epidemiologic studies. Class topics include: basics of molecular epidemiology, potential uses and limitations of biomarkers, sample collection and storage, issues in epidemiologic study design and analysis, and discussion of specific research examples involving molecular markers.

Prerequisite: Knowledge of basic concepts in epidemiology and study designs: PHC 6001

PHC 7636 Artificial Intelligence in Environmental and Global Health 3 Credits**Grading Scheme:** Letter Grade

Discusses fundamental principles, methodology and applications of machine learning and artificial intelligence approaches in environmental and global health, including physiologically based pharmacokinetic (PBPK) modeling, quantitative structure-activity relationship (QSAR) modeling for toxicity prediction, air pollution, water pollution, human biomonitoring, infectious disease, antimicrobial resistance, and big data.

Prerequisite: PHC 6304 or PHC 6313 or PHC 6326 or with permission from the instructor.

PHC 7727 Grant Writing for Population Health Research 3 Credits**Grading Scheme:** Letter Grade

This course provides practical instruction in the grant process, with a specific focus on National Institutes of Health (NIH) procedures. It provides the student with experience in writing parts of the grant application and in reviewing other's grant applications. It also contains a Mock Grant Review session to assist students in understanding the process and content of grant review.

Prerequisite: PHC 6011 Epidemiology Methods II

PHC 7738C Physiologically Based Pharmacokinetic Modeling in Toxicology and Risk Assessment 3 Credits**Grading Scheme:** Letter Grade

Discusses the fundamental principles, software, methodology and applications of physiologically based pharmacokinetic (PBPK) modeling in toxicology and human health risk assessment of environmental chemicals. Students will also learn how to integrate machine learning and artificial intelligence approaches with PBPK modeling to support PBPK model development and applications.

Prerequisite: One semester of pharmacokinetics (e.g., PHA 6125 Introduction to Quantitative Pharmacology or PHA 6131 Physiologically-Based Modeling), toxicology (e.g., PHC 6304 Environmental Toxicology Applications in PH) or with permission from the instructor

PHC 7744 Causal Artificial Intelligence for Health Research 3 Credits**Grading Scheme:** Letter Grade

Will cover theoretical and practical approaches related to causal Artificial Intelligence (AI), embedding machine learning with causal inference methods on real-world data, and methodologies for automated causal learning. Health research topics such as target trials and transportability will be taught. The students will learn theory behind causal inference methods applied under different constraints, and how to build predictive models and risk scores utilizing causal AI.

Prerequisite: PHC 6053 or PHC 7065 or GMS 6803 or GMS 6822 or GMS 6856 Introduction or instructor approval.

PHC 7901 Epidemiology Literature Review and Critique (Journal Club) 1 Credit, Max 3 Credits**Grading Scheme:** S/U

Preparing students to perform peer-review and to think critically. In weekly class discussion sessions, students will review peer-reviewed, published research studies that demonstrate innovative or faculty epidemiologic content or methods. Feedback will be given by student peers and faculty.

Prerequisite: PhD candidacy status or permission from the instructor

PHC 7902 Scientific Writing for Peer Reviewed Publications for Popular Science 3 Credits**Grading Scheme:** Letter Grade

Practice reviewing and critiquing research studies.

Prerequisite: PhD student status or permission of the instructor ;

Corequisite: Conducting mentored doctoral research

PHC 7907 Social and Behavioral Science Journal Club 1 Credit**Grading Scheme:** Letter Grade

Discussing recent literature from top peer-reviewed journals on specific health behaviors or health outcomes. Students will be presenting 4 journal articles. The purpose is to think about health behaviors or health outcomes from a multidisciplinary perspective.

PHC 7910 International Field Epidemiology 3 Credits**Grading Scheme:** S/U

This is an independent study for a student who wishes to accomplish a primary data collection effort internationally.

Prerequisite: PHC 6011 Epidemiology Methods II

PHC 7916 National Field Epidemiology 1-3 Credits**Grading Scheme:** S/U

This applied epidemiology field experience is designed as an opportunity for doctoral students to integrate their growing expertise in epidemiology in a field research experience among a population in the United States.

Prerequisite: PHC 6011 Epidemiology Methods II

PHC 7918 Epidemiology Independent Study 1-3 Credits, Max 12 Credits**Grading Scheme:** S/U

Independent Study is designed for graduate level students who want to pursue in depth an area of study not provided in regularly offered courses. It can involve independent readings or independent projects under the guidance of a faculty sponsor.

Prerequisite: Consent of faculty member supervising the study.

PHC 7925 Biostatistics Journal Club 1-3 Credits, Max 8 Credits**Grading Scheme:** S/U

Meeting weekly to present, review, and discuss current articles in biostatistics or statistics journals or discipline-specific (e.g. medicine, public health, epidemiology) articles with substantive biostatistical content.

PHC 7934 Seminar I: Epidemiology Past, Present, and Future 2 Credits**Grading Scheme:** Letter Grade

The principal goals of this doctoral seminar include becoming familiar with major programs of research in epidemiology, discussing findings and implications of classic/prominent epidemiologic studies, reviewing the strengths and weakness of major epidemiologic study designs, and applying knowledge of epidemiologic study design to students' formulation of their own research studies.

Prerequisite: PhD standing

PHC 7935 Critical Thinking in Environmental and Global Health 1 Credit**Grading Scheme:** Letter Grade

Providing students with the critical thinking and integrative skills necessary to understand contemporary environmental health problems, critically understand the existing literature, develop research and assessment questions, and identify appropriate methodological tools to address the questions. The course is offered as a weekly seminar that revolves around a focal reading, followed by additional background reading and discussion.

Prerequisite: PHC 6313 Environmental Health Concepts in Public Health and PHC 6702 Exposure Measurement and Assessment

PHC 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHC 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Public Health—Health Services Research

HSA 5174 Fundamentals of Health Care Finance 3 Credits**Grading Scheme:** Letter Grade

Introduction to basic theory and principles of finance as applied to the health care industry. Financial statements, cost measurement, budgeting, and capital investment decisions.

Prerequisite: consent of instructor.

HSA 6105 Professional Skills Seminar 1 Credit, Max 4 Credits**Grading Scheme:** S/U

Presentations by speakers from health-related organizations and programs designed to improve career planning and professional skills. May be repeated for credit.

Prerequisite: consent of instructor.

HSA 6114 Health Care System and Policy 3 Credits**Grading Scheme:** Letter Grade

The course provides an overview of the structure of the healthcare delivery system and policy. With periodic changes in diverse aspects of health care system, its dynamic mechanism should be understood. Particularly, the health care system encompasses organization, management, finance, policy and technology. Thus, comprehensive thinking is required.

HSA 6115 Introduction to Management of Health Services Organizations 3 Credits**Grading Scheme:** Letter Grade

Organizational principles and practices as applied to management. Organizational theory, managerial role, managing groups, work design, and organization design.

Prerequisite: consent of instructor.**HSA 6126 U.S. Health Insurance System 3 Credits****Grading Scheme:** Letter Grade

Description and analysis of U.S. health insurance systems. Topics include private vs. public insurers, demands for health insurance, health plan types, premium setting, and reimbursement of providers.

Prerequisite: consent of instructor.**HSA 6152 Overview of U.S. Health Policy 3 Credits****Grading Scheme:** Letter Grade

Survey and critical analysis of federal and state health policy processes and outcomes as they relate to the effectiveness and efficiency of health services in the U.S. and selected countries.

Prerequisite: consent of instructor.**HSA 6177 Health Care Finance 3 Credits****Grading Scheme:** Letter Grade

Applies accounting and financial management theory and principles to the health care industry, with an emphasis on provider organizations. The course focuses on the important accounting and financial management principles and concepts relevant to health services and public health organizations.

Prerequisite: consent of instructor.**HSA 6188 Strategic Management in Health Administration 3 Credits****Grading Scheme:** Letter Grade

The relationship of a health care organization to its environment. Strategic management processes, business planning, and other perspectives to aid in managing complex health care organizations.

Prerequisite: consent of instructor.**HSA 6196 Healthcare Data Analytics 3 Credits****Grading Scheme:** Letter Grade

Designed to arm you with the practical and analytical tools required to make effective tactical and operational decisions in a healthcare environment. Specific topics to be covered include process flow, simulation, decision-making, quality improvement, forecasting, capacity management, project management, and inventory management.

Prerequisite: consent of instructor.**HSA 6198 Information Management in Health Administration 3 Credits****Grading Scheme:** Letter Grade

Survey of management information systems. Analyzing system requirements, system design and evaluation, selecting computer resources, and managing the implementation process.

Prerequisite: consent of instructor.**HSA 6342 Human Resource Management for Health Services Managers 3 Credits****Grading Scheme:** Letter Grade

Knowledge and skills needed for effective management in complex health services organizations. Focuses on human resource acquisition, retention, and exit, as well as labor relations issues.

Prerequisite: consent of instructor.**HSA 6385 Performance Management for Health Care Managers 3 Credits****Grading Scheme:** Letter Grade

Overview, emphasizing implementation. Aspects of performance defined in relation to structure, process, and outcomes, and meeting expectations and requirements of patients, insurers, government, and other organizations.

Prerequisite: consent of instructor.**HSA 6395 Healthcare Data Analytics I 3 Credits****Grading Scheme:** Letter Grade

Introduces students to the use of data analytics in healthcare decision making to help health services organizations get more effectiveness and efficiency from their operations. It is the first in a two course series in the Masters of Health Administration degree program.

HSA 6427 Legal and Ethical Issues in Health Administration 3 Credits**Grading Scheme:** Letter Grade

Survey of legal and ethical issues relating to health administration. Topics include government regulation, tort liability and malpractice, the professional-patient relationship, right to die, and patients without decisional capacity.

Prerequisite: consent of instructor.**HSA 6436 Health Economics 3 Credits****Grading Scheme:** Letter Grade

Fundamental economic relations governing production, consumption, reimbursement, and financing of health services. Characteristics of markets for acute and long-term care services, insurance, and health care labor. Economic evaluation of technology.

Prerequisite: consent of instructor.**HSA 6855 Internship in Health Administration 1 Credit****Grading Scheme:** S/U

Supervised fieldwork in a health administration setting.

HSA 6905 Individual Study in Health Administration 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Individual Study in Health Administration

HSA 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

HSA 6911 Research Seminar in Health Services Research 1 Credit, Max 6 Credits**Grading Scheme:** S/U

Research presentations by graduate students.

HSA 6930 Special Topics in Health Services Administration 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Selected topics in theory and research in health services administration.

HSA 6939 Capstone Seminar in Health Administration 3 Credits**Grading Scheme:** Letter Grade

Analysis of cases dealing with administrative and policy issues in health services. Emphasizes problem-solving in ill-defined, multi-faceted situations.

Prerequisite: consent of instructor.

HSA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

HSA 7106 Seminar in Health Care Access and Utilization 3 Credits**Grading Scheme:** Letter Grade

Overview of context and processes in which individuals seek and obtain health care services; distributional issues; equity.

Prerequisite: consent of instructor.**HSA 7116 Health Services Organizational Research 3 Credits****Grading Scheme:** Letter Grade

Major perspectives in organization theory and their applications to the health care sector.

Prerequisite: consent of instructor.**HSA 7437 Advanced Health Economics 3 Credits****Grading Scheme:** Letter Grade

Exposure to advanced economics models of the health care sector, including static and dynamic models of consumer and producer behavior, risk selection in insurance markets, and optimal reimbursement mechanisms.

Prerequisite: consent of instructor.**HSA 7706 Health Services Research Methods I 3 Credits****Grading Scheme:** Letter Grade

Health Services Research (HSR) Methods I introduces students to the fundamentals of methodologies that are commonly used in HSR, with topics that include the following: study conceptualization, development of research question, study design and its implication for analysis, fundamentals of data cleaning, management, and analysis, and result interpretation and communication.

Prerequisite: PHC 6052 and PHC 6053. Students must have prior experience with basic data entry and analysis in SAS.**HSA 7708 Health Services Research Methods II 3 Credits****Grading Scheme:** Letter Grade

Review and appraisal of methods. Findings and examples from historical and contemporary studies. Introduction to qualitative and quantitative research methodologies.

Prerequisite: consent of instructor.**HSA 7759 Quality and Outcomes in Health Services Research 3 Credits****Grading Scheme:** Letter Grade

Current research concerning small area variation, outcomes, appropriateness, and effectiveness. Theory and specifics of alternative quality improvement and assurance approaches. History of approaches to health care quality assessment.

Prerequisite: consent of instructor.**HSA 7905 Advanced Individual Study in Health Services Research 1-3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Advanced Individual Study in Health Services Research

HSA 7936 Seminar in Health Care Costs and Financing 3 Credits**Grading Scheme:** Letter Grade

Examination of health services research related to costs and financing. Cost measurement and analysis, health insurance, sources and methods of payment, current policy.

Prerequisite: consent of instructor.**HSA 7938 Advanced Seminar in Health Services Research 3 Credits, Max 12 Credits****Grading Scheme:** Letter Grade

Advanced Seminar in Health Services Research

Prerequisite: completion of graduate core program and preliminary dissertation topic.**HSA 7979 Advanced Research 1-4 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HSA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PHC 6641 Social Stratification & Health 3 Credits**Grading Scheme:** Letter Grade

Explores the extent, the causes, and the consequences of social and economic inequality in the U.S. on health. Examines these topics through the lens of two central concepts in social stratification: social inequality and social mobility, with a particular emphasis on intergenerational patterns of mobility within the U.S. as it relates to health, illness, and well-being. Provides students with an understanding of the following content areas: (1) theoretical foundations for understanding social stratification and health (2) research on social stratification and health and (3) social stratification and the social organization of medical care.

PHC 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHC 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Public Relations

PUR 6608 International Public Relations 3 Credits**Grading Scheme:** Letter Grade

Factors to assist conceptualization and execution of international public relations activities. Explores the relationship between environmental variables and international public relations practices. Review of empirical evidence about public relations practices in other countries and methodological issues pertaining to conducting research.

Rehabilitation Science

RSD 6110 Rehabilitation Science Theory and Application I 3 Credits**Grading Scheme:** Letter Grade

Philosophical and theoretical foundations. History of the development of rehabilitation services and funding. Evolution of health care systems in the U.S.

RSD 6401 Skeletal Muscle in Aging and Disease, and Implications for Rehabilitation 3 Credits**Grading Scheme:** Letter Grade

Addresses the impact of aging and various diseases on skeletal muscle biology, the mechanisms therein, and preclinical (animal model) or clinical approaches to therapeutically treating the muscle to improve function.

Prerequisite: This course is open to all Rehabilitation Science PhD students. As such, admission to the RSD program is a prerequisite. Graduate students from other programs are encouraged to register with prior permission of the instructor.

RSD 6410 Development and Evaluation of Rehabilitation Interventions to Promote Participation 3 Credits**Grading Scheme:** Letter Grade

Course focuses on non-pharmacological rehabilitation intervention approaches to reduce disability and promote participation. Examples of these approaches are therapeutic exercise, the use of technology, and behavioral approaches. Students will learn the spectrum of intervention development and evaluation: from conceptualization and manualizing to testing the intervention feasibility, efficacy, and effectiveness.

Prerequisite: CLP 6527C, EDF 6475, EDF 6403, HLP 6535, or an equivalent course in research design and methods at the graduate level. Students in good standing in the Rehabilitation Science Doctoral Program. Others must seek the instructor's permission.

RSD 6701 Matlab Foundations for Rehabilitation Science 3 Credits**Grading Scheme:** Letter Grade

This course introduces Matlab foundations to students to code, compute, analyze, and plot research data that are commonly collected in rehabilitation science studies. Students do not need to have prior experience in programming to be enrolled in class.

Prerequisite: This course is open to all Rehabilitation Science Ph.D. students. RSD students do not need prereq programming skills to take this class. Graduate students from other programs are encouraged to register with the prior permission of the instructor.

RSD 6710 Motor Control: Translating from Fundamental Research to Rehabilitation Practice 3 Credits**Grading Scheme:** Letter Grade

Defines fundamental concepts and theories related to motor control and movement science and discusses these concepts in the context of neurorehabilitation. The course also emphasizes atypical motor control functions and underlying neurophysiological mechanisms following disease/injury. Students will practice scientific writing and presentation skills through weekly in-class presentations.

Prerequisite: This course is open to all Rehabilitation Science PhD students. As such, admission to the RSD program is a prerequisite. Graduate students from other programs are encouraged to register with prior permission of the instructor.

RSD 6718 Neuroplasticity: A Foundation for Neurorehabilitation 3 Credits**Grading Scheme:** Letter Grade

Evidence for plasticity after injury or disease. Factors that influence recovery. Medical approach to enhancing recovery. Potential approaches in physical rehabilitation to facilitate and optimize plasticity.

RSD 6900 College Classroom: Teaching Process and Practice 3 Credits**Grading Scheme:** Letter Grade

Information and skills required for successful teaching faculty in college classroom.

RSD 6905 Individual Work 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Special project or research.

Prerequisite: Consent of adviser, and project approval.

RSD 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

RSD 6920 Rehabilitation Science Journal Club 1 Credit, Max 5 Credits**Grading Scheme:** Letter Grade

Class critically evaluates published papers in broad fields related to Rehabilitation Science. Students present assigned reading including a brief summary of the rationale/background, methodology, results, and implications of the data. Students will learn to present research data to a diverse audience and how to receive and answer research questions.

Prerequisite: Open to all PhD students in Rehabilitation Science. Other graduate students are invited to register with permission of the instructor. However, the course is limited to 12 students.

RSD 6930 Special Topics in Rehabilitation Science 1-4 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Special Topics in Rehabilitation Science

Prerequisite: RSD 6705.

RSD 6938 Doctoral Seminar in Rehabilitation Science 1 Credit, Max 5 Credits**Grading Scheme:** Letter Grade

Students meet and interview national and international scientists studying rehabilitation to discuss key professional and scientific issues related to rehabilitation science. As part of this course, students attend and critique the Rehabilitation Science Seminars, complete seminal readings in visiting scientists' area of focus and moderate and participate in discussion.

Prerequisite: Open to all Rehabilitation Science PhD students. Other graduate students are invited to register with approval of the instructor.

RSD 6940 Supervised Teaching 1-3 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

RSD 7752 Measurement Development for Health and Rehabilitation 2 Credits**Grading Scheme:** Letter Grade

Students will apply qualitative and quantitative approaches to develop and pilot a hypothetical measure relevant for health, rehabilitation, or public health. Students will apply concepts of measurement validity and reliability to design a construct and related items to measure individual, group, or population outcomes. Students will practice qualitative approaches for measurement development and gain knowledge of quantitative approaches to psychometric testing.

Prerequisite: PHC 6052 or CLP 6527C or equivalent.

RSD 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study of for student who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

RSD 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Religion

REL 6038 Religion and Fieldwork 3 Credits

Grading Scheme: Letter Grade

Combining classroom based learning with supervised field research, this class will introduce students to the theoretical and practical issues of religion and fieldwork and will focus on the “nuts and bolts” of fieldwork. We will read both classic and newer works that showcase issues and questions in religion and fieldwork.

REL 6347 American Buddhism 3 Credits

Grading Scheme: Letter Grade

Exploration of relationship between Buddhism and American culture.

RLG 5143 Religion and Social Change 3 Credits

Grading Scheme: Letter Grade

Religion's role in social movements and other forms of cultural, economic, and political transformation.

RLG 5195 Topics in Religion and Society 3 Credits, Max 6 Credits

Grading Scheme: Letter Grade

Examines the interaction between religious bodies and the structures of the societies in which they function, with particular attention to the United States.

RLG 5199 Religion and Nature in North America 3 Credits

Grading Scheme: Letter Grade

Investigation of ways that concepts of religion and nature have evolved and influenced one another during cultural, political and environmental history of North America since European contact.

RLG 5297 Topics in Biblical Studies 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Examines methods of interpreting particular texts or themes chosen from Hebrew scriptures or the Christian New Testament.

RLG 5338 Topics in Asian Religions 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Examines religious traditions that are indigenous to India, China, or Japan.

RLG 5361 Global Islam 3 Credits

Grading Scheme: Letter Grade

Promotes a deeper understanding of the diversity of Muslim cultures and societies in the contemporary global context through an interdisciplinary approach that is both topical and geographical, drawing from perspectives from the social sciences and the humanities

Prerequisite: Currently enrolled UF graduate students may enroll in the course. Non-degree seeking students may enroll pending upon the approval of the Department of Religion.

RLG 5365 Studies in Islam 3 Credits

Grading Scheme: Letter Grade

Historical study of development of selected doctrines, institutions, and practices, using primary and interpretive material.

RLG 5396 Religion and Animals 3 Credits

Grading Scheme: Letter Grade

Examines the place of animals in the cosmologies and ethical systems of the world's diverse religions.

RLG 5495 Topics in Religious Thought 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Investigation of particular themes in a religious tradition or the comparative approach to intellectual dimensions of religious communities.

RLG 5695 Ethics after the Holocaust 3 Credits

Grading Scheme: Letter Grade

Introduces graduate students to major philosophical and theological debates in the aftermath of the Holocaust: modernity, evil, theodicy, resentment and forgiveness, and visual representations. Engagement with major philosophical works, film, and new media.

RLG 5696 Topics in Jewish Thought 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Themes, issues, and personalities in the Jewish tradition, from the biblical period through modern times.

RLG 5906 Individual Work 1-5 Credits, Max 12 Credits

Grading Scheme: Letter Grade

Study of chosen materials under the individual direction of a member of the Graduate Faculty. Plan of study and method of evaluation must be pre-approved by the supervisory committee.

RLG 5937 Topics in Religious Studies 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Issues and methods in the study of religion. Generally more than one religious tradition is studied.

RLG 6035 Method and Theory I 3 Credits

Grading Scheme: Letter Grade

Examines classical formulations of approaches to studying religion and to developing religious studies as an academic discipline.

Prerequisite: graduate standing. Required of all religion graduate students.

RLG 6036 Method and Theory II 3 Credits

Grading Scheme: Letter Grade

Study of religion in light of recent challenges in the humanities and social sciences. Special attention to the concept of religion and its origins in Christian culture of Western Europe; and to the engagement of religion in colonial culture.

Prerequisite: RLG 6035 and graduate standing. Required of all religion graduate students.

RLG 6038 Religion and Fieldwork 3 Credits

Grading Scheme: Letter Grade

Combining classroom based learning with supervised field research, this class will introduce students to the theoretical and practical issues of religion and fieldwork and will focus on the “nuts and bolts” of fieldwork. We will read both classic and newer works that showcase issues and questions in religion and fieldwork.

Prerequisite: Graduate status.

RLG 6095 Utopias and Dystopias 3 Credits

Grading Scheme: Letter Grade

Ideal societies and their roles in religious movements, ideologies, and communities.

RLG 6107 Core Seminar in Religion and Nature 3 Credits

Grading Scheme: Letter Grade

Religious dimensions of relationships between what humans call "nature" and "culture."

RLG 6126 Religion in the Americas 3 Credits

Grading Scheme: Letter Grade

Origins and interactions of religions in the Americas.

RLG 6137 Religion in North America 3 Credits, Max 6 Credits

Grading Scheme: Letter Grade

Examines religious bodies in the United States, from historical, sociological, and theological perspectives.

RLG 6167 Radical Environmentalism 3 Credits**Grading Scheme:** Letter Grade

Critically examines the emergence and social impact of radical environmental groups.

RLG 6183 Religion and Environmental Ethics 3 Credits**Grading Scheme:** Letter Grade

Explorations in classic and contemporary theories and applications of environmental ethics, with special attention to religion.

RLG 6185 Religion, Nature, and Society 3 Credits**Grading Scheme:** Letter Grade

Explores relationships between religion, nature and society both in the context of religious traditions and as a means to understand how these relationships reflect and shape social relations among people. Covers approaches to studying the relationships between different societies and nonhuman nature.

Prerequisite: Graduate status.**RLG 6319 Interpreting Asian Religions 3 Credits****Grading Scheme:** Letter Grade

Critical assessment of the world-religions model for interpreting Asian religions.

RLG 6385 Native Religions in the Americas 3 Credits**Grading Scheme:** Letter Grade

Indigenous religious communities and traditions in North, Central, and South America.

RLG 6387 Religions in Latin America 3 Credits**Grading Scheme:** Letter Grade

Important historical developments and contemporary expressions of religions in Latin America.

RLG 6709 Islam in Africa 3 Credits**Grading Scheme:** Letter Grade

The course examines processes of Islamization and the emergence of local Muslim cultures. It exposes students to the diversity of Islam in Africa. You will become familiar with contemporary African Islam, and understand how it interacts with broader political dynamics. You will acquire skills to assess issues with broad relevance.

RLG 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

RLG 6936 Seminar Relig Studies 3 Credits**Grading Scheme:** Letter Grade

Seminar Relig Studies

RLG 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

RLG 6957 Overseas Studies in Religion 1-3 Credits, Max 9 Credits**Grading Scheme:** S/U

Overseas Studies in Religion

RLG 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Required of all candidates for the M.A. degree.

RLG 7979 Advanced Research 1-15 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been admitted to a doctoral program. Not appropriate for students who have been admitted to candidacy.

Prerequisite: consent of graduate coordinator.**RLG 7980 Research for Doctoral Dissertation 1-15 Credits****Grading Scheme:** S/U

Research for Doctoral Dissertation

SRK 6905 Individual Study in Sanskrit 1-4 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Graduate reading in Sanskrit language and literature.

Prerequisite: consent of instructor.

Romance Languages

FOL 5905 Directed Individual Study 0-5 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Elective individual study course to investigate a topical area of study beyond regularly offered courses. Coursework is conducted based on a proposal and the plan is developed by the student with the faculty supervisor.

FOL 6943 Romance Language Teaching Methods 3 Credits**Grading Scheme:** Letter Grade

Required of all graduate students who will be involved in teaching and have not had a similar course elsewhere.

Prerequisite: graduate standing.

Sociology

DEM 6070 Population Issues 3 Credits**Grading Scheme:** Letter Grade

Survey of theoretical and empirical work in population studies and demography, with an emphasis on the ways that population-based data and approaches can contribute to current directions in sociological research and other related disciplines. Survey of the major topics, theoretical and conceptual approaches and debates, and empirical studies of population.

Prerequisite: SOC_PHD, SOC_MA or graduate students in other social sciences.**SYA 6018 Classical Social Theories 3 Credits****Grading Scheme:** Letter Grade

Sociological theory from its inception in the early 19th century to about 1930. The ideas of Comte, Spencer, Marx, Weber, Simmel, Durkheim, Pareto, Mead, and others.

SYA 6126 Contemporary Sociological Theory 3 Credits**Grading Scheme:** Letter Grade

The study of modern sociological theories, roughly 1930 to the present.

SYA 6315 Qualitative Research Methods 3 Credits**Grading Scheme:** Letter Grade

Fieldwork, observation, participant observation, and other qualitative data-collection and analysis techniques.

SYA 6335 Research Design in Sociology 3 Credits**Grading Scheme:** Letter Grade

Covers major social science research designs and techniques for conducting empirical inquiry into social phenomena. Emphasis on practical skills, epistemological approaches, and critical evaluation of research designs and methods, with a focus on developing a research agenda or a proposal for the dissertation, thesis, or research grant.

Prerequisite: SYA6600 or SYA6315 or SYA6407 or similar graduate social science methods course.**SYA 6407 Quantitative Research Methods 3 Credits****Grading Scheme:** Letter Grade

Applying selected quantitative methods to sociological research problems. Extensive practice applying the methods.

SYA 6600 Professional Development in Sociology 3 Credits**Grading Scheme:** Letter Grade

Introduction to professional practices in sociology and criminology. Overview of research ethics, science communication, and other elements of professional practice in research and teaching. Review of scholarly literature in one's research topic as a first step toward a research proposal. Required for sociology and criminology graduate students.
Prerequisite: Graduate admission in the Department of Sociology and Criminology & Law.

SYA 6905 Individual Work 1-9 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Work on subjects not available in currently offered courses.

SYA 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

SYA 6942 Applied Social Research Project 1-15 Credits, Max 15 Credits**Grading Scheme:** S/U

Supervised individual or team applied research project.

SYA 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

SYA 7933 Special Study in Sociology 3 Credits, Max 36 Credits**Grading Scheme:** Letter Grade

Special Study in Sociology

SYA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

SYA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

SYD 6517 Seminar in Environment and Society 3 Credits**Grading Scheme:** Letter Grade

Survey of sociological topics important for interdisciplinary environmental science.

SYD 6518 Core Issues in Environmental and Resource Sociology 3 Credits**Grading Scheme:** Letter Grade

Addressing the origins and current status of Environmental and Resource Sociology (ERS), central theoretical debates among ER sociologists, and focal topics of concern to ER sociologists, with emphasis on ERS topics current among ER sociologists at the University of Florida.

SYD 6520 Environmental Governance 3 Credits**Grading Scheme:** Letter Grade

A social scientific examination of governance policies, rules, and practices that shape environmental outcomes and regulate human-environment relations.

SYD 6706 Sociology of Race and Racism in the U.S. 3 Credits**Grading Scheme:** Letter Grade

Overview of racial-ethnic oppression, stratification, and conflict in the U.S.

SYD 6807 Sociology of Gender 3 Credits**Grading Scheme:** Letter Grade

Theoretical and empirical literature about social construction of gender. Overview of key literature.

SYO 6407 Health Disparities 3 Credits**Grading Scheme:** Letter Grade

Health needs of vulnerable populations in the United States of America.

SYO 6535 Social Inequality 3 Credits**Grading Scheme:** Letter Grade

The unequal distribution among individuals and groups of wealth, power, and prestige. The effect of class systems on society. The effect of class membership on individuals. Social mobility.

SYP 6575 The Sociology of Deviance and Social Control 3 Credits**Grading Scheme:** Letter Grade

Analysis of major sociological approaches, both theoretical and methodological, for studying deviance and social control. Critical assessment of theoretical explanations and empirical research on deviant behavior. Analysis of social factors influencing formal, medical and informal processes of social control and consideration of the impact of stigma and stigma management.

SYP 6735 Sociology of Aging and the Life Course 3 Credits**Grading Scheme:** Letter Grade

Social and personal conditions of post-retirement years. Family and housing patterns, income, leisure, health, group processes, and evaluation of institutional care of the aged.

Soil and Water Sciences

AGG 5607 Communicating in Academia 3 Credits**Grading Scheme:** Letter Grade

Teaching graduate students about academic writing, specifically focused on research proposals, theses, dissertations, manuscripts, grant proposals, and CVs. Also teaching students about aspects of academic writing that are not normally part of graduate curriculum but are necessary to succeed.

AGG 6503 Nanotechnology in Food, Agriculture, and Environment 3 Credits**Grading Scheme:** Letter Grade

Application of nanotechnology in crop production, food processing and preservation, and environmental remediation; behavior of engineered nanoparticles in plant, soil and the environment, and environmental toxicology and regulations of engineered nanoparticles.

ALS 5155 Global Agroecosystems 3 Credits**Grading Scheme:** Letter Grade

Focusing on the principles of agroecology and presentation of topics that integrate ecological with agricultural principles to optimize resource conservation, productivity, societal benefit, and profitability.

Prerequisite: SWS 3022 or SWS 5050 & ALS 3153 & AGR 4214C or equivalents.

CWR 6537 Contaminant Subsurface Hydrology 3 Credits**Grading Scheme:** Letter Grade

Physical-chemical-biological concepts and modeling of retention and transport of water and solutes in unsaturated and saturated media. Applications of environmental aspects of soil and groundwater contamination.

Prerequisite: None.

SWS 5050 Soils for Environmental Professionals 3 Credits**Grading Scheme:** Letter Grade

Fundamentals of soil properties and processes that explain the central role soils play in the environment. Geared to environmental professionals with little knowledge of soil science. Also offered as a distance education course.

SWS 5050L Soils for Environmental Professionals Laboratory 1 Credit**Grading Scheme:** Letter Grade

Hands-on laboratory experience with many tools and techniques used in soil and water science, in relation to the environment.

Corequisite: SWS 5050: Soils for Environmental Professionals or consent of instructor.**SWS 5115 Environmental Nutrient Management 3 Credits****Grading Scheme:** Letter Grade

Consumption, manufacture, properties, and reserves of fertilizer materials. Methods of application, effects on soil reaction, and plant requirements of fertilizer nutrients. Understanding specific fertilizer reactions. Also offered as a distance education course.

Prerequisite: SWS 3022 or SWS 5050: Soils for Environmental Professionals.**SWS 5132 Tropical Soil Management 3 Credits****Grading Scheme:** Letter Grade

Characteristics and management of tropical soils. Technologies that minimize industrial inputs.

Prerequisite: SWS 3022 or SWS 5050.**SWS 5182 Earth System Analysis 3 Credits****Grading Scheme:** Letter Grade

Analysis of global-scale interdependences between climate, biogeochemical cycles and humans using a systems approach.

Prerequisite: None MAC 2233, PHY 2048, or Similar Would Be Useful But Not A Requirement.**SWS 5208 Sustainable Agricultural and Urban Land Management 3 Credits****Grading Scheme:** Letter Grade

Studying agricultural and urban water quality issues in Florida, their bases, land and nutrient management strategies, and the science and policy behind Best Management Practices (BMPs). Students will learn to evaluate BMP research and analyze its role in determining practices and policies that protect water quality.

Prerequisite: SWS 3022 or equivalent course or with instructor approval.**SWS 5224 Environmental Biogeochemistry 3 Credits****Grading Scheme:** Letter Grade

Overviewing of the biogeochemical processes affecting elemental cycling (carbon, nitrogen, phosphorus, sulfur) in global environmental systems.

Prerequisite: BSC 2009 and BSC 2009L or equivalent courses, OR BSC 2010 and BSC 2010L or equivalent courses, OR CHM 2045 and CHM 2045L or equivalent courses.**SWS 5234 Environmental Soil, Water, and Land Use 3 Credits****Grading Scheme:** Letter Grade

Suitability of soils for different uses. Proper use of soil survey reports, topographic maps, and related information. Relationships between land uses and water behavior in soils and landscapes. Water use and allocation. Also offered as a distance education course.

SWS 5246 Water Resource Sustainability 3 Credits**Grading Scheme:** Letter Grade

Quantitative description of human impacts on hydrologic ecosystems (aquifers, watersheds, coastal zones, lakes, and wetlands). Case studies show the detrimental effects of unsustainable resource use and beneficial management strategies. Also offered as a distance education course.

SWS 5247 Hydric Soils 2 Credits**Grading Scheme:** Letter Grade

Concepts, field identification, and delineation of hydric soils. Instruction in accordance with the National Technical Committee for Hydric Soils and with regulatory agencies. Also offered as a distance education course.

SWS 5248 Wetlands and Water Quality 3 Credits**Grading Scheme:** Letter Grade

Introduction to natural and constructed wetland ecosystems. Problems associated with eutrophication and water quality. Hydrology, soils, and biogeochemistry. Also offered as a distance education course.

Prerequisite: CHM 2040.**SWS 5305C Soil Microbial Ecology 3 Credits****Grading Scheme:** Letter Grade

Occurrence and activities of soil microorganisms and their influence on soil productivity and environmental quality. Also offered as a distance education course.

Prerequisite: SWS 3022 or SWS 5050, MCB 2000C.**SWS 5308 Ecology of Waterborne Pathogens 3 Credits****Grading Scheme:** Letter Grade

Modern methods for molecular and cultivation-dependent identification of soil- and waterborne pathogens. Risk assessment. Survival strategies, gene regulation, and metabolism of waterborne pathogens outside of their mammalian hosts. Also offered as a distance education course.

Prerequisite: MCB 3020, or MCB 3023, or MCB 4203, or equivalent.**SWS 5406 Soil and Water Chemistry 3 Credits****Grading Scheme:** Letter Grade

Theoretical background and current approaches to agricultural and environmental problems. Also offered as a distance education course.

Prerequisite: SWS 3022 or SWS 5050; CHM 3120.**SWS 5424C Soil Chemical Analysis 3 Credits****Grading Scheme:** Letter Grade

Practical and theoretical aspects of instrumentation and techniques commonly used in analyzing soils and plants.

Prerequisite: CHM 3120.**SWS 5551 Soils, Water, and Public Health 3 Credits****Grading Scheme:** Letter Grade

Highlights important instances where soil and water science and public health overlap. Develops skills required for competency in both disciplines.

Corequisite: Graduate status.**SWS 5605C Environmental Soil Physics 3 Credits****Grading Scheme:** Letter Grade

Transport processes for water, solutes, gases, and heat in the root zone. Important soil properties (physical, chemical, and biological) that influence the transfer processes characterized in the field and laboratory. Also offered as a distance education course.

Prerequisite: CHM 2040, MAC 2312, PHY 2004, SWS 5050.**SWS 5716C Environmental Pedology 4 Credits****Grading Scheme:** Letter Grade

Soils in the environment. Heavily oriented toward field applications of pedologic principles and processes. Also offered as a distance education course.

Prerequisite: SWS 3022, SWS 5050, or consent of instructor.**SWS 5721C GIS in Land Resource Management 3 Credits****Grading Scheme:** Letter Grade

Introduction to basic concepts and use of "Arc GIS" to address land resource management issues. Also offered as a distance education course.

SWS 5805 Environmental Soil and Water Monitoring Techniques 3 Credits**Grading Scheme:** Letter Grade

Introducing students to the principles, objectives, and practices in environmental monitoring. Students will learn the proper techniques in planning for monitoring projects, sampling design, sample collection, basic principles of laboratory analysis, and basic data analysis. Quality assurance and quality control requirements are introduced and emphasized.

Prerequisite: BSC 2010 & BSC 2010L; CHM 2045 & CHM 2045L**SWS 6117 Fertilizer Technology and Use 3 Credits****Grading Scheme:** Letter Grade

Presents the basic concepts of fertilizer technology as tools for effective agricultural crop nutrient management. Provides information on a wide range of fertilizer technologies and application methods from nationally and internationally known researchers and industry experts. Detailed understanding of how to produce different fertilizer components and how to use them properly to improve plant use efficiency.

SWS 6134 Soil Quality 3 Credits**Grading Scheme:** Letter Grade

State-of-the-art studies/knowledge on soil quality. Principle assessment of soil quality with respect to biological production, plant and animal health, food security, and environmental quality. Also offered as a distance education course.

Prerequisite: SWS 5050 or consent of instructor.**SWS 6136 Soil and Nutrient Diagnostics for Agricultural Production 3 Credits****Grading Scheme:** Letter Grade

Field nutrient management using basic soil fertility concepts with scientific diagnostic techniques in various soils and cropping systems will be discussed. Nutrient budgeting for effective agricultural best management practices for agricultural and environmental sustainability will be included.

SWS 6209 Urban Soil and Water Systems 3 Credits**Grading Scheme:** Letter Grade

Issues and opportunities related to soil and water quality in urban systems. Students will learn and discuss consequences of human population growth on soil and water systems in urban areas.

Prerequisite: SWS 5050**SWS 6323 Advanced Microbial Ecology 3 Credits****Grading Scheme:** Letter Grade

Phylogeny and evolution; diversity of habitat; genetic exchange.

Prerequisite: SWS 5305C or consent of instructor.**SWS 6366 Biodegradation and Bioremediation 3 Credits****Grading Scheme:** Letter Grade

Principles of biodegradation of toxic organic chemical; practices in conducting biodegradation studies in soils and water, and in microbial aspects of bioremediation of contaminated soils and water.

SWS 6406 Soil Health and Data 3 Credits**Grading Scheme:** Letter Grade

Examine the concept, history, and underlying science of soil health; Apply basic statistical methods to analyze soil data and assess soil health in the R programming environment; Compare and select soil health indicators; Discuss the management practices for enhancing soil health.

SWS 6448 Biogeochemistry of Wetlands and Aquatic Systems 3 Credits**Grading Scheme:** Letter Grade

Biogeochemical cycles of carbon, nitrogen, phosphorus, sulfur, and redox reactions in wetland soils and sediments, as related to their agronomic, ecological, and environmental significance. Also offered as distance education course.

SWS 6454 Advanced Soil and Water Chemistry 3 Credits**Grading Scheme:** Letter Grade

Fundamental principles of surface chemistry as applied to soil and subsurface materials in natural waters. Chemical equilibria in natural systems, aqueous geochemistry, interfacial properties of soil and sedimentary colloids, and sorption of pollutants.

Prerequisite: CHM 3400, or equivalent.**SWS 6456 Advanced Biogeochemistry 3 Credits****Grading Scheme:** Letter Grade

Global elemental cycles in terrestrial, wetland, and aquatic systems as related to water quality, carbon sequestration, and climate change.

SWS 6722 AI Modeling in Soil and Ecosystem Sciences 3 Credits**Grading Scheme:** Letter Grade

AI Modeling to Understand the Properties and Functions of Soils and Ecosystems.

Prerequisite: GEO 6160 OR GEO 6938 - Intro to Programming and Remote Sensing with R OR STA 6093 OR STA 6166 & SWS 5721C, or equivalent, or consent of instructor.**SWS 6804 Modeling Soil, Water, and Ecosystem Processes 3 Credits****Grading Scheme:** Letter Grade

An introduction into predictive modeling of soil, water, and ecosystem processes. Students learn from the ground up how to transform a conceptual model into a mathematical framework that then will be coded up in a simulation model. This hands-on experience serves the students to recognize how data can best serve models and how models can be used to interpret real world data.

SWS 6813C Modeling Land Biogeochemistry 3 Credits**Grading Scheme:** Letter Grade

Modeling the flow of water, carbon and nutrients from an Earth system perspective.

Prerequisite: BSC 3307C or COP 3272 or MAC 2233 or PHY 2048 or SWS 4180 or ABE 5643C or PCB 5358 or SWS 5182 or SWS 5224.**SWS 6905 Special Problems 1-4 Credits, Max 8 Credits****Grading Scheme:** Letter Grade

Laboratory, library, and/or field study and research in a particular aspect of soils. Also offered as a distance education course.

Prerequisite: 15 credits of soil science.**SWS 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Also offered as a distance education course.

SWS 6920 Journal Colloquium in Environmental Science 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

A discussion-based course to help graduate students in environmental science fields develop skills for critical analysis of literature while exploring current literature topics.

Prerequisite: Environmental science/earth system science course or consent of the instructor.**SWS 6931 Seminar 1 Credit, Max 3 Credits****Grading Scheme:** Letter Grade

Presentation of literature, methods of proposed thesis research, and selected topics.

SWS 6932 Topics in Soils 1-4 Credits, Max 8 Credits**Grading Scheme:** Letter Grade

Also offered as a distance education course.

Prerequisite: SWS 3022.**SWS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Also offered as a distance education course.

SWS 6950 Professional Development in Soil, Water, and Ecosystem Sciences 2 Credits**Grading Scheme:** Letter Grade

This course serves as a professional development component to graduate coursework in soil and water sciences and related fields. Topics include common skills and challenges in academia and professional employment. This course is available to both MS and PhD students and is offered every fall and spring semester.

SWS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Also offered as a distance education course.

SWS 6992 Aquatic Toxicology: Science and Applications 3 Credits**Grading Scheme:** Letter Grade

Introduces foundational knowledge and concepts of the field of aquatic toxicology. Examines how environmental and chemical properties influence the fate and bioavailability of contaminants in aquatic environments; introduces principles of toxicology and methods used to study aquatic toxicology, as well as applications of knowledge gained from aquatic toxicology studies.

Prerequisite: [(BSC 2005 and BSC 2005L) or (BSC 2010 and BSC 2010L)] and [(CHM 2045 and CHM 2045L) or (CHM 2046 and CHM 2046L)].

SWS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy. Also offered as a distance education course.

SWS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Also offered as a distance education course.

Spanish

FOL 6326 Technology in Foreign Language Education 3 Credits**Grading Scheme:** Letter Grade

Technology in classrooms. The interface between pedagogy and technology.

Prerequisite: FOL 6943, FRE 6943, or equivalent.

FOL 6943 Romance Language Teaching Methods 3 Credits**Grading Scheme:** Letter Grade

Required of all graduate students who will be involved in teaching and have not had a similar course elsewhere.

Prerequisite: graduate standing.

SPN 6060 Spanish for Functional Reading and Translation 3 Credits**Grading Scheme:** Letter Grade

Designed for graduate students who need to develop reading knowledge of Spanish for research or other programmatic reasons. Provides students with the necessary tools to read literary and scholarly texts in Spanish. Class activities include discussions, grammar exercises, translations and textual analyses.

SPN 6166 Teaching Spanish for the Professions 3 Credits**Grading Scheme:** Letter Grade

Practical training and orientation for graduate students. Business Spanish. Issues of Spanish for health care and other professions. Languages across the curriculum. Professional development: technology in the classroom, scholarly networking, and job search.

SPN 6425 Writing for the Profession 3 Credits**Grading Scheme:** Letter Grade

Develop or perfect skills in the writing of academic Spanish. Class hours are divided between theory/practice of the genres and review/practice of advanced rhetorical strategies in Spanish.

Prerequisite: Current enrollment in graduate program; advanced command of Spanish.

SPN 6480 Spanish Phonetics and Phonology 3 Credits**Grading Scheme:** Letter Grade

Explores the Spanish phonological system from the perspectives of linear and non-linear generative phonology, comparing and contrasting the most popular models and theories used in literature today. Theories are subsequently applied towards broader issues of language acquisition, use and maintenance.

SPN 6702 Issues in Spanish Second Language Acquisition 3 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Explores various topics related to acquiring, learning and using Spanish as a second or foreign language. Specific offerings may cover specific linguistic aspects (e.g., phonology, syntax), specific extralinguistic factors (e.g., context, population), or other topics dependent on faculty expertise or student interest.

SPN 6705 Foundations of Hispanic Linguistics 3 Credits**Grading Scheme:** Letter Grade

Introducing theoretical linguistics, exploring research methods employed in the field, and showcasing the research areas represented in the department. The course is divided in three main units: introduction to theoretical linguistics; introduction to research methods; current research. Taught in Spanish.

SPN 6735 Special Study in Spanish Linguistics 3 Credits, Max 30 Credits**Grading Scheme:** Letter Grade

Varying topics of Spanish linguistics relevant to second language acquisition, sociolinguistics, and historical linguistics.

SPN 6785 Advanced Spanish Phonetics 3 Credits**Grading Scheme:** Letter Grade

Precise description of Spanish pronunciation. Dialect features and contrastive English phonetics.

SPN 6803 Introduction to Generative Syntax in Spanish 3 Credits**Grading Scheme:** Letter Grade

Introduction to contemporary generative syntactic theory, using Spanish language as objects of study. Course is taught in Spanish.

SPN 6804 Advanced Syntax of Spanish 3 Credits**Grading Scheme:** Letter Grade

Detailed study of Spanish morphology and syntax from a contemporary syntactic framework (Minimalism). Designed to provide in-depth study of issues in Spanish morphosyntax, beyond those presented in introductory courses.

SPN 6806 Psycholinguistics of Spanish Bilingualism 3 Credits**Grading Scheme:** Letter Grade

Introduces the core themes of psycholinguistics by using Spanish multilingual speakers as the case study. Explores the acquisition of various lexical components, examining production and comprehension throughout. Addresses cognitive neural consequences of bilingualism on general cognition. Familiarizes students with experimental methods used in psycholinguistic research.

SPN 6827 Sociolinguistics of the Spanish-Speaking World 3 Credits**Grading Scheme:** Letter Grade

Overview of issues in the contemporary Spanish-speaking world: language variation, language contact, discourse analysis, language attitudes, policy and planning, and social factors in language acquisition and use.

Prerequisite: SPN 6785.**SPN 6835 Spanish and Spanish-American Dialectology 3 Credits****Grading Scheme:** Letter Grade

Principles and methods applied to study of regional varieties of Spanish in Spain and Spanish America.

Prerequisite: SPN 6785.**SPN 6845 History of the Spanish Language 3 Credits****Grading Scheme:** Letter Grade

Phonological, morphological, syntactic, and lexical evolution of Spanish language from Latin.

Prerequisite: SPN 6785**SPN 6855 Spanish Syntax 3 Credits****Grading Scheme:** Letter Grade

Morphological, syntactic, and semantic aspects of the Spanish language.

SPN 6856 Spanish in Contact: Issues in Bilingualism 3 Credits**Grading Scheme:** Letter Grade

Structural and sociocultural analysis of the Spanish language in contact with other major languages: Quechua, Aymara, Guarani, Basque, Catalan, English, Portuguese, and African languages.

SPN 6900 Directed Readings in Spanish 3 Credits, Max 6 Credits**Grading Scheme:** S/U

Individualized readings in preparation for Master of Arts comprehensive examinations.

SPN 6940 Supervised Teaching 0-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Required for all graduate teaching assistants in Spanish. Practical training in teaching elementary Spanish courses.

SPN 6945 Practicum in Advanced College Teaching 2 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical training and orientation for advanced doctoral students in teaching upper-division courses. Gain upper-level teaching experience by working closely with a mentor in all areas of the teaching process.

SPW 6209 Colonial Spanish-American Literature 3 Credits**Grading Scheme:** Letter Grade

Readings, research, and discussion. Literary, historical, and legal 16th-, 17th-, and 18th-century texts in Spanish: Colonial Latin America and dealing with contact among European, neo-European, and Native American cultures.

SPW 6216 Spanish Prose Fiction of the Golden Age 3 Credits**Grading Scheme:** Letter Grade

The literary landscape of rampant generic diversity, before novelistic forms solidified. While shepherds in rarified meadows disputed fine points of neo-Platonic love, thieves, prostitutes, and picares inquired their way into carriages, salons, and homes of aristocracy. Fiction provided an outlet for political satire, religious allegory, utopian dreaming, and sheer escapism. Readings and lectures in Spanish.

SPW 6269 Spanish Novel of the Nineteenth Century 3 Credits**Grading Scheme:** Letter Grade

Survey of Spanish narrative beginning with romantic cuadros de costumbres and folletín. Emergence of realist and naturalist narrative from 1870s to 1890s. Emphasizes Valera, Galdos, Clarín, and Pardo Bazán.

SPW 6278 Postwar Spanish Fiction 3 Credits**Grading Scheme:** Letter Grade

Contextualized approach to representative works and significant authors of fiction published in Spain after 1939. Critical and historical readings and textual analysis.

SPW 6285 Contemporary Spanish-American Narrative I 3 Credits**Grading Scheme:** Letter Grade

Textual production of the 1940s and 1950s including broader cultural characteristics of modernization, development of new narrative modes, and theories of understanding Latin America and literature of this period.

SPW 6286 Contemporary Spanish-American Narrative II 3 Credits**Grading Scheme:** Letter Grade

Fiction in the 1960s and after, including the New narrative, the Boom, and the Post-Boom. Broader cultural characteristics. Theories of understanding the area and the literature of the period.

SPW 6345 Twentieth-Century Spanish Poetry 3 Credits**Grading Scheme:** Letter Grade

Introductory survey of major poets. Topics include gender, periodization, aesthetics, historicity, and the relationship of poetry to politics. Close reading of texts in the context of contemporary literary theory.

SPW 6356 Spanish-American Poetry from Romanticism to Vanguardismo 3 Credits**Grading Scheme:** Letter Grade

Major movements from the mid-19th century to the 1930s, especially from Modernismo to the present. Seminal works of poets such as Martí, Casal, Cario, Lugones, Mistral, Storni, Huidobro, and Vallejo.

SPW 6357 Contemporary Spanish-American Poetry 3 Credits**Grading Scheme:** Letter Grade

Sentral aspects of Spanish-American poetry from Vanguardism to the present. Organized around a specific theme, genre, country, region, theoretical problem, or subperiod.

SPW 6366 Spanish-American Essay 3 Credits**Grading Scheme:** Letter Grade

Close reading and critical analysis of texts by major twentieth-century essayists. Themes include affirmation of identity, gender roles, and the definition of ethnic, racial, social, and class categories.

SPW 6545 Spanish Romanticism 3 Credits**Grading Scheme:** Letter Grade

Analyzes literary works of Spanish Neoclassical and Romantic periods in light of their social, historical and ideological contexts.

SPW 6606 Cervantes 3 Credits**Grading Scheme:** Letter Grade

Situates Don Quijote I, II in the cultural nexus of early modern Spain. Surveys contemporary currents in Cervantine criticism.

SPW 6729 The Generation of 1898 3 Credits**Grading Scheme:** Letter Grade

Fin de siècle crisis. The rise of literary modernity and nationalism. Creation of modern intelligentsia in the early 20th century in the works of Unamuno, Costa, Maeztu, Antonio Machado, Baroja, and Valle-Inclán.

SPW 6806 Introduction to Graduate Study and Research 3 Credits**Grading Scheme:** Letter Grade

Tools, problems, and methods of literary research.

SPW 6902 Special Study in Spanish or Spanish-American Literature 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Selected topic or problem (varied each semester).

SPW 6905 Individual Work 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Available only by special arrangement with graduate adviser.

SPW 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

SPW 6934 Seminar in Spanish American Literature and Culture 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Analyzing themes and directions in contemporary Spanish American literature and culture. Feminist literary and cultural criticism. Reading and discussion of key theoretical texts produced in the U.S., Europe, and Latin America. Graduate students from other disciplines are welcome.

SPW 6938 Seminar in Spanish Literature and Culture 3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Prereq or coreq: SPW 6806. Variable topics. Close consideration of a single literary or critical or cultural problem arising in the context of Spanish letters or culture.

SPW 6945 Practicum Adv Col Tch 2 Credits**Grading Scheme:** S/U

Practicum Adv Col Tch

SPW 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

SPW 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

SPW 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Speech, Language and Hearing Sciences

LIN 5741 Applied English Grammar 3 Credits**Grading Scheme:** Letter Grade

Survey of English grammar based on the principles of second language acquisition and social interaction, with implications for teachers.

LIN 6720 Second Language Acquisition 3 Credits**Grading Scheme:** Letter Grade

Neurolinguistic, psycholinguistic, and sociolinguistic bases of second language acquisition in childhood and adulthood.

SPA 5051 Clinical Observation in Audiology 1 Credit**Grading Scheme:** Letter Grade

Opportunity to observe various phases of audiologic practice and to accumulate a minimum of 15 hours of observation experience.

Prerequisite: for beginning graduate students in audiology.

SPA 5102 Auditory Anatomy and Physiology 2 Credits**Grading Scheme:** Letter Grade

In-depth coverage of anatomy and physiology of auditory system to support understanding of auditory function in persons with healthy auditory mechanisms and those with specific disorders.

SPA 5204 Phonological Disorders 3 Credits**Grading Scheme:** Letter Grade

Advanced principles of diagnosis and remediation.

SPA 5211 Voice Disorders 3 Credits**Grading Scheme:** Letter Grade

Advanced theory and techniques of diagnosis and remediation.

SPA 5225 Principles of Speech Pathology: Stuttering 3 Credits**Grading Scheme:** Letter Grade

Advanced theories and techniques of diagnosis and therapy.

SPA 5254 Neurocognitive Language Disorders 3 Credits**Grading Scheme:** Letter Grade

Neurocognitive deficits of language in dementia, traumatic brain injury, and right hemisphere damage.

Prerequisite: introductory neuroanatomy.

SPA 5304 Principles of Audiological Evaluation 3 Credits**Grading Scheme:** Letter Grade

Advanced procedures in speech audiometry, masking, and audiogram interpretation.

SPA 5401 Speech Pathology Language Disorder 3 Credits**Grading Scheme:** Letter Grade

Advanced theory and techniques of diagnosis and remediation of language disorders in infants and preschoolers.

SPA 6010 Basic Auditory Sciences 3 Credits**Grading Scheme:** Letter Grade

The nature of sound, the structure and function of the auditory system, frequency selectivity, auditory filtering, and the psychoacoustics of pure tones and complex sounds.

SPA 6133L Hearing Aid Analysis Laboratory 1 Credit**Grading Scheme:** Letter Grade

Advanced analysis and description of the electroacoustical properties of hearing aids.

Corequisite: SPA 6345.

SPA 6233 Speech Motor Control Disorders 3 Credits**Grading Scheme:** Letter Grade

Developmental and acquired neurogenic speech disorders and their associated neuropathology, etiology, characteristics, assessment practices, and treatment strategies.

SPA 6270 Auditory Processing Disorders 3 Credits**Grading Scheme:** Letter Grade

Anatomy and physiology of the central auditory nervous system, and disorders of auditory processing that occur in humans. Focuses on evaluation and treatment of auditory processing disorders.

Prerequisite: SPA 5304, SPA 5102.

SPA 6305 Pediatric Audiology 3 Credits

Grading Scheme: Letter Grade

Pediatric Audiology

Prerequisite: SPA 6313.

SPA 6311 Medical Audiology 3 Credits

Grading Scheme: Letter Grade

Differential diagnosis of hearing impairment.

SPA 6317 Vestibular Disorders 2 Credits

Grading Scheme: Letter Grade

Mechanics and physiology of human balance, contribution of inner ear to balance, disorders of balance, and approaches to diagnostic assessment and rehabilitation.

Prerequisite: graduate status.

SPA 6323 Audiologic Rehabilitation for Adults 2 Credits

Grading Scheme: Letter Grade

Explores theoretical and clinical literature. Describes assessment and management strategies.

SPA 6324 Audiologic Rehabilitation for Children 2 Credits

Grading Scheme: Letter Grade

Explores theoretical and clinical literature. Assessment and therapy techniques for children.

SPA 6340 Amplification I 2 Credits

Grading Scheme: Letter Grade

Theoretical and applied understanding of current technology in amplification systems for the hearing impaired. Seminar format (2/3) and clinical laboratory activities (1/3).

SPA 6341 Amplification II 2 Credits

Grading Scheme: Letter Grade

Digital and programmable technology in hearing aids.

Prerequisite: SPA 6340.

SPA 6390 Proseminar: Speech-Language Pathology and Audiology 3 Credits

Grading Scheme: Letter Grade

Current professional issues including federal and state regulations, audiologic jurisprudence, audiological management, and interfacing with other professionals.

SPA 6410 Adult Language Disorders 3 Credits

Grading Scheme: Letter Grade

The nature of acquired aphasia and related disorders. Applying neurolinguistic and neuropsychological models to methods of assessment and treatment.

SPA 6506 Clinical Clerkship in Audiology 1 Credit, Max 3 Credits

Grading Scheme: Letter Grade

Beginning-level audiologic practicum.

SPA 6524 Practicum in Speech-Language Therapy: UFSHC 1-6 Credits, Max 8 Credits

Grading Scheme: Letter Grade

Practicum in Speech-Language Therapy: UFSHC

SPA 6531 Clinical Practice in Hearing Assessment 1-6 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Clinical Practice in Hearing Assessment

SPA 6564 Communication and Aging 3 Credits

Grading Scheme: Letter Grade

Characteristics of, and management approaches for, communication disorders found with some frequency in the elderly. Focuses on enhancing communication.

SPA 6581 Special Clinical 1-9 Credits, Max 40 Credits

Grading Scheme: Letter Grade

Advanced study in specific areas of clinical process.

SPA 6805 Introduction to Graduate Research 3 Credits

Grading Scheme: Letter Grade

Introduction to Graduate Research

Prerequisite: required of all graduate students specializing in speech-language pathology or audiology.

SPA 6905 Individual Study 1-3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Supervised study of specialized topic or research project.

Prerequisite: consent of instructor.

SPA 6910 Supervised Research 1-5 Credits, Max 5 Credits

Grading Scheme: S/U

Supervised Research

Prerequisite: SPA 6805, and consent of instructor.

SPA 6930 Proseminar in Speech-Language Pathology and Audiology 1 Credit, Max 6 Credits

Grading Scheme: S/U

Faculty and graduate student research in speech-language pathology, audiology, and related disciplines.

SPA 6935 Applied Reading Disabilities: Diagnosis and Treatment 3 Credits

Grading Scheme: Letter Grade

Seminar and practicum in diagnosis and treatment of developmental reading disabilities.

Prerequisite: majors only.

SPA 6936 Special Topics 3 Credits, Max 9 Credits

Grading Scheme: Letter Grade

Theory and research in communication.

Prerequisite: consent of instructor.

SPA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits

Grading Scheme: S/U

Supervised Teaching

SPA 6942 Externship in Speech-Language Pathology 7-12 Credits, Max 12 Credits

Grading Scheme: Letter Grade

Full-time supervised clinical experience in speech-language pathology. Students provide diagnostic and therapeutic services in clinical setting.

SPA 6971 Research for Master's Thesis 1-15 Credits

Grading Scheme: S/U

Research for Master's Thesis

SPA 7306 Audiologic Assessment in a Medical Setting 5 Credits

Grading Scheme: Letter Grade

Audiologic and medically related aspects of hearing disorders.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7318 Clinical Auditory Electrophysiology 5 Credits

Grading Scheme: Letter Grade

Understanding clinical auditory physiological measures, including auditory-evoked and event-related potentials, otoacoustic emissions, and common clinical protocols applied to auditory disorders.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7319 Balance Disorders: Evaluation and Treatment 5 Credits**Grading Scheme:** Letter Grade

Understanding how humans maintain balance, the contribution of the inner ear to balance, disorders of balance, and approaches to rehabilitation of these disorders.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7325 Audiologic Rehabilitation 5 Credits**Grading Scheme:** Letter Grade

State-of-the-art information on current philosophies and practice patterns for audiologic habilitation and rehabilitation.

Prerequisite: open to students in the distance learning Au.D. program.

SPA 7343 Cochlear Implants and Assistive Devices 5 Credits**Grading Scheme:** Letter Grade

Fitting practices and future directions.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7348 Principles of Amplification 5 Credits**Grading Scheme:** Letter Grade

Recent information regarding amplification systems.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7353 Environmental Hearing Conservation 5 Credits**Grading Scheme:** Letter Grade

Recent information regarding the causes of hearing loss, prevention strategies, and basic mechanisms underlying noise-induced hearing loss.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7354 Seminar in Audiology: Hearing Conservation and Noise Control 3 Credits**Grading Scheme:** Letter Grade

Seminar in Audiology: Hearing Conservation and Noise Control

SPA 7391 Business and Professional Issues in Audiology 5 Credits**Grading Scheme:** Letter Grade

Overview of the healthcare system, the place of audiology in the system, current issues facing the profession, ethics of audiologic practice, providing reimbursement for services, and personnel management.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7566 Counseling Individuals with Hearing Losses 5 Credits**Grading Scheme:** Letter Grade

Recent information about counseling.

Prerequisite: open only to students in the distance learning Au.D. program.

SPA 7945 Graduate Practicum in Audiology 3-6 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Intermediate clinical practicum for Au.D. students.

SPA 7958 Clinical Externship 3-12 Credits, Max 36 Credits**Grading Scheme:** Letter Grade

Clinical Externship

Prerequisite: 12 hours of SPA 7945.

SPA 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

SPA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Sport Management

HLP 6515 Evaluation Procedures in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Evaluation and interpretation of tests and analysis of research data.

HLP 6535 Research Methods in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Introduction to research methodology and design.

HLP 6911 Research Seminar 1 Credit**Grading Scheme:** S/U

Research presentations by graduate students and faculty in the College.

HLP 6935 Variable International Topics 1-6 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Opportunity to study in a wide range of cultural settings.

Prerequisite: adviser's approval.

HLP 7939 HHP PhD Professional Development Seminar 3 Credits**Grading Scheme:** Letter Grade

Designed to complement the scholarly emphases of the HHP PhD program by providing insight into key considerations for professional development and personal growth. Best practices will be shared for developing professional aptitude and the skills necessary for successful matriculation through graduate studies and future professional careers.

HLP 7979 Advanced Research in Health and Human Performance 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field, or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HLP 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

PET 5185 High-Performance Coaching: Priority Alignment 3 Credits**Grading Scheme:** Letter Grade

Students will evaluate the research on coaching, coaching stressors, and the reliance of achievement in sport to gain perspective and self-awareness to manage collateral damage. Students will design plans to navigate demands through the integration of work and life to stay healthy and maintain a focus on "What's Really Important."

Prerequisite: 7HH or 8HH (Graduate students seeking a first master's degree or Graduate students who have earned a master's degree, or who have earned 36 or more credits while seeking a graduate degree, and who have not been admitted to doctoral candidacy).

PET 5186 High-Performance Coaching: Exploring Team Dynamics 3 Credits**Grading Scheme:** Letter Grade

Students will focus on identifying and managing barriers that prevent the maximization of team performance in high-performance environments. Students will assess how human-related issues negatively impact team performance. Students will create structure, systems, and content to provide teams with platforms to manage those issues.

Prerequisite: 7HH or 8HH (Graduate students seeking a first master's degree or Graduate students who have earned a master's degree, or who have earned 36 or more credits while seeking a graduate degree, and who have not been admitted to doctoral candidacy).

PET 5187 High-Performance Coaching: Creating Winning Environments 3 Credits**Grading Scheme:** Letter Grade

Students will identify and design an environment for their team in high-performance settings to systemize behavior management through a sport lens. Students will create systems that define standards and expectations, identify and reinforce above-the-line behaviors, and identify and convert below-the-line behaviors as they impact the team environment.

Prerequisite: 7HH or 8HH (Graduate students seeking a first master's degree or Graduate students who have earned a master's degree, or who have earned 36 or more credits while seeking a graduate degree, and who have not been admitted to doctoral candidacy).

PET 5188 High-Performance Coaching: Building Character through Sport 3 Credits**Grading Scheme:** Letter Grade

Examine research on coaching and coaching pedagogy to create character development strategies for operations within sport organizations. The integration of character based coaching activities will serve as a roadmap for organizations and result in the collection of relatable assets that will evolve into a character development program.

Prerequisite: HH7 or HH8: Graduate students seeking a first master's degree or Graduate students who have earned a master's degree, or who have earned 36 or more credits while seeking a graduate degree, and who have not been admitted to doctoral candidacy.

PET 5766 High-Performance Coaching: Leadership through a Sport Lens 3 Credits**Grading Scheme:** Letter Grade

Students will examine techniques to foster intrinsic motivation and self-awareness among those they lead through a sport lens in high-performance settings. Individual development dialogues will assist those they lead on a journey of self-discovery with the goal of creating a platform to develop a positive and healthy inner coach.

Prerequisite: 7HH or 8HH (graduate students in the college of health and human performance).

PET 6177 Athlete-Centered Coaching and Leadership 3 Credits**Grading Scheme:** Letter Grade

This course explores various applications of the Athlete-Centered Sport Coaching model. Students will learn how elements of this model impact: coaching, team, school and recreational program development, groups in business, life outside of sports, program and individual development. Emphasis will be given to the analysis of coaching perspectives and the strong correlation between sports and business leadership.

Prerequisite: 7 or 8 HH/SPM or consent of instructor.

SPM 5016 Sport Sociology 3 Credits**Grading Scheme:** Letter Grade

Advanced principles and applications of social issues, within the sport industry. An in-depth look at how amateur and professional sport business enterprises reflect societal values and issues in the arena of sport.

SPM 5107 Sport Event Management: Principles and Applications 3 Credits**Grading Scheme:** Letter Grade

Introduces students to the planning and management of national and international sport events through the strategic and systematic process of event management, exploring the phases and structural domains associated with the model.

Prerequisite: 7HH or 8HH standing.

SPM 5181 Athlete Development 3 Credits**Grading Scheme:** Letter Grade

Provides an overview and study of the main skills utilized by athlete development specialists including how to manage the intersection of elite athletes and sport media, athlete career development, and the fundamentals of athlete personal finance.

Prerequisite: Class standing of 7 or 8.

SPM 5185 Name, Image, and Likeness: Amateur Athletes as Brands 3 Credits**Grading Scheme:** Letter Grade

Intercollegiate athletics is undergoing seismic shifts as athletes begin monetizing their name, image and likeness for the first time. This class serves as an introduction to NIL rules and laws to examine how the industry is adapting and explore how college athletes can develop their personal brands to maximize opportunities.

Prerequisite: HH7 OR HH8.

SPM 5205 Environmental Sustainability and Sports 3 Credits**Grading Scheme:** Letter Grade

The sports industry is much more than the teams taking the field. In today's world of sports, managers must be aware of all components of their organization, and this includes impact on the environment. This course is designed to introduce students to sustainability within the sports industry.

Prerequisite: Graduate or Advanced Graduate standing.

SPM 5206 Sport Ethics 3 Credits**Grading Scheme:** Letter Grade

Self-evaluating, examining, and developing philosophy on ethical issues related to sport. Research and discuss major moral and ethical issues related to sport. Opportunities for ethical decision making, using critical analysis.

Prerequisite: 7 or 8 HH/SPM or consent of instructor.

SPM 5207 Sport Sponsorship 3 Credits**Grading Scheme:** Letter Grade

Explores sponsorship in sport. Through the exploration of various types of sponsorship, students will also be able to formulate their own creative solutions to achieve partner brand objectives. Further, students will gain a firm understanding in how sports sponsorships are sought out, formulated, evaluated, and activated to produce positive ROI and ROO for partner brands.

Prerequisite: 7HH or 8HH (graduate status in the College of Health and Human Performance).

SPM 5309 Sport Marketing 3 Credits**Grading Scheme:** Letter Grade

Marketing information systems, pricing strategies, media relations, promotional methods, and endorsements as they relate to marketing theories. Practical applications and principles.

SPM 5405 Sport Mass Media 3 Credits**Grading Scheme:** Letter Grade

This course examines the impact sports and the mass media have had and are continuing to have on each other.

Prerequisite: Graduate student in Health and Human Performance.**SPM 5506 Sport Finance 3 Credits****Grading Scheme:** Letter Grade

Financial theories and practical applications of sport income and expenditures. Principles and procedures of marketing sports in today's society.

SPM 5518 Nonprofit Management in Sport 3 Credits**Grading Scheme:** Letter Grade

Surveys the nonprofit sport environment through a managerial lens. It will situate the nonprofit sector as an important facet of the sport industry, and allow students to analyze this space in the broader social and historical context of its existence.

Prerequisite: 7HH or 8HH (graduate status in the College of Health and Human Performance).**SPM 5726 Sport Business Law 3 Credits****Grading Scheme:** Letter Grade

Covers human resources management and employment/labor law, governance in sport organization, event and venue management and marketing management in the context of sport organizations. This course builds on the basic principles of law introduced in Issues in Sport Law and Advanced Sport Law.

Prerequisite: HH7 or HH8 and SPM 6726.**SPM 5936 Current Topics in Sport Management 1-3 Credits, Max 18 Credits****Grading Scheme:** Letter Grade

Offered, on request of students, to meet special interests inadequately covered in other courses.

Prerequisite: consent of department chair.**SPM 6036 Research Seminar in Sport Management 3 Credits****Grading Scheme:** Letter Grade

Theoretical and practical research information in sport and exercise program management.

SPM 6106 Management and Planning of Sport and Physical Activity Facilities 3 Credits**Grading Scheme:** Letter Grade

Administrative tasks involved in managing, planning, renovating, and maintaining facilities. Effect on program selection and scheduling in sport and fitness.

SPM 6158 Management and Leadership in Sport 3 Credits**Grading Scheme:** Letter Grade

Principles of leadership and management for sport settings.

Prerequisite: 7 or 8 HH/SPM or consent of instructor.**SPM 6308 Study of Sport Consumer Behaviors 3 Credits****Grading Scheme:** Letter Grade

Advanced theoretical and practical information in sport consumer studies.

Prerequisite: graduate status.**SPM 6326 Sport Marketing Analytics 3 Credits****Grading Scheme:** Letter Grade

Covers business analytics with an emphasis on applications for sport marketing research. This course will allow students to develop statistical thinking skills for sport marketing analytics, analyze datasets typically encountered in sport marketing and consumer analysis situations, and utilize the analysis results for sport business decision-making.

Prerequisite: GRHHU SPM_MS (Students in the Sport Management Masters program).SPM6326**SPM 6606 Management of Olympic Games Functional Areas 3 Credits****Grading Scheme:** Letter Grade

Familiarizes students with the management elements of each of the Olympic Games functional areas and will provide students with foundational knowledge about skills needed to work in mega or other sport events.

SPM 6610 Sport Events and Community Development 3 Credits**Grading Scheme:** Letter Grade

Advanced practical information in sport events and community development, including the impacts of sport events on host and neighboring communities, the planning and sport event outcomes for bid phase, event preparation stage, host event phase and post event phase.

Prerequisite: Graduate Status**SPM 6721 Advanced Sport Law 3 Credits****Grading Scheme:** Letter Grade

Further student understanding of foundational legal principles in the field of sport management, especially those principles governing contractual relationships, agency representations, and liability for wrongful conduct. This course builds on the basic principles of law students studied in the introductory Sports Law course.

Prerequisite: SPM 6726.**SPM 6726 Issues in Sport Law 3 Credits****Grading Scheme:** Letter Grade

Legal effects of regulating and managing amateur and professional sports and wellness programs: injury liability, risk management, constitutional rights of athletes, and contract negotiation.

Prerequisite: 7 or 8 HH/SPM or consent of instructor.**SPM 6727 The Application of Fair Competition Laws to Sport Management 3 Credits****Grading Scheme:** Letter Grade

Focuses on collective bargaining agreements and arbitration in sports, the basics of antitrust in the context of the sports industry and the impact of antitrust regulation on business strategy in sports.

Prerequisite: (HH7 or HH8) & SPM 6726.**SPM 6905 Directed Independent Study 1-6 Credits****Grading Scheme:** Letter Grade

Individual research projects under faculty guidance.

SPM 6910 Supervised Research 1-6 Credits, Max 6 Credits**Grading Scheme:** S/U

Supervised Research

SPM 6947 Graduate Internship in Sport Management 3-9 Credits, Max 9 Credits**Grading Scheme:** S/U

On-site full-time practical experience in sport management.

Prerequisite: completion of at least 2 semesters of course work applicable to specialization; permission of advisor, written application, and site approval.

SPM 6948 Advanced Practicum in Sport Management 1-3 Credits**Grading Scheme:** Letter Grade

On-site practical experience in sport management.

SPM 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for master's thesis in sport management.

SPM 7750 Theories in Sport Management 3 Credits**Grading Scheme:** Letter Grade

Expose students to the key concepts of theory, the process of theory development, and the application/extension of theories in sport management, helping students to critically evaluate emergent research topics in sport management and develop theoretically based research models.

Prerequisite: HH8 or HH9 (Doctoral student or doctoral candidate status in the College of Health and Performance).

SPM 7900 Readings in Sport Management 3 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

This course provides students with an overview of various sport management theories and research. Students will gain exposure to a breadth of topics and depth in the specific to areas of sport management. Students will also learn how sport management concepts and principles can be applied to our roles as sport managers, and to our everyday life.

Prerequisite: HHU_PHD; doctoral student status.

Statistics

STA 5325 Fundamentals of Probability 3 Credits**Grading Scheme:** Letter Grade

Topics in probability and statistics, particularly discrete and continuous random variables, sampling distributions, estimation, and hypothesis testing. Applications to engineering and natural science.

Prerequisite: grade of C or better in MAC 2313 and STA 3032 or equivalent.

STA 5328 Fundamentals of Statistical Theory 3 Credits**Grading Scheme:** Letter Grade

Direct continuation of STA 4321/STA 5325. Basic material for distribution theory, sampling distributions, properties of estimators, hypothesis testing, linear regression analysis, and analysis of variance. A good knowledge of calculus is helpful.

Prerequisite: STA 4321 or equivalent.

STA 5503 Categorical Data Methods 3 Credits**Grading Scheme:** Letter Grade

Description and inference using proportions and odds ratios, multi-way contingency tables, logistic regression and other generalized linear models, and loglinear models applications.

Prerequisite: STA 3024, 3032, 4210, 4322, STA 6127, or STA 6167.

Intended for graduate students not majoring in statistics.

STA 5507 Applied Nonparametric Methods 3 Credits**Grading Scheme:** Letter Grade

Introduction to nonparametric statistics. Includes one- and two-sample testing and estimation methods, one- and two-way layout models, and correlation and regression models.

Prerequisite: STA 2023, 3032, 4210, 4322, STA 6126, STA 6166. Intended for graduate students not majoring in statistics.

STA 5701 Applied Multivariate Methods 3 Credits**Grading Scheme:** Letter Grade

Review of matrix theory, univariate normal, t, chi-squared and F distributions, and multivariate normal distributions. Inference about multivariate means, Hotelling's T² multivariate analysis of variance, multivariate regression, and multivariate repeated measures. Inference about covariance structure, principal components, factor analysis, and canonical correlation. Multivariate classification techniques, discriminant and cluster analysis. Additional topics at the discretion of the instructor, time permitting.

Prerequisite: STA 3024, STA 6127, STA 6167, or 4211. Intended for graduate students not majoring in statistics.

STA 5856 Applied Time Series Methods 3 Credits**Grading Scheme:** Letter Grade

Stationarity, autocorrelation, ARMA models, non-stationary processes, ARIMA models, regression with ARMA errors, model-based forecasting, forecasting algorithms.

Corequisite: STA 4322 or STA 5328.

STA 6092 Applied Statistical Practice 3 Credits**Grading Scheme:** Letter Grade

Communication, management, and the organizational, computational, and statistical thinking skills needed for consulting in statistics. Integrating graphic and numeric computing tools, research design concepts, data summary, and statistical inference methods.

Prerequisite: STA 6208

STA 6126 Statistical Methods in Social Research I 3 Credits**Grading Scheme:** Letter Grade

Descriptive statistics, estimation, significance tests, two-sample comparisons, methods for nominal and ordinal data, regression and correlation, introduction to multiple regression.

STA 6166 Statistical Methods in Research I 3 Credits**Grading Scheme:** Letter Grade

Statistical methods based on t, F, and Chi² tests. Analysis of variance for basic experimental designs. Factorial experiments. Regression analysis and analysis of covariance.

Prerequisite: STA 2023 or equivalent.

STA 6167 Statistical Methods in Research II 3 Credits**Grading Scheme:** Letter Grade

Analysis of covariance and general linear model. Factorial, nested, split-plot, and incomplete block designs. Analysis of count data.

Prerequisite: STA 6166.

STA 6177 Applied Survival Analysis 3 Credits**Grading Scheme:** Letter Grade

Focusing on survival analysis, Kaplan-Meier estimates, proportional hazards model, related tests, phase I, II, and III clinical trials, designs and protocols.

Prerequisite: STA 6327

STA 6207 Regression Analysis 3 Credits**Grading Scheme:** Letter Grade

Focusing on simple linear regression; multiple regression; model selection residual analysis; influence diagnostics' multicollinearity; anova and regression; generalized linear models; nonlinear regression.

Prerequisite: STA 4322

STA 6208 Basic Design and Analysis of Experiments 3 Credits**Grading Scheme:** Letter Grade

Focusing on the principles of experimental design, completely randomized design (analysis, contrasts, diagnostics), random effects models, factorial experiments (fixed, random, and mixed effect), block designs, Latin squares, split plots, and full and fractional factorial experiments.

Prerequisite: STA 6207**STA 6246 Theory of Linear Models 3 Credits****Grading Scheme:** Letter Grade

Theory of Linear Models

Prerequisite: STA 6208, STA 6327, STA 6329.**STA 6275 Statistical Computing I: Optimization 3 Credits****Grading Scheme:** Letter Grade

First course in a two course sequence on statistical computing. Builds a foundation for numerical optimization at both algorithmic and theoretical levels. R is the primary computing platform.

Prerequisite: Permission of the instructor.**STA 6276 Statistical Computing II: Monte Carlo Methods 3 Credits****Grading Scheme:** Letter Grade

Second of a two course sequence on statistical computing. Covers Monte Carlo (MC) methods, Monte Carlo methods based on Markov chains (MCMC), and variational inference. Describes implementations of these methods and classes of problems in Bayesian inference they can address. Also, discussion of convergence issues. R is the primary programming language.

Prerequisite: STA 6326;**Corequisite:** STA 6327.**STA 6326 Introduction to Theoretical Statistics I 3 Credits****Grading Scheme:** Letter Grade

Theory of probability. Probability spaces, continuous and discrete distributions, functions of random variables, multivariate distributions, expectation, conditional expectation, central limit theorem, useful convergence results, sampling distributions, distributions of order statistics, empirical distribution function.

Prerequisite: MAC 2313.**STA 6327 Introduction to Theoretical Statistics II 3 Credits****Grading Scheme:** Letter Grade

Estimation and hypothesis testing. Sufficiency, information, estimation, maximum likelihood, confidence intervals, uniformly most powerful tests, likelihood ratio tests, sequential testing, univariate normal inference, decision theory, analysis of categorical data.

Prerequisite: STA 6326.**STA 6329 Matrix Algebra and Statistical Computing 3 Credits****Grading Scheme:** Letter Grade

Basic theory of determinants, inverses and generalized inverses, eigenvalues and eigenvectors; applications of partitioned matrices; diagonalization and decomposition theorems; applications in least squares.

Prerequisite: MAC 3313.**STA 6505 Analysis of Categorical Data 3 Credits****Grading Scheme:** Letter Grade

Varieties of categorical data, cross-classification tables, tests for independence. Measures of association. Loglinear models for multi-dimensional tables. Logit models and analogies with regression. Specialized methods for ordinal data.

Prerequisite: STA 6327 and STA 6208 or consent of instructor.**STA 6707 Analysis of Multivariate Data 3 Credits****Grading Scheme:** Letter Grade

Techniques for analyzing multivariate data. Emphasis on MANOVA and tests on the structure of the dispersion matrix. Topics will include discriminant, factor, profile, and cluster analyses.

Prerequisite: STA 6208 and facility in a computer language.**STA 6905 Individual Work 1-5 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Special topics designed to meet the needs and interests of individual students.

Prerequisite: departmental approval.**STA 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

STA 6934 Special Topics in Statistics 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Special Topics in Statistics

Prerequisite: permission of graduate adviser.**STA 6938 Seminar 1 Credit, Max 15 Credits****Grading Scheme:** S/U

Special topics of an advanced nature suitable for seminar treatment but not given in regular courses.

Prerequisite: departmental approval.**STA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

STA 6942 Internship 1-3 Credits, Max 8 Credits**Grading Scheme:** S/U

Supervised statistical consulting involving planning and/or analyzing research data. Whenever possible, student meets with researcher. Supervision by faculty member or delegated authority and post-internship report.

Prerequisite: STA 6208 or equivalent and consent of graduate coordinator.**STA 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

STA 7179 Survival Analysis 3 Credits**Grading Scheme:** Letter Grade

Theoretical introduction to statistical inferential procedures useful for analyzing randomly right censored failure time data.

Prerequisite: STA 6177.**STA 7233 Advanced Regression 3 Credits****Grading Scheme:** Letter Grade

Introduces a variety of advanced methods used in modern regression analyses, including semiparametric regression, regularization and shrinkage estimators, and advanced statistical machine learning methods.

Prerequisite: STA 7249.**STA 7249 Generalized Linear Models 3 Credits****Grading Scheme:** Letter Grade

Fitting of generalized linear models, diagnostics, asymptotic theory, overdispersion, estimating equations, mixed models, generalized additive models, smoothing.

Prerequisite: STA 6208, 6208, STA 6327, STA 6246.

STA 7334 Limit Theory 3 Credits**Grading Scheme:** Letter Grade

Review of different models of convergence. Cramer-Wold device. Multivariate CLT. Asymptotic theory of empirical distribution and sample quantiles. Bahadur's representation. Asymptotic theory of sample moments. Delta method and its multiparameter generalization. Variance stabilizing transformation. U-statistics: asymptotic theory and its statistical applications. Hoeffding's decomposition. Asymptotic theory of maximum likelihood estimation. Wald's consistency theorem for MLE. Asymptotic normality and efficiency. Asymptotic theory of GLRTs. Statistical applications: asymptotic theory of categorical data, linear models, and generalized linear models.

Prerequisite: STA 6467.**STA 7346 Statistical Inference 3 Credits****Grading Scheme:** Letter Grade

Decision rules and risk functions. Sufficiency, Minimax, and Bayes rules for estimating location and scale parameters.

Prerequisite: STA 6327.**STA 7347 Advanced Inference 3 Credits****Grading Scheme:** Letter Grade

Bayesian statistical inference. Inference using large samples. Relative efficiencies of tests and estimates with special reference to Pitman and Bahadur efficiencies.

Prerequisite: STA 7346.**STA 7348 Bayesian Theory 3 Credits****Grading Scheme:** Letter Grade

Theory underlying the Bayesian paradigm. Issues related to selection of priors; Bayesian interference, both exact and asymptotic; Bayesian model selection; high-dimensional problems; and Bayesian robustness.

Prerequisite: STA 7346**STA 7466 Probability Theory I 3 Credits****Grading Scheme:** Letter Grade

Measure and probability spaces. Random variables. Distribution functions. Abstract Lebesgue and Stieltjes integration. Monotone. Dominated, Cauchy, and mean convergence. Fubini and Radon-Nikodym theorems. Zero-one laws.

Prerequisite: MAA 5228, MAA 6236, or equivalent.**STA 7467 Probability Theory II 3 Credits****Grading Scheme:** Letter Grade

Summability of independent random variables. Laws of large numbers. Convergence in distribution. Characteristic functions. Uniqueness and continuity theorems. The Lindeberg-Feller central limit theorem. Degenerate convergence criterion.

Prerequisite: STA 7466.**STA 7828 Topics in Stochastic Processes 3 Credits****Grading Scheme:** Letter Grade

Branching processes, Brownian motion, continuous state space Markov chains, diffusion processes, Markov chain Monte Carlo, martingales, point processes, renewal processes, stationary processes, stochastic calculus, stochastic differential equations.

Prerequisite: STA 6466 and STA 6467.**STA 7934 Special Topics in Statistics 1-9 Credits, Max 15 Credits****Grading Scheme:** Letter Grade

Possible Topics: Smoothing Methods, Analysis of Longitudinal Data, Data Mining and Statistical Learning, Mixed Models, Theory and Methods, Resampling Methods, Functional Data Analysis.

Prerequisite: Permission of Graduate Coordinator.**STA 7979 Advanced Research 1-12 Credits****Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

STA 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Theatre And Dance

DAA 6905 Graduate Dance Project 1-3 Credits**Grading Scheme:** Letter Grade

Dance to enhance and develop skills in a specific style of dance or movement study.

DAN 6949 Dance Clinical Practice 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Clinical experience in using movement to enhance healing in a hospital or community setting. Student works through Shands Arts in Medicine or a comparable program, in individually contracted situations.

Prerequisite: DAN 3775 and consent of instructor.**THE 5287 History of Decor and Architecture for the Stage 3 Credits****Grading Scheme:** Letter Grade

Architecture and decor from prehistory to the 19th century as they reflect time and spirit in preparation for play production.

THE 6265 Costume History 3 Credits**Grading Scheme:** Letter Grade

Examines the history of fashion and costume, and its relation to the general intellectual, moral, and cultural climate of an era; and how the theatrical designer applies this analysis.

Prerequisite: admission to MFA.**THE 6525 History, Literature, and Criticism I 3 Credits****Grading Scheme:** Letter Grade

Readings and discussions of Western and Japanese dramatic literature and criticism from their beginnings to the 18th century.

THE 6526 History, Literature, and Criticism II 3 Credits**Grading Scheme:** Letter Grade

Discussions of dramatic literature, performance theory, and stage practice from the 19th century to the modern and postmodern of Western, Indian, Chinese, and African cultures.

THE 6565 Seminar in Creative Process 3 Credits**Grading Scheme:** Letter Grade

Specialists in all areas of theatre explore the similarities in their creative thinking and methods.

THE 6905 Individual Study 1-9 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Reading, research, or performance project.

Prerequisite: consent of instructor.**THE 6930 Special Topics 1-6 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

A graduate level lecture, seminar or studio sessions covering selected topics of current interest in theatre/theatre studies.

Prerequisite: MFA Theatre major.**THE 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

THE 6941 Internship 1-9 Credits, Max 9 Credits**Grading Scheme:** S/U

Practical experience in residence with a professional theatre or equivalent.

THE 6950 Applied Theatre 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Specialized practical experience achieved through participation in realized productions.

THE 6955 Summer Repertory Theatre 3-9 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Practical experience in repertory theatre, directly applying skills in all areas of theatre production.

Prerequisite: consent of instructor.**THE 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

THE 6973C Project in Lieu of Thesis 1-9 Credits**Grading Scheme:** S/U

Creative project in lieu of traditional written thesis.

Prerequisite: admission to candidacy.**TPA 5025 Lighting Design I 3 Credits****Grading Scheme:** Letter Grade

Advanced applications. In-depth practice of design concept formulation, use of advanced equipment, and complex scenographic documentation. Introduction to CAD for the lighting designer.

Prerequisite: admission to MFA or consent of instructor.**TPA 5035C Lighting Specialties 3 Credits****Grading Scheme:** Letter Grade

This course investigates, in depth, one of the following rotating topics. Façade lighting, dance lighting, lighting control/programming, basic architectural lighting, museum and gallery lighting, themed entertainment lighting, retail and interior lighting, light and health, advanced lighting design rendering. Additional topics are possible based on the need and interests of the students.

Prerequisite: TPA 5025 and acceptance in to the graduate lighting design program or permission of the instructor.**TPA 5047 Costume Design I 3 Credits****Grading Scheme:** Letter Grade

Emphasizes character and play analysis for the costume designer.

Prerequisite: admission to MFA. Development of skills required for costume design.**TPA 5067 Scene Design I 3 Credits****Grading Scheme:** Letter Grade

Study and practice of the scenic design process. Developing scenic design techniques for theatre and dance. Emphasizes script analysis for the scenic designer.

Prerequisite: TPA 4066; admission to MFA or consent of instructor.**TPA 5079 Graduate Scene Painting 3 Credits****Grading Scheme:** Letter Grade

Advanced techniques in scene painting. Developing textural illusion, and enhancing volume through light and shadow.

Prerequisite: TPA 2075 or admission to MFA.**TPA 5082 Advanced Theatre Graphics 3 Credits****Grading Scheme:** Letter Grade

Rendering for theatrical design. Traditional techniques, computer aided applications, and model building.

Prerequisite: TPA 4066; admission to MFA.**TPA 5236 Costume Technologies Workshop 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Costume crafts work through realized projects. Possible topics: millinery, stage jewelry, masks, prosthetics, wigs, puppetry, footwear, and dyeing.

Prerequisite: consent of instructor.**TPA 6009 Design Studio 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Investigation of design theory, research, concept, and presentation used in production of theatre and dance.

Prerequisite: admission to MFA.**TPA 6019 Prof Sem Design 3 Credits****Grading Scheme:** Letter Grade

Prof Sem Design

TPA 6026 Lighting Design II 3 Credits**Grading Scheme:** Letter Grade

In-depth study of processes. Refinement of aesthetic concept, complex productions, state-of-the-art technologies, CAD applications, and lighting for built environment.

Prerequisite: TPA 5025.**TPA 6048 Costume Design II 3 Credits****Grading Scheme:** Letter Grade

Advanced study. Specialized costume design problems for individual projects.

Prerequisite: TPA 5047.**TPA 6054 Detail Design for Costume Designers 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Intensive study and practical application of designing specific motifs and accessories for costumes.

Prerequisite: TPA 6048 or consent of instructor.**TPA 6069 Scene Design II 3 Credits****Grading Scheme:** Letter Grade

Design work in a variety of genres. Complex multi-set productions.

Prerequisite: TPA 5067 or admission to MFA.**TPA 6235 Costume Construction 3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Detailed study of patterning and construction techniques used in men's and women's dress. Extensive hands-on work with contemporary and historical garments.

Prerequisite: consent of instructor.**TPA 6237 Pattern Making: Flat Patterning 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Using flat pattern techniques to create garments. Emphasizes period details.

Prerequisite: consent of instructor.**TPA 6243 Pattern Making: Draping 3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Advanced study of draping methods of costume creation. Extensive hands-on work using the sculptural qualities of fabric and clothing.

Prerequisite: consent of instructor.**TPA 6258 Computer Drafting 2D 3 Credits****Grading Scheme:** Letter Grade

Study of computer aided drafting for the theatrical designer. Emphasizes techniques for the scenic and lighting designer.

Prerequisite: admission to MFA.

TPA 6357 Programming and Presentation for the Lighting Designer 3 Credits**Grading Scheme:** Letter Grade

Intensive use of high-end software for programming and presenting lighting-design concepts, for the advanced designer.

Prerequisite: TPA 5025, TPA 6026.**TPA 6930 Special Topics 1-6 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

A graduate level lecture, seminar or studio sessions covering selected topics of current interest in theatre design and/or production.

Prerequisite: MFA Theatre major.**TPP 6115 Graduate Acting I: Modern Acting Theory and Practice 2-3 Credits****Grading Scheme:** Letter Grade

Diagnostics of analytical and technical skills of acting through exploration of psychological realism through the use of psycho-physical exercises.

TPP 6116 Graduate Acting II: Shakespeare and High Style 2-3 Credits**Grading Scheme:** Letter Grade

Analytical, research and technical skills needed to perform plays written in "high verse" with particular focus on the plays of Shakespeare.

Students will be directed in the formalist approach to classical performance style. The approach is designed to enhance each student's awareness, development, and capability for heightened performance requirements.

TPP 6145 Graduate Acting III: Period Styles 2-3 Credits**Grading Scheme:** Letter Grade

The stylistic techniques, analysis, and performance of plays from ancient Greek to the early twentieth-century. The course is designed to enhance the imaginative artistry of the student and to develop awareness and capabilities for heightened performance techniques.

Prerequisite: Admission to the MFA Acting program, TPP 6115 : Graduate Acting I: Modern Acting Theory and Practice , TPP 6116 : Graduate Acting II: Shakespeare and High Style**TPP 6149 Acting IV: Contemporary Realism 2-3 Credits****Grading Scheme:** Letter Grade

Investigating the fundamental principles of acting technique. Over a series of progressive exercises, students continue to discover an effective, dependable, repeatable set of working tools for the actor, derived from the teachings of contemporary acting theorists, to enhance their sense of purposefulness, immediacy and truthfulness in their performance work.

Prerequisite: Admission to the MFA Acting program, TPP 6115 : Graduate Acting I: Modern Acting Theory and Practice ,TPP 6116 : Graduate Acting II: Shakespeare and High Style , TPP 6117 Grad Period Styles**TPP 6237 MFA Company Acting Workshop 1-6 Credits, Max 24 Credits****Grading Scheme:** Letter Grade

Student actors study, experiment, and produce in a laboratory emphasizing specialized skills and methods; and nonrealistic and period genres.

TPP 6266 Acting for the Camera 2-3 Credits**Grading Scheme:** Letter Grade

Investigating acting technique relative to the specific constraints and demands of the film/television medium. In addition, the class helps to prepare the actor to procure work in the industry through discussions of and explorations focused on the business aspects of being a professional actor.

Prerequisite: Admission to the MFA Acting program Acting I, Acting II, Acting III, Acting IV**TPP 6285 Voice and Movement I 2-3 Credits****Grading Scheme:** Letter Grade

Vocal skills, emphasizing versatility, production, power, and strength.

TPP 6286 MFA Voice and Speech II: Shakespeare and High Styles 2-3 Credits**Grading Scheme:** Letter Grade

Vocal skills unique to the execution of nontraditional and period roles. Continued development of a virtuoso vocal instrument through exploration and experimentation with consonant, structural, and tonal energy. A coherent approach to voice, speech, text, and actor preparation. Emphasis on Verse Drama and Heightened Style.

Prerequisite: TPP 6116**TPP 6297 The Alexander Technique I 2 Credits****Grading Scheme:** Letter Grade

Introducing fundamental principles of the Alexander Technique (AT); a mind-body approach to the use of self as applied to acting.

Prerequisite: Admission to the MFA Acting program.**TPP 6298 The Alexander Technique II 2 Credits****Grading Scheme:** Letter Grade

Investigating the fundamental principles of the Alexander Technique (AT) introduced in Alexander Technique I. The course includes basic anatomy, developmental movement, breathing and relaxation techniques, and presentations.

Prerequisite: Admission to the MFA Acting program and TPP 6297 .**TPP 6385 Directing 3 Credits****Grading Scheme:** Letter Grade

Explores the philosophy and psychology of directing and the director. Applied to scene study.

TPP 6515 Graduate Movement Training 2-3 Credits**Grading Scheme:** Letter Grade

Helping the actor move freely and explore characterization through movement. This course introduces students to Period Styles and Social Deportment in order to develop awareness and capabilities for heightened performance techn

Prerequisite: Admission to the MFA Acting program, TPP 6115 : Graduate Acting I: Modern Acting Theory and Practice**TPP 6536 Graduate Stage Combat 2-3 Credits****Grading Scheme:** Letter Grade

Instruction in standard stage combat techniques of Unarmed and Rapier Dagger. Safety is emphasized in the creation of the illusion of armed and unarmed violence.

Prerequisite: Admission to the MFA Acting program**TPP 6717 MFA Voice and Speech III: Period Styles 2-3 Credits****Grading Scheme:** Letter Grade

Emphasizing specialized voice and speech skills and methods of specific to the style of dramatic literature from ancient Greek to the early twentieth-century.

Prerequisite: Admission to the MFA Acting program**TPP 6718 MFA Voice and Speech IV: Advanced Vocal Training for the Actor 2-3 Credits****Grading Scheme:** Letter Grade

Graduate Voice and Speech course emphasizing specialized skills and methods specific to modern and contemporary plays, film and television, and voice-over.

Prerequisite: Admission to the MFA Acting program

TPP 6930 Special Topics 1-6 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

A graduate level lecture, seminar or studio sessions covering selected topics of current interest in theatre performance.

Prerequisite: MFA Theatre major.**TPP 6946 Performance Practicum 3 Credits****Grading Scheme:** Letter Grade

Training in specialized areas of performance.

Tourism, Hospitality, and Event Management

HLP 6515 Evaluation Procedures in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Evaluation and interpretation of tests and analysis of research data.

HLP 6535 Research Methods in Health and Human Performance 3 Credits**Grading Scheme:** Letter Grade

Introduction to research methodology and design.

HLP 6911 Research Seminar 1 Credit**Grading Scheme:** S/U

Research presentations by graduate students and faculty in the College.

HLP 6935 Variable International Topics 1-6 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Opportunity to study in a wide range of cultural settings.

Prerequisite: adviser's approval.**HLP 7939 HHP PhD Professional Development Seminar 3 Credits****Grading Scheme:** Letter Grade

Designed to complement the scholarly emphases of the HHP PhD program by providing insight into key considerations for professional development and personal growth. Best practices will be shared for developing professional aptitude and the skills necessary for successful matriculation through graduate studies and future professional careers.

HLP 7979 Advanced Research in Health and Human Performance 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field, or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

HLP 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

HMG 6203 Advanced Strategic Event Management 3 Credits**Grading Scheme:** Letter Grade

Delves into the strategic aspects of event planning and management, elevating students' understanding of the complexities involved in planning events on a global scale. Aligned with industry-leading frameworks such as the Event Management Body of Knowledge (EMBOK) model, Meeting and Business Events Competency Standards (MBECS), and Event Management International Competency Standards (EMICS), the curriculum empowers students with the expertise essential for thriving in event industry roles.

HMG 6296 Strategic Hospitality Business Management 2 Credits**Grading Scheme:** Letter Grade

Equip students with contemporary knowledge and practical skills in strategic management within the hospitality and tourism sector. The course covers four integrated sections—foundation, strategy context, strategy content, and strategy implementation/leadership—aligned with the generic strategy process. Students will explore key strategic frameworks and apply them through case studies, worked examples, and a team-based, multi-period simulation.

HMG 6440 AI Revolutions and Applications in THEM (Tourism, Hospitality and Event Management) 3 Credits**Grading Scheme:** Letter Grade

A foundational examination of the implications of the artificial intelligence revolution (AI) in the tourism, hospitality, and event industry. Content includes analyses of AI applications in booking, transportation, theme parks, destination and attraction marketing, economic, social, cultural, and environmental impacts, as well as motivators to travel.

HMG 6448C GIS and Spatial Analysis for Tourism and Social Data 3 Credits**Grading Scheme:** Letter Grade

Focuses on building spatial data analysis skills using tourism, destination management, and natural resources data. Combining lecture and lab instruction, the course teaches how to utilize the opportunities provided by dynamically developing methods of geographical information systems (GIS) for visualization and geographic analysis of the data.

HMG 6466 Revenue Management in Hosp Bus 2 Credits**Grading Scheme:** Letter Grade

This course is designed to provide conceptual and practical knowledge regarding hospitality revenue management. Specifically, our focus will be on the lodging industry and we will examine the tools and techniques hospitality professionals employ to optimize their revenue generation.

HMG 6563 Branding Strategies in Tourism, Hospitality and Event Management 2 Credits**Grading Scheme:** Letter Grade

Aim to empower students with knowledge and capacities to understand and analyze brand and branding management in the hospitality and tourism industry, from both a corporate and consumer perspective. This objective will be achieved through key concepts surrounding the subject: corporate perspective, the development of brand and brand architecture, the definition and role of marketing mix, the integrating marketing communication and brand management, and the consumer perception in branding.

HMG 6566 Tourism and Hospitality Business Perspectives 2 Credits**Grading Scheme:** Letter Grade

Examine tourism, hospitality, and event businesses and their roles and impacts in the wider economic and social environment. This course will focus on destination promotions, lodging management, restaurant operations, meetings, conventions market segments, and the impacts of Artificial Intelligence (AI) and robotics on the industries.

HMG 6583C Data Mining with Social Data 3 Credits**Grading Scheme:** Letter Grade

Introduces the students to issues related to data-intensive problems. Newly available massive amounts of data produced with the networks of traditional sensors, social networks, and novel data acquisition systems require new approaches to data storage and analysis. The course focuses on building the initial Big Data analysis skills.

Prerequisite: HLP 6515 and HLP 6535 or instructor consent

HMG 6589C Applied Multivariate Analysis for Tourism and Hospitality 3 Credits**Grading Scheme:** Letter Grade

Focuses on building students' data analysis skills using "real life" data from tourism, leisure and well-being, hospitality, sports and related fields. Combining lecture and lab instruction, the course teaches advanced statistical techniques to analyze data in order to inform managerial decisions.

Prerequisite: HLP 6515 and HLP 6535 or per Instructor Approval.**HMG 6630 Destination and Hospitality Crisis Management 2 Credits****Grading Scheme:** Letter Grade

Establish a foundation for crisis management in hospitality/tourism. Students will focus on crisis management models, crisis communication models, emergency management models, and how the three are integrated. Additionally, students will become familiar with the similarities and differences between risk management (safety, security, etc.) and crisis management planning and implementation.

HMG 6740 Smart Cities, Attractions, and Theme Parks 3 Credits**Grading Scheme:** Letter Grade

Provides the foundation needed to design smart tourism places. Examines relationships between technology, traveler behavior, and the travel industry. Students learn to integrate technology, analytics, marketing, and the design of tourism cities, attractions, and theme parks. Focuses on sustainable/safe/healthy environments with cutting-edge technologies including Artificial Intelligence (AI) and Data Science.

Prerequisite: Open to master's students who have not been admitted to doctoral candidacy.**HMG 6747 Marketing in Hospitality/Tourism 2 Credits****Grading Scheme:** Letter Grade

Providing a marketing analysis of the hospitality and tourism industry. The course will cover key marketing principles in practices and discuss tourism and hospitality marketing strategies. Case studies will be used to help students develop an understanding of the interrelationship among the marketing concepts that will be covered in this course. The course should allow students to take the proper marketing steps and make decisions given the latest trends in tourism and hospitality.

LEI 5121 Outdoor Recreation and Park Management 3 Credits**Grading Scheme:** Letter Grade

History and current issues of outdoor recreation, preservation, and conservation policy in U.S. Review of government and private roles in providing outdoor recreation opportunities. Synthesis of social science research on outdoor recreation behavior and implementation of strategies utilizing current research in park management operations to improve visitor experiences.

LEI 5188 Trends & Issues in Tourism, Hospitality and Event Management 3 Credits**Grading Scheme:** Letter Grade

Introduction to issues and trends pertinent to tourism, hospitality and event management. Influence of social, demographic, and environmental changes on tourism, hospitality and events are examined drawing on relevant theories, empirical research, and societal changes to frame analysis.

LEI 6325 Ecotourism 3 Credits**Grading Scheme:** Letter Grade

Examination of tourism development in hospitality and tourism industry. Emphasis on planning and impacts to area. Case studies used to understand planning and development issues in various destinations worldwide emphasizing how tourism policy affects destination.

LEI 6326 Sport Tourism 3 Credits**Grading Scheme:** Letter Grade

Analysis of the interconnectedness of sport and tourism for behavioral, historical, economic, management, marketing, environmental, and policy perspectives.

LEI 6336 Tourism Planning and Development 3 Credits**Grading Scheme:** Letter Grade

Examination of development in hospitality and tourism industry. Case studies used to understand planning and development issues in various destinations around the world. Emphasis on impact of tourism policy on area.

LEI 6351 Heritage Tourism 3 Credits**Grading Scheme:** Letter Grade

Theory, practice, history, terminology and current issues of cultural heritage tourism planning and management. Basic survey of cultural and heritage components: motives and behaviors of heritage tourist attractions (museums, arts, festivals/events, and landscapes), interpretation, economics, and policies.

LEI 6895 Tourism Theory and Concepts 3 Credits**Grading Scheme:** Letter Grade

Analysis of theories, concepts, and issues related to tourism. Topics include sociocultural impacts of tourism, tourist roles, definitions of tourism, tourist motivations, issues of inequality, terrorism and tourism, sex tourism, and tourism and urban regeneration.

LEI 6903 Readings in Recreation, Parks, and Tourism 1-3 Credits, Max 6 Credits**Grading Scheme:** S/U

Selected independent, in-depth readings on a specific topic. Readings will be supervised and evaluated.

Prerequisite: Intended for master's students.**LEI 6905 Directed Independent Study 1-5 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Individual projects under faculty guidance.

LEI 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

LEI 6931 Special Topics in Recreation, Parks, and Tourism 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Special Topics

Prerequisite: Intended for master's students.**LEI 6940 Supervised Teaching 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Teaching

LEI 6944 Practicum in Tourism & Recreation Management 1-6 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Practicum in Tourism Recreation Management

LEI 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

LEI 7170 Foundations of Leisure Behavior 3 Credits**Grading Scheme:** Letter Grade

Advanced examination of sociological, socio-psychological, and philosophical literature in leisure studies. Topics include leisure definitions debate; influence of gender, race, class, and age on leisure; time crunch and commodification of leisure; and role of leisure in 21st century society.

LEI 7901 Tourism, Hospitality, and Event Management in Higher Education 3 Credits**Grading Scheme:** Letter Grade

Examines current trends and issues impacting tourism, hospitality, and event management in higher education. Topics include curriculum development, accreditation, distance learning, university organization and governance, university economics, faculty responsibilities, and life in the academy.

Prerequisite: required for all doctoral students.**LEI 7904 Advanced Readings in Tourism, Hospitality and Event Management. 1-3 Credits, Max 6 Credits****Grading Scheme:** S/U

Advanced Readings in Tourism, Hospitality and Event Management

Prerequisite: intended for doctoral students.**LEI 7905 Advanced Independent Study in Recreation, Parks and Tourism 1-3 Credits, Max 6 Credits****Grading Scheme:** Letter Grade

Individual projects completed under faculty guidance.

Prerequisite: intended for all doctoral students.**LEI 7910 Advanced Supervised Research 1-5 Credits****Grading Scheme:** S/U

Advanced Supervised Research

LEI 7933 Advanced Special Topics in Tourism, Hospitality, and Event Management 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Advanced Special Topics in Tourism, Hospitality, and Event Management.

Prerequisite: intended for doctoral students.

Urban and Regional Planning

URP 6007 Survey of Urban and Regional Planning 3 Credits**Grading Scheme:** Letter Grade

An overview of the comprehensive planning process designed for graduates who are considering a career in urban and regional planning or who are pursuing studies, such as urban analytics, where some knowledge of the planning process is desirable.

Prerequisite: Graduate Standing.**URP 6042 Urban Economy 3 Credits****Grading Scheme:** Letter Grade

Principles of urban systems, including analytical techniques such as economic base analysis.

URP 6059 Community Engagement 3 Credits**Grading Scheme:** Letter Grade

Provides instruction and hands on experience with community engagement and stakeholder collaboration, especially within an urban and regional planning context and in support of diversity, equity, and inclusion.

URP 6061 Planning Administration and Ethics 3 Credits**Grading Scheme:** Letter Grade

Administration and management of public and private planning offices; ethics of planning profession.

URP 6100 Planning Theory and History 3 Credits**Grading Scheme:** Letter Grade

History of planning and the associated development of theory. Synoptic versus disjointed incrementalism and the political setting for comprehensive planning are emphasized.

URP 6131 Land Use Planning Law 3 Credits**Grading Scheme:** Letter Grade

Introduction to regulatory and nonregulatory techniques of plan implementation. Relationship of law and politics to the planning process. Police power as the basis for regulation. Mandatory planning and status of adopted comprehensive plans.

URP 6132 Growth Management Seminar 3 Credits**Grading Scheme:** Letter Grade

Introducing students with an interest in land use planning to the evolution of growth management planning law in Florida.

Prerequisite: URP 6131.**URP 6203 Planning Research Design 1-3 Credits, Max 3 Credits****Grading Scheme:** Letter Grade

Emphasizes research design, and literature research; student presentations at appropriate stages in thesis work.

URP 6223 Introduction to Urban Analytics 3 Credits**Grading Scheme:** Letter Grade

This course introduces Urban Analytics and its applications to real world problems in urban and regional planning, urban studies, and related fields, including urban data sources, processing, visualization, modeling, and analysis methods.

Prerequisite: Graduate students.**URP 6224 Intermediate Urban Analytics 3 Credits****Grading Scheme:** Letter Grade

This course will provide implementations of Machine Learning (ML) and Artificial Intelligence (AI) methods into spatial concepts using real world problems in the field. This course will also teach students relevant advanced programming skills to work with spatial datasets.

Prerequisite: URP 6223.**URP 6231 Quantitative Data Analysis for Planners 3 Credits****Grading Scheme:** Letter Grade

Planning problem formulation, quantitative research skills, and data gathering techniques. Statistical analysis and emphasis on computer applications.

URP 6270 Introduction to Planning Information Systems 3 Credits**Grading Scheme:** Letter Grade

Introduction to concepts, theories, and practice of the use of Geographic Information Systems as applied to urban and regional planning issues.

URP 6271 Automation for Geospatial Modeling and Analysis 3 Credits**Grading Scheme:** Letter Grade

Covers methods and techniques for automating geospatial modeling and analysis for urban planning by using visual models, computer programming, and custom-built applications and tools that utilize Geographic Information Systems (GIS) technology in the context of planning information systems.

URP 6272 Urban Spatial Analysis 3 Credits**Grading Scheme:** Letter Grade

Theoretical and practical knowledge about spatial relationships as applied to urban form and the development and analysis of urban environments using geographic information systems and spatial analysis techniques such as spatial statistical modeling.

Prerequisite: URP6270 or consent of the instructor.

URP 6274 GPS for Planners: Introduction to Global Positioning System 1 Credit**Grading Scheme:** Letter Grade

Basics of digital field collection using GPS. GPS applications, components, concepts, mission planning, data collection in field, navigation, real-time and postprocessing correction using base station data, and exporting GPS to GIS.

URP 6275 Intermediate Planning Information Systems 3 Credits**Grading Scheme:** Letter Grade

Advances technical skills and theoretical/ conceptual skills to allow students to solve intermediate spatial problems using geographic information systems. Students will learn intermediate concepts and skills for data management, editing, analysis, and automation.

Prerequisite: URP6270 or consent of the instructor.**URP 6276 Internet Geographic Information Systems 3 Credits****Grading Scheme:** Letter Grade

Examines the theoretic and technological background in the emerging technologies in web-based geographic information systems (GIS).

Prerequisite: URP 6270**URP 6277 Land Use Visioning and Analysis 3 Credits****Grading Scheme:** Letter Grade

Fundamental data analysis techniques and GIS skills necessary for land use analysis and visioning.

Prerequisite: URP 6270 or consent of instructor.**URP 6278 Web Mapping and Visualization 3 Credits****Grading Scheme:** Letter Grade

Utilization of web mapping for communication and visualization of geographic data. Includes fundamentals of web GIS, web mapping formats, and spatial architecture, and technical skills for symbolizing data, publishing maps on the web, and creating web mashups.

Prerequisite: Satisfactory completion (B or higher) of URP 6270, Introduction to Planning Information Systems**URP 6280 3D Geospatial Modeling and Visualization 3 Credits****Grading Scheme:** Letter Grade

Covers methods and techniques for modeling and visualization of physical urban environments in three and four dimensions to help understand, simulate, evaluate, and communicate graphically concepts and ideas about planning and design of built environment. Software used in the course include GIS, 3D modeling, visualization, rendering, parametric modeling.

URP 6341 Urban Planning Project 1-12 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Projects encompass city wide comprehensive planning examining the interaction of urban and social systems cast in scenarios of future growth and development.

URP 6409 Sustainable Community Development 3 Credits**Grading Scheme:** Letter Grade

Explores the range of planning and development processes associated with creating sustainable communities ranging in scale from individual buildings, to collections of buildings and spaces within neighborhoods or larger collections of neighborhoods, as well as planning at the city and regional scale.

URP 6421 Environmental Land Use Planning and Management 3 Credits**Grading Scheme:** Letter Grade

Introduction to the types of environmental impacts associated with land development and the connection between land use planning, the environmental regulation of land, and environmental assessment and analysis in the United States and internationally, with a special focus on Florida.

URP 6424 Sustainable Urbanism in the Americas 3 Credits**Grading Scheme:** Letter Grade

An examination of sustainable patterns of growth in several urban environments in the Americas, within the context of specific cities and metropolitan regions. Urban management practices, particularly those related to urban lifestyles and consumption patterns are covered.

Prerequisite: URP 6100 pr permission of the instructor.**URP 6428 Advanced Environmental Planning 3 Credits****Grading Scheme:** Letter Grade

The course will examine cutting edge environmental planning theory and practice that aims to collectively manage linked social and ecological systems that are important, complex, and adaptive.

Prerequisite: URP 6421 or URP 6429 or consent of instructor.**URP 6429 Natural Resources Planning and Management 3 Credits****Grading Scheme:** Letter Grade

Natural resources planning, management principles, practices of natural resources, ecosystem, restoration planning, and management at local and regional levels

URP 6445 Planning for Climate Change 3 Credits**Grading Scheme:** Letter Grade

Overviewing the relationship between human activities and climate change and what can planning do to mitigate and adapt to climate change, including the science and scenarios of climate change, impacts on the built and natural environment, the mitigation measures, and adaptive planning approaches to build resilient communities.

URP 6526 Health and the Built Environment 3 Credits**Grading Scheme:** Letter Grade

Using connections between urban planning and public health using an environmental health framework on a global, regional, and local scale. Historical connections and emerging issues, such as obesity and physical activity, sustainability, and environmental justice, climate change, social equality, children's health, and the role of land use, environmental and other planning decisions.

Prerequisite: None.**URP 6541 Economic Development Planning 3 Credits****Grading Scheme:** Letter Grade

Major international and national economic development theory, issues and trends as they affect local economic development planning, methods, and practice.

URP 6542 Urban Land Economics 3 Credits**Grading Scheme:** Letter Grade

Review of land economics within the context of urban and regional planning.

URP 6603 Development Review 3 Credits**Grading Scheme:** Letter Grade

Seminar on practice of local government planning with emphasis on development review and land development regulation.

URP 6610 International Development Planning 3 Credits**Grading Scheme:** Letter Grade

Critical examination of institutions that play a role in development issues in poorer nations within the context of international development strategies, exposing students to dominant strategies and emerging perspectives on international development.

URP 6645 Sustainable Urbanism in Europe 3 Credits**Grading Scheme:** Letter Grade

Introduction to sustainability planning, policies and practices in European cities. Examines key urban issues such as land use, transportation, the environment, energy, economics and urban design through approaches that advance the goals of sustainable urbanism.

URP 6646 International Perspectives in Urban and Regional Planning 3 Credits**Grading Scheme:** Letter Grade

Presents contemporary global and critical issues in urban and regional Planning, selecting critical topics such as inequality, immigration, and segregation and case studies from around the world, encouraging students to evaluate and develop different strategies and corrective courses of action.

URP 6711 Transportation and Land Use Coordination 3 Credits**Grading Scheme:** Letter Grade

Explores the connection between land use and transportation by considering how four major sets of actors shape the urban environment: individuals, businesses, the professions and governments.

Prerequisite: URP 6716; URP 6131;**Corequisite:** URP 6716**URP 6716 Transportation Policy and Planning 3 Credits****Grading Scheme:** Letter Grade

Introduction to transportation policy planning in urban context. Transportation policy instruments and policy-making processes, critical issues in transportation policy, history of policy in U.S. at federal, state, and local levels.

URP 6743 Affordable Housing Law 3 Credits**Grading Scheme:** Letter Grade

Broad understanding of the affordable housing crisis and the federal, state, and local regulatory schemes employed to correct this deficiency, as well as the legal battles which have served as the basis for such regulations or the challenge thereof. Enhancement of legal drafting skills through the preparation of research memoranda and comprehensive plan language.

URP 6745 Housing, Public Policy, and Planning 3 Credits**Grading Scheme:** Letter Grade

Supply, demand, and market relationships. History of government housing policy. Exploration of relationship between housing policy and urban and regional planning.

URP 6821 Transportation and Land-Use Modeling 3 Credits**Grading Scheme:** Letter Grade

The planning process, modeling and applications for passenger transportation and land-use development of metropolitan areas with respect paid to its contribution to transportation project and policy analysis.

URP 6855 Urban Form in Cities throughout the Americas 3 Credits**Grading Scheme:** Letter Grade

Urban form and development theories and how planning interfaces with developmental trends in North, Central, and South America.

URP 6871 Planning and Design I 3 Credits**Grading Scheme:** Letter Grade

Lectures, readings, and exercises in planning research and design methods. Emphasis on design graphics and other means of communication.

URP 6872 Planning and Design II 3 Credits**Grading Scheme:** Letter Grade

Focus on alternative roles and potential contributions from both private and public sector participants, case studies and exercises in formulation of urban design plans for private and public sectors.

Prerequisite: URP 6871**URP 6880 Defensible Space and CPTED in Urban Design 3 Credits****Grading Scheme:** Letter Grade

Introduction to crime prevention through environmental design (CPTED) and defensible space in urban planning design.

URP 6887 Advanced Defensible Space in Urban Design 3 Credits**Grading Scheme:** Letter Grade

Advanced analysis of Defensible Space, CPTED, and other place-based crime prevention planning theories and practices in distressed communities.

Prerequisite: URP 6880/4882**URP 6905 Exploration and Directed Study 1-4 Credits, Max 10 Credits****Grading Scheme:** Letter Grade

Exploration and Directed Study

URP 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

URP 6920 Colloquium 1 Credit**Grading Scheme:** S/U

Introduction to the field; historical and philosophical concepts, processes, and issues related to the profession of planning. For entering MAURP students.

URP 6931 Topical Seminar 1-4 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Current planning opportunity examined.

URP 6941 Urban Planning Professional Development 1-3 Credits, Max 3 Credits**Grading Scheme:** S/U

Off-campus, professional experience and development in the field of urban and regional planning.

URP 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

URP 6979 Master's Research Project 1-6 Credits, Max 15 Credits**Grading Scheme:** S/U

This option, in lieu of thesis, accommodates a physical design, geospatial analysis, or other community-based planning project that because of its maps, graphic content, or subject does not fit comfortably within a thesis format.

Veterinary Medicine

VME 5101 Comparative Biomedical Sciences and One Health 3 Credits**Grading Scheme:** Letter Grade

This course is an introduction to Comparative Biomedical Sciences and One Health with emphasis on the interconnectedness of human, animal, and environmental health.

VME 5141 Introduction to Comparative Immunology 3 Credits**Grading Scheme:** Letter Grade

Comparative Immunology is an introductory course to comparative immunology with the main objective of introducing graduate students to the evolutionary perspective of the immune systems and the similarities and differences in the immune systems of different animal species. The course covers therapeutic strategies, such as vaccination.

VME 5244 Physiology: Organ Systems 4 Credits**Grading Scheme:** Letter Grade

Emphasizes domestic animals commonly encountered in veterinary medicine. Physiology of nervous, muscle, blood, cardiovascular, respiratory, renal, gastrointestinal, and endocrine systems.

Prerequisite: knowledge of general biochemistry.**VME 5715C Small Animal Soft Tissue Minimally Invasive Surgery 0-1 Credits****Grading Scheme:** Letter Grade

Introduction to the current state of laparoscopy and thoracoscopy in small animal surgery. Lectures will focus on specific procedures and associated case selection considerations. Descriptions of required and recommended instrumentation as well as procedural steps will be presented and basic techniques will be practiced in the laboratory setting on trainers.

Prerequisite: Baccalaureate degree or permission of an academic advisor of a student in a premedical Baccalaureate program such as animal science, biology, or physiology & Enrollment in a graduate clinical or laboratory medicine/surgery program.

VME 6010 Aquatic Animal Conservation Issues 3 Credits**Grading Scheme:** Letter Grade

An online introduction to some controversial conservation issues, surrounding aquatic species, ranging from invertebrates to marine mammals, culminating in a 5-page grant proposal and review.

Prerequisite: None.**VME 6011 Introduction to Aquatic Wildlife Health Issues 3 Credits****Grading Scheme:** Letter Grade

An online introduction to the natural history, anatomy, physiology, behavior, and health issues of aquatic wildlife: marine mammals, sea turtles, crocodilians, and some fish and invertebrates, culminating in a five-page grant proposal and review.

Prerequisite: None.**VME 6014 Marine Mammal Biology 3 Credits****Grading Scheme:** Letter Grade

This is an introductory online course for graduate students designed to provide an introduction to a variety of marine mammal species including cetaceans, sirenians, pinnipeds, mustelids, and ursids. Each module will broadly explore a particular theme related to the study of marine mammals, including basic biology, physiology, and conservation and management. Each module will consist of multiple lectures, assigned readings, and an assignment and/or quiz.

Prerequisite: BSC 2010 and BSC 2010L and BSC 2011 and BSC 2011L and two additional Science classes (examples include PCB 4723C or ZOO 3713C or PCB 4043C or ZOO 2203C or ZOO 4926 or GLY 3083C or FAS 4932 or ZOO 4403C or VME 4012 or instructor permission).

VME 6015 Sea Turtle Medicine and Rehabilitation 3 Credits**Grading Scheme:** Letter Grade

This online course is designed to provide an introduction to the clinical care involved in the rescue and rehabilitation of sea turtles. In this course, students will gain foundational knowledge in sea turtle biology, anatomy, and physiology and how each of these factor into the clinical care and management of sea turtles during rescue events and in rehabilitation settings.

Prerequisite: Successful completion of a Bachelor of Science degree or instructor permission.

VME 6017 Manatee Health & Conservation 3 Credits**Grading Scheme:** Letter Grade

Introducing graduate students to manatee natural history, anatomy, physiology, behavior, conservation and health issues. Students will gain a working knowledge of these topics, exposure to current experts in these fields, be able to evaluate and discuss common health and mortality issues, and explain current management strategies.

Prerequisite: None.**VME 6051 Cruelty to Animals and Interpersonal Violence 3 Credits****Grading Scheme:** Letter Grade

The relationship between cruelty to animals and interpersonal violence has been substantiated by as significant body of work in the social sciences. Participants in this course will gain a fundamental knowledge of this connection, examine both qualitative and quantitative studies and case histories of the correlation between cruelty to animals, child abuse, domestic violence, elder abuse, and teen violence. Participants will learn how to recognize the connection between cruelty to animals and human violence and will review a variety of intervention programs for victims and at-risk or offending populations.

Prerequisite: None.**VME 6052 Animal Crime Scene Processing 3 Credits****Grading Scheme:** Letter Grade

This course provides the student with formal academic training in basic crime scene processing techniques specialized for the analysis of crime scenes involving injured or deceased animals, or scenes involving acts of animal cruelty. A focus will be on the recognition, documentation, and preservation of various types of physical evidence involving animal abuse, cruelty, neglect and death.

Prerequisite: None.**VME 6053 Skeletal Trauma Analysis in Animals 3 Credits****Grading Scheme:** Letter Grade

Provides an introduction to skeletal trauma in nonhuman remains. Also covered will be skeletal evidence of other types of abuse including starvation, infection, or neglect. Skeletal pathology will be addressed.

VME 6054 Scientific and Legal Principles of Forensic Evidence 3 Credits**Grading Scheme:** Letter Grade

This course will focus on crime scene integrity, crime scene searches, chain of custody issues, courtroom presentation of physical evidence, and expert witness testimony. Emphasis will also be placed on the management of scene personnel, the media, victims, and suspects.

Prerequisite: None**VME 6056 Animal Law 3 Credits****Grading Scheme:** Letter Grade

Animal law is a quickly growing field and is becoming essential to social policy in the United States as well as around the world. This course introduces and surveys important overarching legal themes that occur throughout the unique relationship between humans and animals.

VME 6070 Systematic Review and Meta-Analysis for Biomedical Research 2 Credits**Grading Scheme:** Letter Grade

This course is an introduction to systematic review and meta-analysis, an essential research synthesis tool for researchers to appraise currently available primary research objectively and to identify gaps in research.

VME 6071C Medical 3D Printing 3 Credits**Grading Scheme:** Letter Grade

This course will cover the application of 3D printing technologies in the field of medicine. It will cover subjects from image acquisition with the correct parameters, image processing, image mask creation, importing to 3D software, manipulation in the 3D environment and exporting the file for successful 3D printing. This will cover a large number of mechanical and biological considerations for repair and replacement of soft and hard tissues and joints.

Prerequisite: EGM 3520 or EGM 2511 or BME 2202 or EGM 3400 EMA 3000L.

VME 6100 Infectious Disease Management for Animal Shelters 3 Credits**Grading Scheme:** Letter Grade

Explores all aspects of practical infectious disease management in animal shelters, including prevention, diagnosis, management, and outbreak investigations.

Prerequisite: VME 6810 and VME 6811 and VME 6816.

VME 6140 VMS Graduate Journal Club: Mucosal Immunology 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Critical analysis of recently published research reports in the field of mucosal immunology.

Prerequisite: Permission of Instructor.

VME 6195 Wildlife Virology: Emerging Wildlife Viruses of Veterinary and Zoonotic Importance 3 Credits**Grading Scheme:** Letter Grade

Wildlife Virology is a 3-credit graduate-level course focusing on pathogenic viruses that are naturally maintained in wildlife species which are transmissible to humans, domestic animals, and other wildlife/zoological species. Covers a comprehensive and diverse set of RNA and DNA viruses that naturally infect free-ranging mammals, birds, reptiles, amphibians, and fish.

Prerequisite: Specific introductory coursework is not required prior to taking this course, although a basic background in general microbiology or virology is recommended.

VME 6200 Fundamentals of Respiratory Physiology 3 Credits**Grading Scheme:** Letter Grade

Provides the fundamental concepts of respiratory physiology. This will be accomplished by learning the physiological mechanisms involved in the movement of air into the lung, transfer of oxygen and carbon dioxide across the gas exchange surface, transport of these gases by the blood, delivery of these gases to the tissues, acid-base balance in the blood and the neural control of breathing.

Prerequisite: BCH 3025 or equivalent, MAC 2233 or equivalent, PHY 2020 or equivalent, or permission of program.

VME 6200L Laboratory Assessments for Fundamentals of Respiratory Physiology 2 Credits**Grading Scheme:** Letter Grade

Introduces and applies essential concepts and methods of respiratory physiology measurements and assessments to graduate students including an understanding of to calibrate instruments, how to measure physiological parameters, how to determine lung volumes, breathing patterns, respiratory gases and apply these measurements to human and animal assessments. Students will learn the types of equipment that are used for respiratory physiological assessments and the application to humans and animals.

VME 6430C Contemporary Issues in Small Animal Surgery 3 Credits**Grading Scheme:** Letter Grade

Current or significant scientific papers from the veterinary and human literature, formal presentations will be given on topics relevant to contemporary small animal surgery, including comparative/translational aspects. Emphasizes morbidity and mortality discussions on recent clinical soft-tissue and orthopedic case material.

Prerequisite: DVM (or equivalent degree); master's students or Small Animal Surgical Residents pursuing a master's degree.

VME 6464 Molecular Pathogenesis 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Papers on mechanisms of pathogenesis and molecular approaches toward diagnosis and control of either parasitic or viral and bacterial diseases. Focus varies each semester.

Prerequisite: biochemistry, immunology, or consent of instructor.

VME 6505 Autoimmunity 1 Credit, Max 3 Credits**Grading Scheme:** Letter Grade

Biological and biochemical aspects of immunology, focusing on molecular and cellular events involved in genetic susceptibility, pathogenesis, and treatment of human autoimmune diseases.

Prerequisite: GMS 6006 or consent of instructor.

VME 6508 Veterinary Virology: Molecular and Evolutionary Biology of Animal Viruses 3 Credits**Grading Scheme:** Letter Grade

Veterinary Virology is a 3-credit (3 hours of lecture/week) graduate-level course focused on understanding the common, fundamental molecular and evolutionary mechanisms used by veterinary viruses to infect and spread efficiently to cause disease in animal hosts.

Prerequisite: Previous introductory coursework in molecular biology and/or general microbiology/virology is recommended, although not required.

VME 6570 Wildlife Conservation and Forensic Science 3 Credits**Grading Scheme:** Letter Grade

Learning the fundamental concepts of animal conservation and protection. The course will also address the applicability and importance of forensic science in wildlife investigations, including an introduction to the scientific and forensic method, crime scene analysis and processing, types of evidence, evidence collection, and field analyses.

VME 6571 Forensic Applied Animal Behavior 3 Credits**Grading Scheme:** Letter Grade

Reviewing Forensic Applied Animal Behavior, which is defined as the application of knowledge of animal behavior to the purpose of the law. This includes documenting the behavioral effects of abuse, neglect or inadequate care that may be in violation of laws, regulations, and industry or community standards.

VME 6572 Forensic Aspects of Agricultural Animal Welfare 3 Credits**Grading Scheme:** Letter Grade

Introducing agricultural animal welfare with a focus on the legal aspects associated with abusive care of agricultural animals. This course explores scientific and ethical dialogue on agricultural animal welfare issues. Completing this course will provide an understanding of current U.S. laws governing agricultural animal welfare as well as the ability to minimally evaluate and assess the welfare of an agricultural animal.

VME 6573 Applications of DNA for Companion Animal and Wildlife Cases 3 Credits**Grading Scheme:** Letter Grade

Introducing the student to the basic understanding of DNA and how it is used to identify species and provide evidence for criminal investigations. Upon completion of this course, the student will have basic knowledge of how DNA is used to identify species, gender and individual identification, chain of custody, and the agencies and laboratories doing veterinary and wildlife forensic DNA assays.

VME 6574 Aquatic Animal Pathology and Forensic Science 3 Credits**Grading Scheme:** Letter Grade

Addresses aquatic animal pathology and the types of injuries seen in aquatic animal forensic cases. Necropsy techniques and subsequent sample analysis, background historical, ecological and conservation information regarding each species examined, and related forensic techniques including sampling, handling, and legal concerns by renowned species researchers and professionals will be covered.

VME 6575 Veterinary Forensic Medicine 3 Credits**Grading Scheme:** Letter Grade

Introducing students to the application of veterinary medicine to the forensic sciences. Course topics will focus on the interpretations of injury patterns, cause, manner and mechanism of death. Upon completion of this course, the student will have a basic knowledge of the pathological documentation required for scenes involving animals, including recognition of abuse, crime scene investigation, and interacting with the legal community.

Prerequisite: None.**VME 6576 Veterinary Forensic Pathology 3 Credits****Grading Scheme:** Letter Grade

Introducing and developing in-depth the field of veterinary forensic pathology, including how to perform and document, through photographs and written reports, a professional necropsy.

VME 6577 Practicing Pathology 3 Credits**Grading Scheme:** Letter Grade

Strengthening and broadening students' knowledge of the pathologic basis of disease as well as specific systemic diseases, and how to apply this knowledge when performing a necropsy. Necropsy technique itself will be covered in depth. The course teaches astute observation, accurate description, and educated interpretation of the changes observed at necropsy, in addition to postmortem case management, using examples of relevance in shelter populations.

VME 6578 Forensic Veterinary Osteology 3 Credits**Grading Scheme:** Letter Grade

Providing an introduction to the non-human skeleton emphasizing the general identification of complete and fragmentary skeletal remains. This course, will cover bone biology, development and anatomy, taphonomy, age, and sex. This knowledge forms the underpinning for advanced study in veterinary forensic osteology or zooarchaeology. Learning objectives will be accomplished through a combination of lecture material, readings, quizzes, a case study, and online active discussions.

VME 6579 Veterinary Forensic Radiology and Imaging 3 Credits**Grading Scheme:** Letter Grade

Students completing this course will gain an understanding of how radiology and imaging can be used in the veterinary forensic sciences. Topics include: imaging modalities, the performance, interpretation and reportage of veterinary imaging studies as applied to the courts or the law.

VME 6580 Cybercrime in Wildlife Investigations 3 Credits**Grading Scheme:** Letter Grade

Provides an understanding of cybercrime from perspectives of wildlife investigations. Computer forensics, mobile device technology, email and network forensics, basics of electronic evidence and processing an electronic crime scene are covered. Also provides a comprehensive analysis of the legal principles that apply to cybercrime and electronic trade in wildlife.

VME 6581 Working Dogs in Conservation and Forensic Science 3 Credits**Grading Scheme:** Letter Grade

Abilities of the canine nose are well-documented. Working dogs are being increasingly utilized for their olfactory skills in conservation and forensic science for the calculation of population trends of endangered species, the eradication of invasive species in protected environments, identification of disease, and the identification of infestations and chemical contaminants.

VME 6582 Introduction to Forensic Medicine 1 4 Credits**Grading Scheme:** Letter Grade

This course covers the basic elements of forensic medicine and focuses on the role of the forensic pathologist in the investigation of crime and death. Although much of forensic medicine, relies on the principles of morbid anatomy as discovered in earlier centuries, more recent techniques are also presented.

VME 6583 Applied Companion Animal & Livestock Forensic Genetics 3 Credits**Grading Scheme:** Letter Grade

This course will continue from Applications of DNA for Forensic and Wildlife Cases (VME 6573). Students will use the previous information to describe collection of evidence, chain of evidence, laboratory protocols, data analysis, and report writing while doing in depth data analysis to resolve complex cases.

Prerequisite: VME 6573.**VME 6602 General Toxicology 3 Credits****Grading Scheme:** Letter Grade

General principles of toxicology. Mechanisms for occurrence of toxic effects in target organs and tissues.

Prerequisite: background in biochemistry, physiology, and pharmacology.**VME 6603 Advanced Toxicology 3 Credits****Grading Scheme:** Letter Grade

Survey of the health effects of each major class of toxicants.

Prerequisite: VME 6602.**VME 6604 Literature Survey in Toxicology 1-2 Credits, Max 2 Credits****Grading Scheme:** Letter Grade

Critical presentation and evaluation of current literature in selected topics in toxicology.

VME 6605 Toxic Substances 3 Credits**Grading Scheme:** Letter Grade

In-depth information on signs, symptoms, underlying mechanisms, diagnosis, and management of poisoning by drugs and chemicals.

Prerequisite: VME 6602

VME 6607 Human Health Risk Assessment 4 Credits**Grading Scheme:** Letter Grade

Conceptual approaches and computational techniques for quantitative health risk assessment.

VME 6610 Ecotoxicology 3 Credits**Grading Scheme:** Letter Grade

This course will present conceptual and fundamental knowledge required to discern the impacts of environmental contaminants on wildlife and ecosystems.

Prerequisite: Permission of the program.**VME 6613 Forensic Toxicology I 3 Credits****Grading Scheme:** Letter Grade

Analytical techniques used to examine forensic drug and forensic toxicology specimens.

Prerequisite: organic chemistry recommended.**VME 6614 Forensic Toxicology II 3 Credits****Grading Scheme:** Letter Grade

Toxicology of compounds commonly encountered in forensic specimens.

Prerequisite: VME 6613.**VME 6615 Veterinary Forensic Toxicology 3 Credits****Grading Scheme:** Letter Grade

Encompassing the concepts of veterinary forensic toxicology including basic principles of veterinary toxicology, legal aspects of veterinary toxicology, utilization of veterinary diagnostic laboratories in forensic cases, conducting veterinary toxicology field investigations, history-taking, and proper collection, handling and preservation of samples. Species-relevant aspects of veterinary toxicology will be covered.

VME 6616 Veterinary Drug Ecotoxicology 3 Credits**Grading Scheme:** Letter Grade

Veterinary agents, as administered to livestock, exotic, and companion animals may pose considerable repercussions to wildlife and the environment. Students will review the necessary features of a healthy, balanced ecosystem and recognize the species that are most susceptible to exposure in conjunction with key toxicological concepts and terminologies.

VME 6617 Environmental Risk Assessment of Veterinary Drugs 3 Credits**Grading Scheme:** Letter Grade

Provides a comprehensive understanding of the hazards that veterinary agents can pose to wildlife and the environment. Details methods for hazard mitigation and the suite of actions that can be taken to preempt risks. Students will also gain deeper insight into the breadth of pertinent environmental and wildlife regulations.

Prerequisite: Critical Thinking and Environmental Monitoring of Veterinary Agents (VME 6XXX)**VME 6618 Ecological Risk Assessment 3 Credits****Grading Scheme:** Letter Grade

When quantitative environmental risk assessments are performed, both a human health and an ecological risk assessment are usually required. This course fills that knowledge deficit and provides students with the methodologies and techniques used to protect ecosystems. The course provides conceptual approaches and quantitative techniques for performing ecological risk assessments.

Prerequisite: Basic toxicology or ecotoxicology course.**VME 6620 The Practice of Regulatory Toxicology 3 Credits****Grading Scheme:** Letter Grade

Regulatory toxicology includes the evaluation of substances in prescribed assays, the goal of which is to determine hazards to humans. This course will review the basics in the practice of conducting using prescribed in vivo and in vitro systems and evaluating the results.

Prerequisite: VME 6602.**VME 6621 New Approach Methodologies in Toxicology 3 Credits****Grading Scheme:** Letter Grade

New Approach Methodologies are a rapidly evolving set of computational and cell based model systems as an alternative to traditional animal based testing which are transforming the fields of toxicology, hazard and exposure assessment, and regulation. Introduce students to New Approach Methodologies, the diversity of methods, their emerging use in regulatory toxicology, and ongoing discussions about their strengths and limitations.

Prerequisite: Permission of program.**VME 6650 Principles of Mammalian Pharmacology 4 Credits****Grading Scheme:** Letter Grade

Principles of drug action. Emphasizes mechanisms of action and side effects for major drug classes used in humans and other mammals.

Prerequisite: graduate-level physiology course.**VME 6651 Seminars in Veterinary Anesthesia and Analgesia 2 Credits, Max 8 Credits****Grading Scheme:** S/U

Weekly seminar series on topics in anesthesia and analgesia of veterinary species including pharmacology, physiology with a focus on cardiorespiratory and pain pathophysiology, anesthesia equipment, airway management, anesthetic management of patients with co-existing diseases, and challenges posed by anesthetizing unique species. Presented by residents, graduate students, faculty, and visiting speakers.

Prerequisite: Consent of the instructor is required;**Corequisite:** Student must be enrolled in a graduate program and must have a DVM or equivalent professional degree.**VME 6710C Advanced Small Animal Airway and Thoracic Surgery 1 Credit****Grading Scheme:** Letter Grade

Intensive review of surgical diseases of the thorax and respiratory tract in cats and dogs. Lectures will focus on the etiology, diagnosis, surgical treatment, and prognosis for the discussed conditions. Surgical approach options will be discussed in depth. These procedures will be practiced in the laboratory setting on cadavers.

Prerequisite: Must be a graduate student registered at the University of Florida.**VME 6711 Small Animal Abdominal Surgery 1 Credit****Grading Scheme:** Letter Grade

An intensive review of surgical diseases of the abdominal cavity in cats and dogs. Lectures will focus on the etiology, diagnosis, surgical treatment, and prognosis for each of the discussed conditions. Surgical approach options will be described and discussed in depth including location, positioning, technique, instrumentation and procedural steps.

Prerequisite: This course is offered to UF graduate students with interest in research and management of small animal abdominal surgery in dogs and cats.

VME 6712C Small Animal Interventional Radiology 1 Credit**Grading Scheme:** Letter Grade

Serves as an introduction to the current state of interventional radiology in small animal surgery. Lectures will focus on specific procedures associated case selection considerations.

Prerequisite: Graduate students enrolled in UF CVM graduate program in Veterinary Medical Sciences.

VME 6714C Small Animal Orthopedic Minimally Invasive Surgery 1 Credit**Grading Scheme:** Letter Grade

Introduction to the current state of arthroscopy and minimally invasive fracture repair in small animal surgery.

Prerequisite: Graduate students enrolled in UF CVM or another academic unit in UF Health Science Center.

VME 6720C Developmental and Acquired Small Animal Orthopedic Diseases 1 Credit**Grading Scheme:** Letter Grade

A review of various developmental and acquired orthopedic diseases affecting dogs and cats. Lectures focus on the pathophysiology, diagnosis, specific treatments, and prognosis. Descriptions of required and recommended approaches, instrumentation, and procedural steps for appropriate surgical management of applicable abnormalities will be detailed.

Prerequisite: Baccalaureate degree or permission of the course coordinator, students in programs such as animal science, biology, or physiology; or enrollment in a graduate clinical or laboratory medicine or surgery program.

VME 6721 Advanced Small Animal Fracture Management 1 Credit**Grading Scheme:** Letter Grade

An intensive review of surgical fracture management in dogs and cats. Introductory lectures focus on fracture etiology. The majority of the course will be devoted to an in depth discussion of implant systems utilized to stabilize fractures in small animals. Final lectures will involve in-depth reviews of specific fracture types and their management. The review will also focus on comparative aspects relating to analogous fractures in human patients.

Prerequisite: Baccalaureate degree, particularly students enrolled in graduate clinical or laboratory medicine or surgery program. Students pursuing a baccalaureate degree such as animal science or biology or physiology can enroll with coordinator permission.

VME 6722 Advanced Small Animal Arthrology in Dogs and Cats: Disease, Reconstruction, and Arthroplasty 1 Credit**Grading Scheme:** Letter Grade

An intensive review of advanced surgical and medical research and the clinical management of joint diseases and injuries in dogs and cats. The first three lectures will focus on the etiology, pathophysiology, manifestation and diagnostic strategies of degenerative, immune mediated, and septic arthropathies. The majority of the course will be devoted to in-depth evaluation of specific surgical techniques used to address joint instabilities using biologic or prosthetic reconstruction techniques.

Prerequisite: This course is offered to UF graduate students with interest in research and management of small animal arthrology, disease, reconstruction, and arthroplasty in dogs and cats.

VME 6766 Laboratory Quality Assurance/Quality Control 3 Credits**Grading Scheme:** Letter Grade

Procedures for ensuring quality practices in the analytical laboratory.

VME 6767 Issues in the Responsible Conduct of Research 1 Credit**Grading Scheme:** S/U

Presentation and discussion of issues; guiding principles and potential pitfalls.

VME 6771 Veterinary Epidemiologic Research 3 Credits**Grading Scheme:** Letter Grade

Design, analysis, and interpretation of epidemiologic studies.

VME 6800 Welfare and Wellness for Pets and People 1 Credit**Grading Scheme:** S/U

Promotes wellness for those who care for pets by rehearsing skills needed for taking care of oneself and colleagues with the same attention used to promote welfare for pets.

Prerequisite: Must be currently enrolled as a professional veterinary student, DVM candidate, at the UF College of Veterinary Medicine to take the VEM 5XXX version of the course OR must be currently enrolled as a UF graduate student.

VME 6801 Principles of Management in Animal Shelters 3 Credits**Grading Scheme:** Letter Grade

A survey course to introduce students to management skills applicable in a shelter setting.

Prerequisite: VME 6819.

Corequisite: Access to a local animal shelter where you can observe and/or review organizational techniques and methods applied for managing volunteers and staff.

VME 6810 Integrating Veterinary Medicine with Shelter Systems 3 Credits**Grading Scheme:** Letter Grade

Understanding and appreciation of the critical role played by veterinarians in protecting the health and welfare of sheltered dogs and cats.

Prerequisite: Permission of department.

VME 6811 Shelter Animal Physical Health 3 Credits**Grading Scheme:** Letter Grade

Construction, critique, and implementation of policies and protocols to protect and enhance the physical health and well-being of sheltered dogs and cat, including recognizing and responding to threats to physical health.

Prerequisite: Permission of department.

VME 6812 Problem-Oriented Approach to Shelter Animal Behavior and Welfare 3 Credits**Grading Scheme:** Letter Grade

Concepts related to shelter behavior programs; evaluation of quality of shelter behavior programs; and implementation of changes to promote shelter animal behavior and welfare.

Prerequisite: VME 6813;

Corequisite: Have ready access to shelter dogs or cats to work on cases.

VME 6813 Behavioral Health for Shelter Dogs and Cats 3 Credits**Grading Scheme:** Letter Grade

Introduces canine and feline behavior so students will understand how and why dogs and cats end up in shelters, what can be done to enhance their behavioral health while they are in the shelter, how to manage common shelter behavioral issues, and how behavior influences adoptions and retention.

Prerequisite: Permission of department.

VME 6814 Principles of Teaching for Animal Shelters 3 Credits**Grading Scheme:** Letter Grade

Introduces pedagogical skills necessary for effectively teaching in the setting of an animal shelter.

VME 6815 Animal Shelter Population Management by the Metrics 3 Credits**Grading Scheme:** Letter Grade

Teaches the fundamentals of using shelter data to make data-driven decisions to enhance animal health and improve operational efficiency.

VME 6816 The Role of the Animal Shelter in Protecting Community and Public Health 3 Credits**Grading Scheme:** Letter Grade

Enhances the ability of shelter medical professionals to serve as informed and active protectors of human and animal health in their communities.

VME 6817 Humane Euthanasia Practices for Animal Shelters 3 Credits**Grading Scheme:** Letter Grade

Serves to establish best practices for students interested in coaching shelters in humane euthanasia. Prerequisites would be that you have access to an animal shelter where you can observe and discuss euthanasia practices during the course.

VME 6818 High Quality High Volume Spay Neuter 3 Credits**Grading Scheme:** Letter Grade

Gives students in-depth knowledge of HQHVS (High Quality High Volume Spay/Neuter) and introduces skills necessary for evaluating, improving, and developing successful HQHVS programs based on community need.

VME 6819 Principles of Leadership in Animal Shelters 3 Credits**Grading Scheme:** Letter Grade

Advances have occurred in animal sheltering and shelter medicine in recent years, and effective leadership is crucial to navigate this change in order to build healthy organizational culture and fulfill its mission. Students will be aware of their strengths as a leader, and of areas for additional development.

VME 6820 Introduction to Veterinary Disaster Response 1 Credit**Grading Scheme:** Letter Grade

Be prepared to respond to veterinary disaster events as a volunteer. Recognize the standards of care for operating emergency animal shelters and transporting pets before and after disaster events. Understand the need for animal shelters to maintain all-hazard plans and adapt plans in the face of a pandemic.

Prerequisite: Currently enrolled as a graduate student or with departmental approval.

VME 6830 Principles of All Hazard Responding in Animal Welfare 3 Credits**Grading Scheme:** Letter Grade

Provides students with in-depth knowledge of the all hazards approach to emergency planning and response and how it affects people and animals.

Prerequisite: VME 6820 can be taken as a prerequisite or concurrently with this course.

VME 6840 Life-Enhancing Strategies of Animal Welfare Organizations 3 Credits**Grading Scheme:** Letter Grade

This course explores innovative, life-enhancing programs and strategies that promote optimal animal health and welfare, ideal community and personnel involvement and organizational success of animal welfare organizations.

Prerequisite: Access to a local animal shelter where you can observe and/or review organizational programs, structure and function related to animals, volunteers, and staff.

VME 6841 Communications and Marketing for Animal Welfare Organizations 3 Credits**Grading Scheme:** Letter Grade

Understand the unique benefits and challenges of external communications and marketing in animal welfare organizations.

Prerequisite: Permission of department.

Corequisite: Relationship with a local animal shelter to view communications and marketing campaigns (can be done by websearch, email, telephone, or in person).

VME 6842 Fundraising and Development for Animal Welfare Organizations 3 Credits**Grading Scheme:** Letter Grade

Understand how to create and maintain a successful development program that supports the important mission of an animal welfare organization.

Prerequisite: Permission of department.

Corequisite: Access to a nonprofit animal welfare organization and their development staff, fundraising program, and IRS form 990s.

VME 6905 Problems in Veterinary Medical Sciences 1-4 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Problems in Veterinary Medical Sciences

VME 6907 Mechanisms of Microbial Virulence Journal Club 1 Credit, Max 4 Credits**Grading Scheme:** Letter Grade

Covers contemporary topics in host-microbe interactions by focusing on critical analysis of recently published manuscripts. The selected articles will cover the molecular mechanisms that bacteria, viruses and parasites utilize for pathogenesis of various hosts, such as animals, insects, and nematodes.

VME 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

VME 6931 Seminar in Veterinary Medical Sciences 1 Credit, Max 8 Credits**Grading Scheme:** S/U

Seminar in Veterinary Medical Sciences

VME 6932 Seminar in Physiological Sciences 1 Credit, Max 8 Credits**Grading Scheme:** S/U

Weekly seminar series on topics in comparative physiological sciences, including nervous, cardiovascular, gastrointestinal, urogenital, and musculoskeletal systems.

VME 6933 Seminar in Infectious Diseases and Experimental Pathology 1 Credit, Max 8 Credits**Grading Scheme:** S/U

Weekly seminar series on topics in infectious diseases of animals presented by students, faculty, and visiting speakers.

VME 6934 Topics in Veterinary Medical Sciences 1-4 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Studies in topics involving new developments and/or research techniques in veterinary medical sciences.

Prerequisite: consent of instructor.

VME 6936 Seminar in Pathophysiology 1 Credit, Max 8 Credits**Grading Scheme:** S/U

Weekly seminar series in mammalian pathophysiology.

Prerequisite: physiology, biochemistry.

VME 6937L VMS Graduate Seminar Series 1 Credit**Grading Scheme:** Letter Grade

This course is a forum for CVM graduate students and faculty to exchange information that can advance animal health, human health, and environmental health.

Prerequisite: Student must be enrolled in PhD or MSc program.**VME 6938 Topics in Aquatic Animal Health 1 Credit, Max 4 Credits****Grading Scheme:** Letter Grade

Presentation/discussion by students of selected articles relating to aquatic animal health, including both vertebrates and invertebrates.

VME 6939 Topics in International Shelter Medicine 3 Credits**Grading Scheme:** Letter Grade

Introduces and familiarizes students to the unique challenges of practicing shelter medicine in international, resource-limited environments.

VME 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

VME 6950 Capstone Project Presentation 1-3 Credits**Grading Scheme:** Letter Grade

Students design and present to a live online audience a culminating project and e-portfolio that demonstrates their academic achievement and ability to use the knowledge and skills gained while completing the online MS Veterinary Medical Sciences, Concentration in Shelter Medicine.

VME 6951 Communicating Research About Shelter Medicine 1 Credit**Grading Scheme:** Letter Grade

Apply principles of good writing and strong visual layouts for transforming academic research into public documents that can be shared during your Capstone Project Presentation as well as at conferences, meetings, or the animal shelter workplace.

Corequisite: It is best taken after your advisor has approved your Capstone Project proposal (or research topic) so you can begin working on your presentation.

VME 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

VME 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students in veterinary medical sciences before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

VME 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Wildlife Ecology and Conservation

ALS 6500 Multivariate Statistics for Agricultural and Life Sciences 3 Credits**Grading Scheme:** Letter Grade

This course provides students with a conceptual and practical understanding of the application of multivariate statistics in the life sciences. Topics covered include ordination, clustering, and discrimination. Prior experience with the programming language R is necessary for this course.

Prerequisite: STA 6093.**ALS 6501 Data Carpentry for Biologists 3 Credits****Grading Scheme:** Letter Grade

An introduction to data management, manipulation, and analysis, with an emphasis on biological problems. Class consists of short introductions to new concepts followed by hands on computing exercises using R and SQLite, but the concepts apply to programming languages and databases more generally. No background in computing is required.

WIS 5496 Research Design in Wildlife Ecology 3 Credits**Grading Scheme:** Letter Grade

Scientific philosophy and logic of modern ecological approaches, and practical research design as applied to wildlife field ecology. Offered fall term.

Prerequisite: STA 2023 or equivalent; upper-division course in ecology.**WIS 5555C Conservation Biology 3 Credits****Grading Scheme:** Letter Grade

Application of biological and resource management theory to the problem of the conservation of natural communities. Offered fall term.

Prerequisite: basic courses in ecology, genetics.**WIS 5562 Conservation Medicine 3 Credits****Grading Scheme:** Letter Grade

Discusses conservation and wildlife forensic science with a transdisciplinary approach. Topics include forensic science, wildlife crime, illegal wildlife trade, and bushmeat trade; ecotoxicology, and the use of plants to harm humans, livestock, or wildlife.

WIS 6050 Pro Communication in Wildlife Forensic Sciences 3 Credits**Grading Scheme:** Letter Grade

Course will cover areas of scientific communication crucial to a successful career. Basic principles of written and verbal communication are covered before progressing into scientific writing style and composition. This foundation will be used to apply principles to writing research papers and statements, review articles, grant proposals, presentations and posters.

WIS 6051 Wildlife Tracks and Sign 3 Credits**Grading Scheme:** Letter Grade

Intended for wildlife professionals who wish to have a deeper understanding of the behavior of terrestrial animals in terms of the habitats they frequent, what and where they feed, den and bedding locations, and other activities. Will enhance the quality of field work in as it pertains to conducting animal surveys, observations, and capturing/handling wildlife.

WIS 6052 Bird Language 3 Credits**Grading Scheme:** Letter Grade

Intended for wildlife professionals who wish to have a deeper understanding of bird behaviors and how their 'language' plays a key role in the complex interactions occurring between species of the animal kingdom with highly developed cognitive abilities.

WIS 6306 Applied Wildlife Forensic Genetics 3 Credits**Grading Scheme:** Letter Grade

Provides an overview of the principles of genomics and population genetics as they apply to forensic science and forensic DNA analysis. A strong emphasis will be placed on the theories and models of population genetics and how they are directly applied in forensic DNA typing and the interpretation of results.

Prerequisite: VME 6573.**WIS 6307 Integrated Wildlife Forensic Genetics 3 Credits****Grading Scheme:** Letter Grade

This is an integrative course to be taken by students who have completed the Introduction to Forensic Genetics for Companion Animals and Wildlife, and the Applied Wildlife Forensic Genetics courses. Throughout the course students will be required to set up procedures and/or follow procedures in their mock forensic laboratory

Prerequisite: VME 6573 and WIS 6306.**WIS 6405 Biodiversity 3 Credits****Grading Scheme:** Letter Grade

Biodiversity emerges from a combination of ecological and evolutionary processes operating across many scales of space and time. This course examines the concept of biodiversity and the processes that generate important patterns of biodiversity in ecology.

WIS 6421 Wildlife Toxicology: The Ecohealth Perspective 3 Credits**Grading Scheme:** Letter Grade

Provides a global assessment of toxicological stressors, including pesticides, environmental contaminants, and other emerging chemical threats, and reviews the impact on wildlife, through an ecohealth perspective. Outlines the physiological and pathological impacts of toxins in wildlife as it relates to the investigative process for wildlife forensics.

WIS 6425 Carrion Ecology and Evolution 3 Credits**Grading Scheme:** Letter Grade

Carrion Ecology and Evolution includes a range of organisms including molecular, bacterial, fungal, invertebrate, and vertebrate communities. Intra interspecific interactions related to population biology, community ecology, processes that manifest into habitats and ecosystems will be addressed. A multidisciplinary view of organisms will provide the basis for understanding decomposition.

WIS 6444C Wetland Management 3 Credits**Grading Scheme:** Letter Grade

Prepares students for basic monitoring, field research, and management of wetlands, using ecological principles and knowledge of community variation in relation to stressors. Identification, monitoring techniques, and management and restoration techniques will be taught through a combination of class lectures and hands-on field exercises and labs.

WIS 6455 Wildlife Population Ecology 3 Credits**Grading Scheme:** Letter Grade

Rigorous background in population analysis covering population growth and regulation, species interactions, life-history theory, and population viability analysis.

WIS 6466 Wildlife Population Modeling 3 Credits**Grading Scheme:** Letter Grade

Theory and applications of life tables, age, and stage-structured matrix population models. Sensitivity analysis and analysis of life table response experiments. Unstructured population models.

Prerequisite: one course in calculus or linear algebra; one course in basic or popular ecology.**WIS 6468C Pattern and Process in Landscape Ecology 3 Credits****Grading Scheme:** Letter Grade

Exploration of applied and quantitative methods to explore links between landscape patterns and processes.

WIS 6505C Quantitative Analysis of Animal Populations 3 Credits**Grading Scheme:** Letter Grade

Quantitative models are useful to explain and predict animal population's patterns and processes. Model's usefulness stems from their ability to synthesize complex processes using a limited number of parameters and assumptions. In this course, students will learn the theory and application of quantitative methods to estimate population level statistics and quantify related uncertainty

Prerequisite: STA 6093.**WIS 6522 Coupled Human and Wildlife Systems 3 Credits****Grading Scheme:** Letter Grade

This course will train graduate students in implementing the Coupled Human and Natural Systems (CHANS) framework for interdisciplinary wildlife research around the globe. This is an interdisciplinary approach to addressing global challenges by explicitly examining interactions and feedbacks between humans (e.g., culture, socioeconomics, governance) and nature (e.g., wildlife, plants, abiotic features).

Prerequisite: PCB 4043C or equivalent or permission of instructor**WIS 6526 Stakeholder Engagement in Natural Resources 3 Credits****Grading Scheme:** Letter Grade

This course introduces the concept of stakeholders and builds understanding of diverse perspectives of people that affect or are affected by natural resource decisions. The course also provides students with a variety of tools to engage with communities/groups for effective decision-making.

WIS 6544 Administration in Natural Resources 3 Credits**Grading Scheme:** Letter Grade

Natural resource agency administration primer in budgets, personnel management, program development, leadership, and strategic planning.

WIS 6557 International Wildlife Conservation Law, Policy and Ethics 3 Credits**Grading Scheme:** Letter Grade

Upon successful completion of the course, students will understand the complexity of the international legal structure and be able to identify the organizations tasked with developing and enforcing international wildlife laws. In addition, students will gain skills necessary to identify the ethical and cultural concerns complicating solutions to conservation issues.

WIS 6558 Introduction to U.S. Wildlife Law, Policy & Ethics 3 Credits**Grading Scheme:** Letter Grade

Upon successful completion of this course students will possess a thorough understanding of the U.S. legal system governing fish and wildlife conservation as it relates to wildlife management and will develop the skills necessary to analyze the complex stakeholder motivations affecting U.S. wildlife conservation policies from multiple perspectives.

WIS 6559 Forensic Science for Conservation Biology 3 Credits**Grading Scheme:** Letter Grade

This course will demonstrate the relationship between the forensic sciences and conservation biology and how the many different forensic disciplines can be applied to ecological and conservation-based issues. Students will gain an understanding of wildlife ecology, biodiversity, current environmental and wildlife concerns, and environmental forensics.

WIS 6561 Wildlife Crime Scene Processing 3 Credits**Grading Scheme:** Letter Grade

Provides a detailed understanding of forensic science and medicine and how to properly document and process a crime scene where wildlife may be the victim, or possibly the perpetrator. Focus is on evidence recognition and handling as well as techniques for the improvisation of crime scene processing equipment under field conditions.

WIS 6563 Wildlife Forensic Pathology 3 Credits**Grading Scheme:** Letter Grade

Examine the pathology and pathogenesis of infectious and non-infectious diseases, traumatic injury, and poisoning that are a feature of wildlife forensic cases. Recognition of aspects of gross and histopathological pathology and correlate changes with clinical pathology and other data. Understand infectious agents and involvement in the production of pathological lesions.

WIS 6565 Negative and Suboptimal Research Findings in Wildlife Forensics 3 Credits**Grading Scheme:** Letter Grade

This course highlights the value and limitations of 'non-findings' and small or singular sample sizes in research. The focus is on giving participants tools with which to formulate meaningful research conclusions while accurately conveying the quality or scope of evidence gathered.

WIS 6576 Human and Wildlife Conflict 3 Credits**Grading Scheme:** Letter Grade

Introduces issues of human and wildlife conflict both in historical context and current conservation. Explore solutions, including innovative and traditional agricultural practices, hunting and tourism as potential means of off-setting the cost of wildlife damage, and policy development at the local, regional, and national or international levels.

WIS 6905 Research Problems in Wildlife and Range Sciences 1-6 Credits, Max 10 Credits**Grading Scheme:** Letter Grade

Research Problems in Wildlife and Range Sciences

Prerequisite: consent of instructor.**WIS 6910 Supervised Research 1-5 Credits, Max 5 Credits****Grading Scheme:** S/U

Supervised Research

Prerequisite: consent of instructor.**WIS 6933 Seminar 1 Credit****Grading Scheme:** S/U

Seminar

WIS 6934 Topics in Wildlife Ecology and Conservation 1-4 Credits, Max 16 Credits**Grading Scheme:** Letter Grade

Advanced concepts and practices in wildlife management and conservation. Topics vary.

WIS 6940 Supervised Teaching 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Teaching

Prerequisite: consent of instructor.**WIS 6946 Wildlife Forensics Internship 1-6 Credits, Max 6 Credits****Grading Scheme:** S/U

This internship will provide an opportunity for students to gain first-hand experience at a public or private conservation, ecological or forensic institution of their choice, with approval for credit from the University of Florida (UF). Placement is designed to integrate theory and practice beyond the scope of the online program.

WIS 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

WIS 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

WIS 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Women's Studies

WST 5933 Proseminar in Women's Studies 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Proseminar (seminar that prepares you for more advanced work) introducing graduate students to Women's Studies scholarship. Overview of feminist thought, interdisciplinary research, and feminist practice. Students are introduced to scholars in the field, and learn how to design and implement an independent research project appropriate to Women's Studies.

WST 6004 Feminist Methods in Research and Scholarship 3 Credits**Grading Scheme:** Letter Grade

Provides graduate training covering a range of qualitative and quantitative research methods for giving voice to the diversity of women's experiences and those of understudied and marginalized populations, making visible the invisible and undercounted aspects of people's lives and studying intersectionality. Includes overview of feminist critiques of science and epistemologies.

Prerequisite: None. Open to all graduate students in all colleges.**WST 6024 Girlhood Studies 3 Credits****Grading Scheme:** Letter Grade

Critically examines the construction of girlhood through social, political, economic, and cultural frameworks. Uses materials and methodologies from various disciplines to explore diverse experiences, challenges, and identities of girls from global and intersectional perspective. Presents complex intersections of gender, age, race, class, sexuality, and ability across diverse cultural and geographical contexts.

WST 6245 Women and Therapy 3 Credits**Grading Scheme:** Letter Grade

Survey of the development of mental health interventions from the 19th century to the present, with attention to women as patients, practitioners, and consumers

WST 6329 History of Women's Medicine 3 Credits**Grading Scheme:** Letter Grade

Explores Western mainstream medicine (including psychology) and doctoring within the context of women's health during the nineteenth and twentieth centuries. Interdisciplinary approach appropriate for graduate students in various disciplines; course materials include primary and secondary texts from medicine, psychology, history, and gender studies.

WST 6348 Ecofeminism 3 Credits**Grading Scheme:** Letter Grade

Holistic framework for understanding connections among environmental, feminist, and social justice issues. Critical analysis of positions within ecofeminist theory.

WST 6406 Advanced Black Feminisms: Frameworks, Methods, Futures 3 Credits**Grading Scheme:** Letter Grade

Interdisciplinary investigation of Black feminist knowledge production, including institutional origins, key sites of inquiry, and imagined futures. Explores multiple methodological approaches. Prioritizes contributions of scholars who may be outside of the canon. Engages primary sources, secondary texts, and audio and visual material. Possible topics include labor, pleasure, and violence.

WST 6508 Advanced Feminist Theory 3 Credits**Grading Scheme:** Letter Grade

Introduction to contemporary theoretical ideas in feminist thought. Often taught with a common theme, in and across disciplines.

Prerequisite: Graduate-level course in feminist theory or equivalent.**WST 6596 Intersectional Activism 3 Credits****Grading Scheme:** Letter Grade

Theory and research about intersections of race, class, gender, sexuality in activism and social movements

WST 6905 Independent Study 1-3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Independent reading or research under guidance.

Prerequisite: consent of instructor and department chair; and 1 women's studies course, or course that counts for women's studies.**WST 6935 Special Topics in Women's Studies 1-3 Credits, Max 15 Credits****Grading Scheme:** Letter Grade

Selected topics in gender and women's studies, emphasizing new knowledge production and contributions in feminist scholarship. Examines a specific topic, a major figure, or a current problem in more depth than is regularly possible in a more general course.

WST 6936 Feminist Challenges to Disciplinary Paradigms 3 Credits, Max 6 Credits**Grading Scheme:** Letter Grade

Examines how feminist scholarship can transform traditional disciplines and bodies of knowledge. Acquaints students with the major feminist challenges to ways of thinking in one or more fields of study. Such ways of thinking can include theory, methodology, disciplinary assumptions, and/or applications.

WST 6946 Internship in Applied Women's Studies and Gender Research 1-3 Credits, Max 6 Credits**Grading Scheme:** S/U

Practical experience in community. Internship with local agency, group, or business in women's issues.

Prerequisite: permission of program director.**WST 6957 International Studies in Women's Studies and Gender Research 1-6 Credits, Max 12 Credits****Grading Scheme:** S/U

International Studies in Women's Studies and Gender Research
Prerequisite: admission to approved study abroad program and permission of department.

WST 6971 Research for Master's Thesis 1-15 Credits**Grading Scheme:** S/U

Research for Master's Thesis

Writing Program

ENC 1101 Expository and Argumentative Writing 3 Credits**Grading Scheme:** Letter Grade

The principal elements of writing clearly, efficiently and effectively. ENC 1101 also focuses on writing logical arguments, building research skills and developing critical thinking through reading, writing and discussion. (C) (WR)

Attributes: General Education - Composition, Satisfies 6000 Words of Writing Requirement**ENC 1102 Argument and Persuasion 3 Credits****Grading Scheme:** Letter Grade

Writing techniques and forms of argument in a range of disciplines. For their major writing assignment in this course, students will write an extensively researched and well-documented research paper, learning professional and academic writing conventions and developing their critical thinking skills. (C) (WR)

Prerequisite: ENC 1101.**Attributes:** General Education - Composition, Satisfies 6000 Words of Writing Requirement**ENC 2305 Analytical Writing and Thinking 3 Credits****Grading Scheme:** Letter Grade

Advances students critical thinking and writing skills beyond first-year composition. With wide-ranging themes in areas such as languages, political science, anthropology or biology, this course exposes students to the advanced analytical techniques and communication strategies that professors in all disciplines expect them to know. (C) (WR)

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** General Education - Composition, Satisfies 6000 Words of Writing Requirement**ENC 3246 Professional Communication for Engineers 3 Credits****Grading Scheme:** Letter Grade

Students master a variety of communication strategies and genres of writing relevant to engineering, such as composing email, memos, letters, technical descriptions, instructions, academic research reports and professional proposals. Students also respond to complex rhetorical situations, thus preparing for work in their professional communities. (C) (WR)

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 3252 Writing for Strategic Communication 3 Credits****Grading Scheme:** Letter Grade

Effective writing strategies for pitching, planning, and delivering content on behalf of organizations and within professional communities. Rhetorical analysis of strategic communication in content-rich marketing published via digital platforms. Intended for public relations, advertising, and telecom majors.

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement

ENC 3254 Professional Writing in the Discipline 3 Credits**Grading Scheme:** Letter Grade

A communication course adjusted to a specific professional discipline, the discipline to be determined by need. Covers major elements of organizational communication with emphasis on composition of reports, proposals, letters and memos, manuals, and oral presentations. Course materials and assignments are relevant to the specific discipline. (C) (WR)

Prerequisite: ENC 1101 OR ENC 1102.**Attributes:** General Education - Composition, Satisfies 6000 Words of Writing Requirement**ENC 3453 Writing in the Health Professions 3 Credits****Grading Scheme:** Letter Grade

Designed to help students master a variety of communication strategies and genres of writing relevant to the health professions. Students learn to compose clear messages to professionals, patients, and the public, preparing them for upper-division courses and building a foundation for work in their professional communities.

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 3459 Writing in the Medical Sciences 3 Credits****Grading Scheme:** Letter Grade

Training in advanced literacy skills for medical practitioners, including the use of medical databases and the presentation of medical research to professional and lay audiences. Work in teams that are typical of medical practice to learn techniques for effective patient interaction. (C) (WR)

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 3464 Writing in the Social Sciences 3 Credits****Grading Scheme:** Letter Grade

Designed to help students master a variety of communication strategies and genres of writing relevant to the social sciences. Conducting original research, students learn the relationship between clear, simple prose and thoughtful social analysis. Students write literature reviews, develop methodologies, present results, analyze data, and draft graduate or internship applications.

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 3465 Writing in the Law 3 Credits****Grading Scheme:** Letter Grade

Designed to help students master a variety of communication strategies and genres of writing relevant to law, with special emphasis on legal reasoning and logic. Students write legal briefs, a legal memorandum, business correspondence, and law school applications and are introduced to legal research and moot court debate.

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 3466 Writing in the Communication Sciences 3 Credits****Grading Scheme:** Letter Grade

For communication science professionals who interact with audiences that range from school counselors to caregivers and colleagues, excellent writing an essential skill. Focus is on writing in graduate school and as practitioners: research-based reports, clinical documents, and career portfolios. (C) (WR)

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 3483 Writing in the Physical Sciences 3 Credits****Grading Scheme:** Letter Grade

Designed to improve writing skills necessary for success in the physical sciences, both in graduate school and the workplace. Investigating an area of special interest, students learn advanced library research, correct documentation, stylistic conventions for their major fields, and how to present research effectively. (C) (WR)

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 3934 Special Topics in Rhetoric and Writing 3 Credits****Grading Scheme:** Letter Grade

Designed to advance students' ability to write in specific genres or to develop their understanding of special topics related to the field. Specific sections will be tailored to the expertise of the faculty members teaching the course.

Prerequisite: ENC 1101 or ENC 1102.**Attributes:** Satisfies 6000 Words of Writing Requirement**ENC 4458 Writing the Science Thesis 3 Credits****Grading Scheme:** Letter Grade

In this course, students learn to write an academic thesis and a publishable version of their research, preparing them for both academic and scientific audiences. Assignments include a literature review, thesis, research report, and conference poster. Frequent peer review prepares students for collaboration, a necessary skill in contemporary science.

Prerequisite: ENC 1102 with minimum grade of C.**ENC 4493 Peer Tutoring in Rhetoric and Writing 2 Credits****Grading Scheme:** Letter Grade

Examines the theories and best practices used by writing tutors with the goal of preparing to be peer writing tutors. Includes preparation on conducting needs assessments, prioritizing advice, and giving effective writing feedback. Observe experienced tutors and be guided through the first tutorial sessions.

Prerequisite: ENC 1102.**ENC 4905 Directed Independent Study in Rhetoric and Writing 1-3 Credits****Grading Scheme:** Letter Grade

Designed for the advanced student who wants to pursue in depth an area of study not provided in regularly offered courses. Independent study can involve independent reading or projects under faculty guidance.

Prerequisite: Permission of instructor.**ENC 4930 Special Topics in Rhetoric and Writing 1-3 Credits****Grading Scheme:** Letter Grade

Designed to advance students' ability to write in specific genres and to develop their understanding of special topics related to the field. Specific sections will be tailored to the expertise of the faculty members teaching the course.

Prerequisite: completed 60 credits.

ENG 1001 Modes of Inquiry 3 Credits**Grading Scheme:** Letter Grade

Strategies for dealing successfully with various media types common to the college experience (web-based, film, traditional readings, etc.). Through reading, writing, research and small group discussion, students will develop and refine reading, writing and speaking skills. Modes of Inquiry employ a cross-discipline approach so that student encounter reading and writing as it happens in the humanities, social sciences and business. Course also utilizes the electronic classroom, giving students the opportunity to polish computer skills and take advantage of online resources. The critical thinking, reading and writing skills learned in this course enhance the communications skills needed for a successful college career. (WR)

Attributes: Satisfies 2000 Words of Writing Requirement**RED 1343 Reading and Writing Content Area 1-7 Credits****Grading Scheme:** Letter Grade

Covers the fundamentals of beginning college writing and critical reading skills.

Zoology

BOT 6726C Principles of Systematic Biology 4 Credits**Grading Scheme:** Letter Grade

Theory of biological classification, taxonomy, nomenclature, and phylogenetics. Discussion of issues in systematic biology including species concepts and reticulate evolution. Laboratory experience in phylogenetic methods, including parsimony, maximum likelihood, Bayesian inference, divergence time estimation, and ancestral state reconstruction.

PCB 5307C Limnology 4 Credits**Grading Scheme:** Letter Grade

Biological, chemical, and physical dynamics of inland waters.

Prerequisite: PCB 4044C, CHM 2046.**PCB 5415C Behavioral Ecology 4 Credits****Grading Scheme:** Letter Grade

Theoretical and empirical bases for behavioral adaptations.

Prerequisite: ZOO 3513C, 4472C, PCB 4044C, 4674, or consent of instructor.**PCB 5615 Molecular Evolution and Systematics 4 Credits****Grading Scheme:** Letter Grade

Patterns and processes of change at the molecular level in populations, species, and higher taxonomic groups, and their systematic implications.

Prerequisite: PCB 3063, graduate standing, or consent of instructor.**PCB 6049 Seminar in Ecology 1-3 Credits, Max 9 Credits****Grading Scheme:** Letter Grade

Rotating seminar: various topics in ecology.

PCB 6377C Physiological Ecology of Vertebrates 4 Credits**Grading Scheme:** Letter Grade

Physiological mechanisms that influence distribution and ecological relations, water conservation, and energy exchange in vertebrates.

Prerequisite: course in physiology.**PCB 6447C Community Ecology 4 Credits****Grading Scheme:** Letter Grade

The evolutionary ecology of communities; conceptual and quantitative approaches to community structure; statistics independent projects.

Prerequisite: PCB 4044C or equivalent, and consent of instructor.**PCB 6695 Seminar in Evolutionary Biology 1 Credit, Max 5 Credits****Grading Scheme:** Letter Grade

Current thinking. New topic each time offered. Recently published book or symposium proceedings on newly emerging research theme. Supplementary material drawn from evolutionary biology journals. Directed readings.

Prerequisite: PCB 4674.**ZOO 5115C Vertebrate Paleontology 3 Credits****Grading Scheme:** Letter Grade

Evolutionary history of major vertebrate groups, emphasizing the principles of prehistoric investigations.

Prerequisite: ZOO 3713C.**ZOO 5486C Mammalogy 4 Credits****Grading Scheme:** Letter Grade

Study of the ecology, natural history, behavior, and evolutionary history of mammals.

Prerequisite: ZOO 2203C.**ZOO 6005 Integrative Principles of Zoology I 4 Credits****Grading Scheme:** Letter Grade

Integrative approach to fundamental principles of ecology, evolution, and comparative biology.

ZOO 6308 Dynamic Optimization Modeling in Behavioral and Evolutionary Ecology 3 Credits**Grading Scheme:** Letter Grade

Powerful and simple techniques for formalizing hypotheses. Appropriate to address questions of relative fitness of alternative choices or strategies. Instruction in computer programming and dynamic modeling.

ZOO 6406 Biology of Sea Turtles 3 Credits**Grading Scheme:** Letter Grade

All aspects of biology of sea turtles and how their biology affects their conservation.

ZOO 6456C Ichthyology 4 Credits**Grading Scheme:** Letter Grade

Ichthyology

Prerequisite: ZOO 2203C.**ZOO 6542 Nutritional Ecology 3 Credits****Grading Scheme:** Letter Grade

Interactions of nutrition and ecology, emphasizing how digestive processes regulate animal productivity and plant/animal interactions.

ZOO 6905 Individual Studies 1-8 Credits, Max 12 Credits**Grading Scheme:** Letter Grade

Individual Studies

ZOO 6910 Supervised Research 1-5 Credits, Max 5 Credits**Grading Scheme:** S/U

Supervised Research

ZOO 6920 Zoology Colloquium 1 Credit, Max 9 Credits**Grading Scheme:** S/U

Readings and oral presentations on general topics in zoology. Discussions with eminent scientists in the discipline.

ZOO 6927 Special Topics in Zoology 1-4 Credits, Max 15 Credits**Grading Scheme:** Letter Grade

Special Topics in Zoology

ZOO 6931 Seminar in Marine Turtle Biology 1-2 Credits, Max 5 Credits**Grading Scheme:** Letter Grade

Advanced topics in biology and conservation of marine turtles.

Prerequisite: consent of instructor.

ZOO 6939 Seminar in Animal Behavior 1-3 Credits, Max 9 Credits**Grading Scheme:** Letter Grade

Advanced topics in animal behavior.

Prerequisite: graduate standing or consent of instructor.**ZOO 6971 Research for Master's Thesis 1-15 Credits****Grading Scheme:** S/U

Research for Master's Thesis

ZOO 7979 Advanced Research 1-12 Credits**Grading Scheme:** S/U

Research for doctoral students before admission to candidacy. Designed for students with a master's degree in the field of study or for students who have been admitted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

ZOO 7980 Research for Doctoral Dissertation 1-15 Credits**Grading Scheme:** S/U

Research for Doctoral Dissertation

Graduate Degrees

Information about this Page

- **Doctoral degree listings and requirements:** See the *Ph.D. and other doctoral degree requirements* section of this catalog for standards governing graduate offerings at the doctoral level, including information about the transfer of credit, graduate minors, leaves of absence, supervisory committee structure, language requirements, campus residency stipulations, admission to candidacy, the dissertation, graduate degree certification, and the qualifying/final examinations.
- **Master degree listings and requirements:** Specifics about the master's degree offerings can be viewed by expanding the listings below and by reviewing the sections related to the Master of Arts and Master of Science degrees.
- **Sequence of the page:** On the list to follow, doctoral degrees appear first, then master's degrees, with the Specialist listed last. Expand the listings to reveal available majors and concentrations followed by the guidelines specific to the degree.
- **Expanding subheadings and printing/saving to PDF:** To view all subheadings on a page or to print/save the fully expanded PDF of the page, please use the print options button on the orange toolbar at the top of each page.

Ph.D. and Other Doctoral Degree Requirements

Minimum Course Requirements: Course requirements for doctoral degrees vary from field to field and from student to student. In all fields, the Ph.D. degree requires at least 90 credits beyond the bachelor's degree or a minimum of 60 credits beyond an accredited and awarded master's degree, formally documented via the Master's Degree Acknowledgement (process outlined below). At least 45 credits of any doctoral degree must be completed at the University of Florida, and in all cases, the student must complete the qualifying examination at the University of Florida.

Master's Degree Acknowledgement (MDA): The MDA is a formalized process to acknowledge the content, level, relevancy, and contribution of a student's prior earned master's degree earned at a non-UF institution or in another field of study within UF to the specific student's doctoral program of study at the University of Florida. Academic unit program faculty must complete a holistic review of the individual's official records and transcripts to specifically evaluate the previously awarded master's degree. Such a review must consider the following elements: age of the

degree, curricular level, grades, and grading schemes. Please note that international degrees may have timelines and curricula that vary from UF standards.

The degree must have been determined by the Office of Admissions to be an accredited master's degree or equivalent to an accredited master's degree for international degrees. This determination by the Office of Admissions is documented in the student's record and marked as final, official, and complete with official transcript documents viewable in the student's record.

The MDA must be submitted prior to the qualifying examination and will be documented in the student's Student Information System record and is subject to review by the college and approval by the Graduate School. This decision is final and cannot be reversed at a later date.

Transfer of Credit Policy for Doctoral Degrees: Any courses beyond a master's degree taken at another university to be requested to be applied to the UF doctoral degree must be taken at an institution offering the doctoral degree and must be approved for graduate credit by the Graduate School of the University of Florida. All courses to be transferred must be graduate-level, letter-graded with a grade of B or better, and must be demonstrated to relate directly to the degree being sought. The maximum allowance for transfer is 15 credits.

Major: A Ph.D. student does the major work in an academic unit specifically approved for offering doctoral courses and supervising dissertations. See Graduate Programs. At least a B (3.00 truncated) is needed for courses included in the major.

Minor: Minor work must be in an academic unit other than the major. If an academic unit contributes more than one course (as specified in the curriculum inventory and/or the Graduate Catalog) to the major, the student is not eligible to earn a minor from the contributing academic unit. A 3.00 (truncated) GPA is required for minor credit.

With the supervisory committee's approval, the student may choose one or more minor fields. If one minor is chosen, the supervisory committee member representing the minor suggests 12 to 24 credits of courses numbered 5000 or higher as preparation for a qualifying examination. If two minors are chosen, each must include at least 8 credits. Competency in the minor is demonstrated by a written examination by the minor academic unit or by the oral qualifying examination.

Leave of Absence

A doctoral student who seeks to take leave from UF for more than 1 semester should obtain written approval from the supervisory committee chair for a leave of absence for a designated period of time. This approved leave is kept on file in the student's departmental record. It does not need Graduate School approval. If the student is absent for three or more consecutive terms, the student must reapply for admission on returning. See Readmission and Catalog Year.

Supervisory Committee

Supervisory committees are nominated by the academic unit chair, approved by the dean of the college concerned, and appointed by the Dean of the Graduate School. The committee should be appointed as soon as possible after the student starts doctoral work and no later than the end of the second term of equivalent full-time study. The Dean of the Graduate School is an ex officio member of all supervisory committees.

Duties and responsibilities of the supervisory committee:

- Inform the student of all regulations governing the degree sought. This does not absolve the student from responsibility for being informed about these regulations. See *General Regulations*.
- Meet immediately after appointment to review the student's qualifications and discuss and approve a program of study.
- Meet to discuss and approve the proposed dissertation project and the plans for carrying it out.
- Give the student a yearly evaluation letter in addition to S/U grades earned for research courses 7979 and 7980. The chair writes this letter after consulting with the supervisory committee.
- Conduct the qualifying examination (or participate in it if administered by the academic unit).
- Meet when at least half the work on the dissertation is complete to review procedure, progress, and expected results; and to make suggestions for completion.
- Meet with the student when the dissertation is completed and conduct the final oral examination to assure that the dissertation is a piece of original research and a contribution to the body of knowledge. The supervisory committee chair or cochair is generally present with the candidate for the examination. Other committee members may attend remotely if necessary and allowed within posted guidelines. Individual academic units must have established guidelines when addressing exceptions, applying this policy consistently in all cases. Only the actual supervisory committee may sign the ETD Signature Page, and they must approve the dissertation unanimously. See *Examinations in General Regulations*.

Membership: The supervisory committee for a doctoral candidate comprises at least four members selected from the Graduate Faculty. At least two members, including the chair, must be from the academic unit recommending the degree. At least one member serves as the external member and must be from a different educational discipline, with no ties to the home academic unit. One regular member may be from the home academic unit or another unit.

If a minor is chosen, the supervisory committee includes at least one Graduate Faculty member representing the student's minor. If the student elects more than one minor, each minor area must be represented on the supervisory committee. Therefore, committees for students with two minors must have a minimum of five members.

Special appointments: People without Graduate Faculty status may be made official members of a student's supervisory committee through the special appointment process. Appropriate candidates for special appointments include

- Individuals from outside UF with specific expertise who contribute to a graduate student's program of study
- Tenure-track faculty not yet qualified for Graduate Faculty status
- Non-tenure-track faculty or staff at UF who do not qualify for Graduate Faculty status

Limitations for special appointments:

- They do not hold Graduate Faculty appointments
- They have a special appointment that is specific only to an individual student's committee
- **They may not serve as a supervisory committee chair, co-chair, external member, or minor representative.**

For official recognition and tracking by the Graduate School, the student's supervisory committee chair requests the special appointment, briefly

explaining what the special appointment contributes to the supervisory committee. A special appointment is made for a specific supervisory committee. If a student changes to a new degree or major and the committee chair wishes to include the special member on the new supervisory committee, another request must be submitted to the Graduate School for the new committee.

External member:

- Represents the interests of the Graduate School and UF
- Knows Graduate Council policies
- Serves as an advocate for the student at doctoral committee activities.

If the academic unit's committee activity conflicts with broader University policies or practices, the external member is responsible for bringing such conflicts to the attention of the appropriate governing body. Therefore, the external member is prohibited from holding any official interest in the doctoral candidate's major academic unit. Faculty holding joint, affiliate, courtesy, or adjunct appointments in the degree-granting academic unit cannot be external members on a student's committee.

Minor member: The Graduate Faculty member who represents a minor on a student's committee may be appointed as the external member if they do not have a courtesy graduate appointment in the student's major academic unit.

Cochair: To substitute for the chair of the committee at any examinations, the cochair must be in the same academic unit as the candidate.

Substituting members at qualifying and final examination: If a supervisory committee member cannot be present at the student's final defense, a Graduate Faculty member in the same academic area may substitute for the absent committee member. The substitute should sign the Final Examination form on the left side, in the space provided for committee members, noting the name of the absent member.

The chair of the student's major academic unit also must indicate the reason for the absence and state that the absent member agreed to this substitution at the final examination.

The substitute should not sign the ETD signature page. The original committee member must sign.

No substitutes are allowed for the chair or external member of the committee. Changes to the supervisory committee may be entered online in GIMS before the qualifying examination.

The Graduate Council wants each supervisory committee to function as a University committee (not a departmental committee), applying University-wide standards to the various doctoral degrees, notwithstanding exceptions noted within this catalog.

Language Requirement

Any foreign language requirement for the Ph.D. is established by the major academic unit with approval of the college. The student should check with the graduate coordinator of the appropriate academic unit for specific information. The foreign language departments offer classes for graduate students starting to study a language. See the current *Schedule of Courses* for available languages. All candidates must be able to use the English language correctly and effectively, as judged by the supervisory committee.

Enrollment Requirement

The total number of credits (including 30 for a prior master's degree) that may be transferred cannot exceed 45, which means doctoral students must complete a minimum of 45 of 90 total credits required for the doctoral degree at the University of Florida. An academic unit or college may establish and monitor its own more stringent requirements as desired.

Qualifying Examination

All Ph.D. candidates must take the qualifying examination. It may be taken during the third term of graduate study beyond the bachelor's degree.

The student must be registered in the term the qualifying examination is given.

The examination, prepared and evaluated by the full supervisory committee or the major and minor academic units, is both written and oral and covers the major and minor subjects. Except for allowed substitutions, all members of the supervisory committee must attend the oral part (even if through remote means). The candidate and the supervisory committee chair or cochair generally are physically present together at the same location. However, academic units may establish consistent policy to allow attendance via remote means as exceptions to this tradition in rare incidences. For all guidelines regarding physical presence at the defense examinations, please see the (<https://grad.ufl.edu/media/gradufl.edu/pdf/phys-pres.pdf>) Physical Presence Policy (<https://grad.ufl.edu/media/gradufl.edu/pdf/phys-pres.pdf>) on the Graduate School website.

At the time of the qualifying examination, the supervisory committee is responsible for deciding whether the student is qualified to continue working toward the Ph.D. degree. For all guidelines regarding physical presence at the defense examinations, please see the Physical Presence Policy on the Graduate School website.

If a student fails the qualifying examination, the Graduate School should be notified. A re-examination may be requested, but it must be recommended by the supervisory committee. At least one term of additional preparation is needed before re-examination.

Time lapse: Between the oral part of the qualifying examination and the date of the degree, there must be at least 2 terms. The term the qualifying examination is passed is counted, if the examination occurs before the midpoint of the term.

Registration in Research Courses

Advanced Research (7979) is open to doctoral students not yet admitted to candidacy (classified as 7 and 8). Students enrolled in 7979 during the term they qualify for candidacy will stay in this registration unless the academic unit elects to change their enrollment to Research for Doctoral Dissertation (7980), which is reserved for doctoral students admitted to candidacy (classified as 9).

Admission to Candidacy

A graduate student becomes a candidate for the Ph.D. degree when the student is granted formal admission to candidacy. Such admission requires the approval of the student's supervisory committee, the academic unit chair, the college dean, and the Dean of the Graduate School. The approval must be based on:

- The academic record of the student
- The supervisory committee's opinion on overall fitness for candidacy
- An approved dissertation topic
- A qualifying examination as described above

The student should apply for admission to candidacy as soon as the qualifying examination is passed and a dissertation topic is approved by the student's supervisory committee.

Dissertation

Each doctoral candidate must prepare and present a dissertation that shows independent investigation, and that is acceptable in form and content to the supervisory committee and to the Graduate School. The work must be of publishable quality and must be in a form suitable for publication, using the Graduate School's format requirements. **The student and supervisory committee are responsible for the level of quality and scholarship.** Graduate Council requires the Graduate School's Thesis, Dissertation, and Publications Office, as agents of the Dean of the Graduate School, to review theses and dissertations for acceptable format and to make recommendations as needed.

Doctoral dissertation requirements: Before presentation to the Graduate School's Thesis, Dissertation, and Publications Office, the dissertation should be virtually complete and completely formatted (not in a draft format). Students must be completely familiar with the format requirements of the Graduate School and should work with one of the consultants in the Thesis and Dissertation Support Center (<https://helpdesk.ufl.edu/application-support-center/>) to troubleshoot the dissertation before attempting to make a first submission to the editors in the Graduate School's Thesis, Dissertation, and Publications Office. Students who fail to first meet with one of the T&D Lab Consultants often find their document rejected upon first submission to the Graduate School's Thesis, Dissertation, and Publications Office, for not meeting the minimum submission standards, required for an editorial review. In order to set an appointment with the support center, students should visit their website (<https://helpdesk.ufl.edu/application-support-center/>) and select the option to "Book an Appointment" from the menu on the left.

Dissertation Format Requirements:

<http://graduateschool.ufl.edu/about-us/offices/editorial/format-requirements/>

Doctoral Dissertation Checklist:

<http://graduateschool.ufl.edu/media/graduate-school/pdf-files/Doctoral-Checklist.pdf>

The Graduate School's Thesis, Dissertation, and Publications Office:

<http://graduateschool.ufl.edu/about-us/offices/editorial/thesis-and-dissertation/>

Thesis and Dissertation Support Center:

<https://helpdesk.ufl.edu/application-support-center/>

GatorLink email requirement: UF requires all students to maintain access to their GatorLink email.

Dissertation First Submission: Before presentation to the Graduate School's Thesis, Dissertation, and Publications Office, the thesis should be virtually complete and completely formatted (not in a draft format). Students must be completely familiar with the format requirements of the Graduate School and should work with one of the consultants in the Thesis and Dissertation Support Center to troubleshoot the

dissertation before attempting to make submission to the editors in the Graduate School's Thesis, Dissertation, and Publications Office. Students who fail to first meet with one of the Lab Consultants often find their document rejected upon First Submission to the Graduate School's Thesis, Dissertation, and Publications Office, for not meeting the minimum submission standards required for an editorial review.

Should the document pass the submission requirements and appear acceptable for review, the Graduate School's Thesis, Dissertation, and Publications Office will email the student, using their GatorLink email address, confirming the submission and responding with an acceptance email. Should the document not pass first submission requirements, a denial email will instead be sent, advising the student of their options at that time. This notice must be addressed immediately. Once a successful first submission has been achieved and the document has been reviewed by one of the Graduate School's editors, another email is sent, providing editorial feedback to the student and committee chair. The student is responsible for retrieving the dissertation, review comments, and resolving any deficits related to the format requirements. Students should promptly make all required changes.

Uploading and submitting the final pdf for Final Submission: After changes have been made to the satisfaction of the supervisory committee, the Electronic Thesis or Dissertation (ETD) Signature Page is submitted electronically to the Graduate School's Thesis, Dissertation, and Publications Office, via the Graduate Information Management System (GIMS) (<https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp>). This must be completed by the the Graduate School's Thesis, Dissertation, and Publications Office's Final Submission Deadline. Once submitted, the student should upload and submit the final pdf of the electronic thesis, using the Editorial Package portal found within the Graduate Information Management System (GIMS) (<https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp>). The document will undergo a final review by one of the Graduate School Representatives. The Graduate School's Thesis, Dissertation, and Publications Office ensures that the format is acceptable, that all indicated changes were made, and that all of the hyperlinks work within the document. The Graduate School Representative then emails the student regarding the status of the ETD. If accepted, no further changes are allowed. If changes are still required, the student should resubmit the corrected document as soon as possible. All documents must be confirmed with final approval emails from the Graduate School's Thesis, Dissertation, and Publications Office by the Final Clearance deadline. This deadline is firm, and no exceptions can be granted. When all changes have been made and approved, the Graduate School's Thesis, Dissertation, and Publications Office will email the Committee Chair and the student with a message, indicating the student has achieved Final Clearance with the Graduate School's Thesis, Dissertation, and Publications Office.

Final Clearance: Among other requirements (see Checklist above), the final thesis must be confirmed as accepted, by email, by 5:00 p.m. on this deadline. This deadline only applies, if all other posted deadlines for the term have been appropriately met. Because there are hundreds of students in this process, most students complete all requirements well in advance. It is the responsibility of the student to ensure they have achieved Final Clearance status by the Final Clearance Deadline for the term in which they intend to graduate. This can be confirmed via GIMS.

Publication of dissertation: The work will be accessible through the University's Institutional Repository (IR). Students who began their graduate program in the fall of 2001 or later must submit their final dissertations electronically to the IR (not on paper). All dissertation students must submit a publication agreement to ProQuest even if they

elect not to send the full dissertation to ProQuest for publication; after University restrictions have expired, the abstract of the document will be retained in ProQuest archives.

Copyright: The student is automatically the copyright holder, by virtue of having written the dissertation. A copyright page should be included immediately after the title page to indicate this. The Graduate School's Thesis, Dissertation, and Publications Office does not accept copyright registration requests. Registering copyright is not required and does not benefit most students. Any students who wish to register a copyright can do so themselves (<http://www.copyright.gov>).

Dissertation language: Dissertations must be written in English, except for students pursuing degrees in Romance or Germanic languages and literatures. Students in these disciplines, with the approval of their supervisory committees, may write in the topic language. A foreign language dissertation should have the Acknowledgments, Abstract, and Biographical Sketch written in English. All page titles before Chapter 1 should also be in English.

Journal articles: Dissertations may include journal articles as chapters, if all copyright considerations are addressed appropriately. In such cases, Chapter 1 should be a general introduction, tying everything together as a unified whole. The last chapter should be general conclusions, again tying everything together into a unified whole. Any chapter representing a journal article needs a footnote at the bottom of the first page of the chapter: "Reprinted with permission from ..." giving the source, just as it appears in the list of references. The dissertation should have only 1 abstract and 1 reference list.

Guidelines for Restriction on the Release of Dissertations

Research performed at the University can effectively contribute to the education of our students and to the body of knowledge that is our heritage only if the results of the research are published freely and openly. Conflicts can develop when it is in the interests of sponsors of university research to restrict such publication. When such conflicts arise, the University must decide what compromises it is willing to accept, taking into account the relevant circumstances.

Final Examination

While submitting the dissertation and completing all other work prescribed for the degree, the candidate is given a final examination, oral or written or both, by the supervisory committee. The candidate and the supervisory committee chair or cochair generally are physically present together at the same location. However, academic units may establish consistent policy to allow attendance via remote means as exceptions to this tradition in rare incidences. For all guidelines regarding physical presence at the defense examinations, please see the Physical Presence Policy on the Graduate School website.

The defense should be no more than three semesters, including the term in which the defense is completed, before the degree is awarded. All forms should be signed at the defense: the candidate signs and posts the UF Publishing Agreement to GIMS, after discussing their choices with the supervisory committee chair(s); the entire supervisory committee signs the ETD Signature Page and the Final Examination Report at the defense. If dissertation revisions are requested, the supervisory Committee Chair or their designee should withhold posting the ETD Signature Page to GIMS until all committee members are satisfied with the dissertation. However, this form must be submitted electronically, via GIMS, by the Final Submission Deadline for the Graduate School's Thesis, Dissertation,

and Publications Office, during the term of the student's intended degree award.

Satisfactory performance on this examination and adherence to all Graduate School regulations outlined above complete the requirements for the degree.

Time limitation on the Qualifying Exam: All work for the doctorate must be completed within 5 calendar years after the qualifying examination, or this examination must be repeated.

Doctoral Degree Offerings

Doctor of Audiology (Au.D.)^N

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#EDS>) within this catalog.

Doctor of Audiology Degree Requirements

The College of Public Health and Health Professions offers a program leading to the degree of Doctor of Audiology. The Au.D. degree is awarded after a 4-year program of graduate study. Foreign languages are not required. The program leading to the Au.D. degree is administered by the Department of Speech, Language and Hearing Sciences, the college, and the Graduate School.

See the Ph.D. and general doctoral requirements section of this catalog for the standards governing all doctoral offerings, such as further information regarding transfer of credit, graduate minors, leaves of absence, supervisory committee structure, language requirements, campus residence requirements, qualifying and final examinations guidelines, admission to candidacy, the doctoral dissertation, and graduate degree certification. Statements apply to both the Ph.D. and Ed.D. degrees, unless stated otherwise.

Admission: To be considered for the Au.D. program, students must meet the following minimum requirements:

- A 3.00 junior-senior undergraduate grade point average
- Evidence of good potential for academic success in at least three letters of recommendation, and
- Evidence of acceptable skills in written expression through a personal statement describing the motivation and skills applicable to graduate study and the profession of audiology.

Course requirements include 110 credits for students entering the program with a bachelor's degree awarded by an accredited institution consisting of at least 70 credits of didactic instruction, 30 credits of applied practicum, and 3 credits of audiology research.

A 70-credit program leading to the Au.D. is offered for applicants holding an earned master's degree in audiology from an accredited institution.

A 45-credit program leading to the Au.D. is offered for applicants holding an earned master's from an accredited institution, certification and/or licensure in audiology, and at least 3 years of full-time experience in audiology.

Comprehensive examination, required for all Au.D. candidates, may be taken during the eighth term of study beyond the bachelor's degree. Both written and oral, this examination is prepared and evaluated by the supervisory committee, which is responsible for determining whether the

student is qualified to continue work toward the degree by completing the clinical residency.

Doctor of Education (Ed.D.)^T

The Doctor of Education (Ed.D.) degree offers advanced professional training and academic preparation for the highest levels of educational practice. Programs are available in the School of Teaching and Learning, the School of Special Education, School Psychology, and Early Childhood Studies, and the School of Human Development and Organizational Studies in Education.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#AUD>) within this catalog.

A minimum of 90 credits beyond the bachelor's degree or a minimum of 60 credits beyond an accredited and awarded master's degree formally documented via the Master's Degree Acknowledgement (refer to process under Doctoral degree requirements) is required. Course requirements vary with the academic unit and with the student's plan for research and/or professional pursuit. With the approval of the supervisory committee, the student may choose one or more minor fields of study. The Ed.D. requires a qualifying examination and a dissertation.

See the Ph.D. and general doctoral requirements section of this catalog for the standards governing all doctoral offerings, such as further information regarding transfer of credit, graduate minors, leaves of absence, supervisory committee structure, language requirements, campus residence requirements, qualifying and final examinations guidelines, admission to candidacy, the doctoral dissertation, and graduate degree certification. Statements apply to both the Ph.D. and Ed.D. degrees, unless stated otherwise.

Doctor of Musical Arts (D.M.A.)^N

See the Ph.D. and general doctoral requirements section of this catalog for the standards governing all doctoral offerings, such as further information regarding transfer of credit, graduate minors, leaves of absence, supervisory committee structure, language requirements, campus residence requirements, qualifying and final examinations guidelines, admission to candidacy, the doctoral dissertation, and graduate degree certification. Statements apply to both the Ph.D. and Ed.D. degrees, unless stated otherwise.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#EDD>) within this catalog.

Doctor of Philosophy (Ph.D.)^T

The Doctor of Philosophy (Ph.D.) is a research degree and is granted on evidence of general proficiency, distinctive attainment in a special field, and particularly on ability for independent investigation as demonstrated in a dissertation presenting original research with a high degree of literary skill. Consequently, doctoral programs are more flexible and varied than those leading to other graduate degrees. The Graduate Council does not specify what courses are required for the Doctor of Philosophy degree. General requirements: the program should be unified in relation to a clear objective, the program should have the considered approval of the student's entire supervisory committee, and the program should include an appropriate number of credits of doctoral research. For guidance, please consult the Policy on PhD Programs (<http://aa.ufl.edu/media/aaufledu/policies/PhD-Programs-Policy.pdf>).

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#DMA>) within this catalog.

Doctor of Plant Medicine (D.P.M.)^N

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#PHD>) within this catalog.

Campus program: The College of Agricultural and Life Sciences offers an interdisciplinary program leading to the degree of Doctor of Plant Medicine (D.P.M.). The D.P.M. degree is awarded after a 3- to 4-year program of graduate study. Foreign languages are not required. The program leading to the D.P. M. degree is administered by the Entomology and Nematology Department, College of Agricultural and Life Sciences, and the Graduate School.

Admission entrance requirements:

- B.S. or B.A. degree, preferably in biological, agricultural, or health science.
- A 3.00 grade point average in upper-division courses.
- Applicants from countries where English is not the native language must also achieve a satisfactory score on one of the following: TOEFL (Test of English as a Foreign Language: paper=550, web= 80), IELTS (International English Language Testing System: 6 (6.5 Effective: Spring 2026)), MELAB (Michigan English Language Assessment Battery: 77) or successful completion of the University of Florida English Language Institute program.
- Evidence of good potential for academic success in at least three letters of recommendation.
- Evidence of acceptable skills in written expression through personal statements briefly describing their backgrounds, reasons, and career goals for studying plant medicine.

Course requirements: Students entering the program with a bachelor's degree must earn 100 credits. This includes at least 85-86 credits of course work and 15-16 credits of internship. Students entering the program with a master's degree in a related area may be allowed to transfer up to 30 credits in graduate courses corresponding to those required by the D.P.M. degree program. All D.P.M. students must complete two substantial 3-credit internships. Signed approval by a student's Committee and the D.P.M. Director is required prior to registering for substantial internship credits.

Comprehensive examination: Both written and oral comprehensive examinations are required of all D.P.M. students. The written examination has three sections: entomology/nematology, plant pathology, and plant/soil science. Faculty from the appropriate disciplines are appointed by the D.P.M. Program Director and D.P.M. Competency Exam Coordinators to develop and grade the final written examination. The three sections of the written exam may be taken independently throughout the program at the discretion of the supervisory committee and the D.P.M. Director. Students are encouraged to complete the exam prior to the last full year of the D.P.M. program and their anticipated semester of graduation. Students should also complete the

D.P.M. Competency Area Exams before the completion of a substantial internship. After a student passes all three sections of the final written examination (80% or higher is considered a passing grade), the supervisory committee administers an oral examination that tests the student's ability to diagnose and manage plant health problems. A student who fails to pass a comprehensive examination may retake an exam once with the recommendation of their supervisory committee.

Distance program: The College of Agricultural and Life Sciences offers a distance education program leading to the D.P.M. degree for highly qualified students. The D.P.M. degree is awarded after a 3- to 4-year program of graduate student. Foreign languages are not required. The distance education program leading to a D.P.M. degree is administered by the Entomology and Nematology Department, College of Agricultural and Life Sciences, and the Graduate School.

Admission entrance requirements:

- A graduate degree (Master's or Doctoral) with a concentration in plant health science, plant pathology, agronomy, horticulture, environmental horticulture, forestry, entomology, nematology, soil science or a similar field.
- A passing score for the Certified Crop Advisor (CCA) exam administered by the Agronomy Society of America (ASA).
- Completion of at least two years of full-time work in a professional job associated with the Plant Doctor (DPM/H) profession. Examples of professional jobs associated with the Plant Doctor profession include: crop consultant, industry scientist, extension specialist, diagnostician, identifier, survey specialist, plant pest risk analyst, plant health technician, or instructor.
- A minimum score of a 300 on the Graduate Record Examination (GRE). Verbal and quantitative portions of the GRE should be approximately 150 each. Exceptions to the minimum may be considered by the DPM admissions committee.
- International applicants must also have a TOEFL score above 80.
- A graduate (Master's or Doctoral) grade point average of 3.0 or higher.
- A passing score (80% or higher) on the Plant Pathology Written Comprehensive Exam. The exam must be completed in Gainesville, Florida.

Course requirements: Students enter the program with a Master's or Doctoral degree and must earn 60 credits. Transfer of graduate credits from another graduate degree are not allowed for the distance education program. All D.P.M. students must complete two substantial 3-credit internships. Signed approval by a student's Committee and the D.P.M. Director is required prior to registering for substantial internship credits.

Comprehensive examination: Both written and oral comprehensive examinations are required of all D.P.M. students. The written examination has three sections: entomology/nematology, plant pathology, and plant/

soil science. Faculty from the appropriate disciplines are appointed by the D.P.M. Program Director and D.P.M. Competency Exam Coordinators to develop and grade the final written examination. Students enrolled in the distance education program must pass the plant pathology written competency area exam prior to admission. The two remaining sections of the written exam may be taken independently throughout the program at the discretion of the supervisory committee and the D.P.M. Director. Students are encouraged to complete the exam prior to the last full year of the D.P.M. program and their anticipated semester of graduation. Students should also complete the D.P.M. Competency Area Exams before the completion of a substantial internship. After a student passes all three sections of the final written examination (80% or higher is considered a passing grade), the supervisory committee administers an oral examination that tests the student's ability to diagnose and manage plant health problems. A student who fails to pass a comprehensive examination may retake an exam once with the recommendation of their supervisory committee.

See the Ph.D. and general doctoral requirements section of this catalog for the standards governing all doctoral offerings, such as further information regarding transfer of credit, graduate minors, leaves of absence, supervisory committee structure, language requirements, campus residence requirements, qualifying and final examinations guidelines, admission to candidacy, the doctoral dissertation, and graduate degree certification. Statements apply to both the Ph.D. and Ed.D. degrees unless stated otherwise.

Master's Degree General Requirements

The master's degree is conferred only on completing a coherent and focused program of advanced study. Each academic unit sets its own minimum degree requirements beyond the minimum required by the Graduate Council.

Graduate School regulations are as follows. Colleges and academic units may have additional regulations beyond those stated below.

Unless otherwise indicated in the next sections on master's degrees, these general regulations apply to all master's degree programs at the University. The University of Florida's Policy regarding examinations for master's level degrees can be found by following this link: Supervisory Committees and Final Examinations for Master Level Degree Programs Policy (<https://grad.ufl.edu/media/gradufl.edu/pdf/master-exam.pdf>).

Course requirements: Graduate credit is awarded for courses numbered 5000 and above. The program of course work for a master's degree must be approved by the student's adviser, supervisory committee, or faculty representative of the academic unit. No more than 9 credits from a previous master's degree program may apply toward a second master's degree. These credits are applied only with the written approval of the Dean of the Graduate School.

Major: Work in the major must be in courses numbered 5000 or above. For work outside the major, 6 credits of courses numbered 3000 or above may be taken if part of an approved plan of study.

Minor: Minor work must be in an academic unit other than the major. If an academic unit contributes more than one course (as specified in the curriculum inventory and/or the Graduate Catalog) to the major, the student is not eligible to earn a minor from the contributing academic unit. If a minor is chosen, at least 6 credits of work are required in the

minor field. Two 6-credit minors may be taken with the major academic unit's permission. A 3.00 (truncated) GPA is required for minor credit.

Degree requirements: Unless otherwise specified, for any master's degree, the student must earn at least 30 credits as a graduate student at UF. No more than 9 of the 30 credits (earned with a grade of A, A-, B+, or B) may be transferred from institutions approved for this purpose by the Dean of the Graduate School. At least half of the required credits (not counting 6971) must be in the major.

Transfer of credit: Only graduate-level (5000-7999) work with a grade of B or better is eligible for transfer of credit. A maximum of 15 transfer credits is allowed. These can include no more than 9 credits from institution/s approved by UF, with the balance obtained from postbaccalaureate work at the University of Florida. Credits transferred from other universities are applied toward the degree requirements, but grades earned are not computed in the student's grade point average. Acceptance of transfer of credit requires approval of the student's supervisory committee and the Dean of the Graduate School.

Academic units must submit petitions for transfer of credit for a master's degree during the student's first term of enrollment in the Graduate School.

The supervisory committee is responsible for using established criteria to ensure the academic integrity of coursework before accepting graduate transfer credits.

Supervisory committee: The student's supervisory committee must be appointed as soon as possible after the student is admitted to the Graduate School and no later than the second term of graduate study.

Supervisory committees for graduate degree programs are initiated by the student, nominated by the respective academic unit chair, approved by the college dean, and appointed by the Dean of the Graduate School. The Dean of the Graduate School is an ex officio member of all supervisory committees. Only Graduate Faculty may serve on a supervisory committee. If a student takes fewer than 12 credits in the first term, the deadline is the end of the term during which the student has accumulated 12 or more credits or the end of the second term. If a minor is designated for any degree, a representative from that minor is needed on the supervisory committee. If two minors are designated, two representatives are needed.

The supervisory committee for a master's degree with a thesis should consist of at least two Graduate Faculty members, unless otherwise specified. If a minor is designated, the committee must include a Graduate Faculty member from the minor department. See Supervisory Committees and Final Examinations for Master Level Degree Programs Policy (<https://grad.ufl.edu/media/gradufl.edu/pdf/master-exam.pdf>) for guidance.

For a master's degree without a thesis, oversight is at the academic unit/department/college level only. Non-thesis programs may choose to have a formal committee or an alternate structure as determined by the program's graduate faculty and consistent with academic unit policies. The oversight authority will be considered as the supervisory committee. Units are able to enter their internal information into GIMS as a convenience. Any student with a minor must have the name of the graduate faculty member overseeing the minor entered into GIMS.

Changes to existing supervisory committee: A student, in consultation with their academic unit, may seek changes to an existing supervisory committee. Changes to a student's committee are allowed until the

midpoint of the term of the degree award if the defense has not occurred. No changes are allowed after the defense. For procedural details, contact the major academic unit.

Language requirements:

1. Each academic unit determines whether a reading knowledge of a foreign language is required. The requirement varies from one academic unit to another, and the student should check with the appropriate academic unit for specific information.
2. All candidates must be able to use the English language correctly and effectively, as judged by the supervisory committee.

Examination: Each candidate must pass a final comprehensive examination. Some programs use different terminology, such as a *capstone course*. This examination must cover the candidate's field of concentration. It must occur no more than three semesters, including the term in which the examination is completed, before the degree is awarded.

Time limitation: All work (including transferred credit) counted toward the master's degree must be completed within 7 years before the degree is awarded.

Leave of absence: Any thesis student who will not register at UF for a period of more than one semester needs prior written approval from the supervisory committee chair for a leave of absence for a designated period of time. This approval remains in the student's departmental file. The Graduate School does not require notification. If the student is absent for three or more consecutive terms, the student must reapply for admission on returning. See Readmission and Catalog Year.

Master's thesis requirements: Each master's thesis candidate must prepare and present a thesis that shows independent investigation. It must be acceptable, in form and content, to the supervisory committee and to the Graduate School. The work must be of publishable quality and must be in a form suitable for publication, guided by the Graduate School's format requirements. The academic unit is responsible for quality and scholarship. Graduate Council requires the Graduate School's Thesis, Dissertation, and Publications Office, as agents of the Dean of the Graduate School, to review theses and dissertations for acceptable format, and to make recommendations as required.

- Format requirements and example pages:
<http://graduateschool.ufl.edu/about-us/offices/editorial/format-requirements/>
- Checklist:
<http://graduateschool.ufl.edu/media/graduate-school/pdf-files/Masters-Checklist-.pdf>
- Thesis and Dissertation Support Center/Electronic Theses and Dissertation Lab:
<https://helpdesk.ufl.edu/application-support-center/>
- The Graduate School's Thesis, Dissertation, and Publications Office Information:
<http://graduateschool.ufl.edu/graduation/thesis-and-dissertation/>
(<http://graduateschool.ufl.edu/graduation/thesis-and-dissertation/>)

GatorLink email requirement: UF requires students to maintain access to their GatorLink email accounts. Accordingly, the Graduate School's Thesis, Dissertation, and Publications Office only communicates with students through official GatorLink email.

Thesis first submission: When first presented to the Graduate School, the thesis must be successfully orally defended. Therefore, the final examination data must be posted by the academic unit into the Student Information System (SIS), prior to the student attempting to submit their thesis document for review by the Graduate School's editorial staff; accordingly, the defense must occur prior to the first submission deadline for the student's intended term of degree award. Directly following the oral defense, the Academic Unit must submit the Final Exam Form through SIS, and the student must submit their UF Publishing Agreement through the Graduate Information Management System (GIMS). Should additional revisions be required by the committee to the thesis document itself, the ETD Signature Page should be held by the academic unit from posting until the issues are fully resolved. Please be aware, however, the student will remain unable to submit their final thesis for review by the Graduate School's Thesis, Dissertation, and Publications Office until the ETD Signature Page is submitted; in turn, this should be posted by the final submission deadline within the student's intended term of degree award.

Uploading and submitting the final pdf for Final Submission: After changes have been made to the satisfaction of the supervisory committee, the Electronic Thesis or Dissertation (ETD) Signature Page is submitted electronically to the Graduate School's Thesis, Dissertation, and Publications Office, via the Graduate Information Management System (GIMS) (<https://gradschool.ufl.edu/gimspportal/gatorlink/portal.asp>). This must be completed by the Graduate School's Thesis, Dissertation, and Publications Office's [Final Submission](#) Deadline. Once submitted, the student should upload and submit the final pdf of the electronic thesis, using the Editorial Package portal found within the Graduate Information Management System (GIMS) (<https://gradschool.ufl.edu/gimspportal/gatorlink/portal.asp>). Once submitted, the document will undergo a final review by one of the Graduate School Representatives. The Graduate School's Thesis, Dissertation, and Publications Office ensures that the format is acceptable, that all indicated changes were made, and that all of the hyperlinks work within the document. The Graduate School Representative then emails the student regarding the status of the ETD. If accepted, no further changes are allowed. If changes are still required, the student should resubmit the corrected document as soon as possible. All documents must be confirmed with final approval emails from the Graduate School's Thesis, Dissertation, and Publications Office by the Final Clearance deadline. This deadline is firm, and no exceptions can be granted. When all changes have been made and approved, the Graduate School's Thesis, Dissertation, and Publications Office will email the Committee Chair and the student with a message, indicating the student has achieved Final Clearance with the Graduate School's Thesis, Dissertation, and Publications Office.

Final Clearance: Among other requirements (see Checklist above), the final thesis and all accompanying forms must be confirmed as approved by email by 5:00 p.m. on this deadline. This deadline only applies if all other posted deadlines for the term have been appropriately met. Since there are hundreds of students concurrently completing the process, most students complete all requirements well in advance, in order to ensure they do not face the chance of not graduating within their intended term.

Copyright: The student is automatically the copyright holder by virtue of having written the thesis. A copyright page should be included immediately after the title page to indicate this.

Thesis language: Theses must be written in English, except for students pursuing degrees in Romance or Germanic languages and literatures.

Students in these disciplines, with the approval of their supervisory committees, may write in the topic language. A foreign language thesis should have the Acknowledgments, Abstract, and Biographical Sketch written in English. All page titles before Chapter 1 should also be in English.

Journal articles: A thesis may include journal articles as chapters, if all copyright considerations are addressed appropriately. In such cases, Chapter 1 is a general introduction, tying everything together as a unified whole. The last chapter contains the general conclusions, once again tying everything together into a unified whole. Any chapter representing a journal article requires a footnote at the bottom of the first page of the chapter: "Reprinted with permission from ..." giving the source, just as it appears in the list of references. The thesis must have only 1 abstract and 1 reference list.

Change from thesis to non-thesis option: Permission of the supervisory committee is needed to change from thesis to non-thesis option. This permission must be forwarded to the Graduate School by the midpoint of the final term via the Graduate Information Management System (GIMS). The candidate must meet all the requirements of the non-thesis option as specified above. A maximum of 3 credits earned with a grade of S in 6971 (Research for Master's Thesis) can be counted toward the degree requirements only if converted to credit as A, A-, B+, or B in Individual Work. The supervisory committee must indicate that the work was productive in and by itself and that the work warrants credit as a special problem or special topic course.

Supervisory committee: The student's supervisory committee should be appointed as soon as possible after the student is admitted to the Graduate School and no later than the second term of graduate study. Supervisory committees for graduate degree programs are initiated by the student, nominated by the respective academic unit chair, approved by the college dean, and appointed by the Dean of the Graduate School. The Dean of the Graduate School is an ex officio member of all supervisory committees. Only Graduate Faculty may serve on a supervisory committee. If a student takes fewer than 12 credits in the first term, the deadline is the end of the term during which the student has accumulated 12 or more credits or the end of the second term. If a minor is designated for any degree, a representative from that minor is needed on the supervisory committee. If two minors are designated, two representatives are needed.

Thesis final examination: When most of the student's coursework is completed, and the thesis is in final form, the supervisory committee must examine the student orally or in writing on:

1. the thesis,
2. the major subjects,
3. the minor or minors, and
4. matters of a general nature pertaining to the field of study.

It is traditional but not required that the candidate and the supervisory committee chair or co-chair are physically present together at the same location. Individual academic units must have established guidelines when addressing exceptions and apply this policy consistently in all cases. For all guidelines regarding physical presence at the defense examinations, please see the Physical Presence Policy on the Graduate School website.

If a supervisory committee member cannot be present at the student's final defense, a Graduate Faculty member in the same academic unit

may substitute for the absent committee member. No substitutions are allowed for the Chair.

The substitute should sign the Final Examination form in the space provided for committee members, noting the name of the absent member. The chair of the student's major academic unit also must indicate the reason for the absence and state that the absent member agreed to this substitution at the final examination. The substitute should not sign the ETD signature page. The original committee member should sign that form.

The defense date must be fewer than three semesters, including the term in which the defense is completed, before degree award. All forms should be signed at the defense: the candidate submits the UF Publishing Agreement form into GIMS; and the entire supervisory committee signs the ETD Signature Page and the Final Examination Report. If thesis changes are requested, the supervisory Committee Chair or the Committee's designee may hold the ETD Signature Page, until all requirements are met regarding the thesis. Once all stipulations of the Committee members are satisfied, and before the Graduate School's Thesis, Dissertation, and Publications Office's Final Submission deadline for the term of intended degree award, verification of completion of this form must be submitted electronically via GIMS.

Non-thesis final comprehensive examination: Non-thesis students must pass a comprehensive written or oral examination on the major and on the minor if a minor is designated. This comprehensive examination must be taken no more than three semesters, including the term in which the exam is completed, before the degree is awarded.

M.A. and M.S. Degree Requirements

The general requirements for the Master of Arts and the Master of Science degrees also apply to the following degrees: Master of Arts in Education, Master of Arts in Mass Communication, Master of Science in Construction Management, Master of Science in Pharmacy, and Master of Science in Statistics. There are additional requirements for specialized degrees.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#programs>) within this catalog.

Course requirements: A master's degree with thesis requires at least 30 credits, including up to 6 credits of Research for Master's Thesis (6971). All thesis students must register for an appropriate number of credits in 6971.

A non-thesis Master of Arts or Master of Science degree requires at least 30 credits. No more than 6 of those credits can be from S/U courses. Non-thesis students cannot use Research for Master's Thesis (6971).

For all master's programs, at least half the required credits (not counting 6971) must be in the major. One or two minors of at least 6 credits each may be taken, but a minor is not required by the Graduate School. Minor work must be in an academic unit other than the major.

Non-thesis M.S. engineering programs: Students in engineering, if working at off-campus centers, must take half the coursework from full-time UF faculty members and must pass a comprehensive written examination by a committee recommended by the Dean of the College of Engineering. This written comprehensive examination may be taken at an off-campus site.

Master Degree Offerings

Master of Accounting (M.Acc.)^N

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#programs>) within this catalog.

The recommended curriculum to prepare for a professional career in accounting is the 3/2 five-year program with a joint awarding of the Bachelor of Science in Accounting and the Master of Accounting degrees on satisfactory completion of the 150-credit program. The entry point into the 3/2 is the start of the senior year.

Students who have already completed an undergraduate degree in accounting may enter the 1-year M.Acc. program, which requires 34 credits of coursework. At least 20 credits must be in graduate-level accounting, excluding preparatory courses. All students must take a final comprehensive examination. For details about requirements, see *General Regulations* for master's degrees.

M.Acc./J.D. program: This joint program culminates in both the Juris Doctor (J.D.) degree awarded by the College of Law and the Master of Accounting (M.Acc.) degree awarded by the Graduate School. The program is for students with an undergraduate degree in accounting who are interested in advanced studies in both accounting and law. About 20 credits fewer are needed for the joint program than if the two degrees were earned separately. The two degrees are awarded after completing the curriculum requirements for both degrees. Students must take the GMAT and also the LSAT before admission and must meet the admission requirements for the College of Law (J.D.) and the Fisher School of Accounting (M.Acc.).

Master of Agribusiness (M.AB.)^N

The Master of Agribusiness (M.AB.) is a one-year, thirty-credit-hour non-thesis degree program designed for students with no educational background in economics and offers advanced study for students seeking careers in sales, marketing, and management with organizations that operate mainly in the food industry and agribusiness sector. The courses complement the student's undergraduate education and prepare them for careers in private industry, state and federal government, education at secondary and post-secondary institutions, entrepreneurial pursuits, professional schools, financial analysis, agricultural production and marketing, food and consumer goods, and sales firms. The program includes a diversity of students from areas such as Animal Science, Food Science, Horticulture, Agricultural Education and Communication, Wildlife Ecology and Conservation, Agricultural and Biological Engineering, Turfgrass Management, Business Administration, and Agronomy.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#list\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#list) within this catalog.

Contact the Graduate Program in 1170 McCarty Hall for further information.

Master of Architecture (M.Arch.)^T

The Master of Architecture (M.Arch.) is an accredited graduate degree meeting the professional requirements of the National Architectural Accrediting Board for students who wish to qualify for registration and practice as architects. Candidates are admitted from architectural, related, and unrelated undergraduate backgrounds; professional experience is encouraged but not required.

The M.Arch. requires at least 52 credits, including no more than 6 credits in ARC 6971 Research for Master's Thesis (1-15 cr.) or ARC 6979 Master's Research Project (1-10 cr.). Course sequences in design history and theory, structures, technology, and practice must be completed. Students are encouraged to propose individual programs of study (outside of required courses), and interdisciplinary work is encouraged.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MAB>) within this catalog.

Master of Arts (M.A.)^{T/N}

The Master of Arts follows the general requirements and regulations for Master's Degrees.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MA>) within this catalog.

Master of Arts in Education (M.A.E.)^T

The general requirements for the Master of Arts and the Master of Science degrees also apply to the Master of Arts in Education. Although the general requirements for the Master of Arts and the Master of Science degrees also apply to the following discipline-specific degrees, there are some important differences. For detailed requirements, see the Majors Section of this catalog (<https://gradcatalog.ufl.edu/graduate/programs-college/>).

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MAE>) within this catalog.

Master of Arts in Mass Communication (M.A.M.C.)^{T/N}

The College of Journalism and Communications offers the Master of Arts in Mass Communication through two tracks-the Pro Master's Track or the Ph.D./Research Track. There is also an available online master's program. In either track, students may choose from the following specializations: Journalism, Public Relations, Telecommunication, International/Intercultural Communication, or Science/Health Communication. The general requirements for the Master of Arts and the Master of Science degrees also apply to the Master of Arts in Mass Communication.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MAE>) within this catalog.

Master of Arts in Teaching (M.A.T.)^N

The M.A.T. and the M.S.T. degrees combine graduate study in a discipline with selected education courses and a teaching internship, providing flexible curricula that prepare students for a variety of options, including teaching and further graduate work. For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MAMC>) within this catalog.

Requirements for both degrees are as follows:

- A reading knowledge of one foreign language if required by the student's major.
- Satisfactory completion of at least 36 credits while registered as a graduate student, with work distributed as follows:
- At least 18 credits in the major and 6 credits in the minor.

- Six credits in an academic unit internship in teaching (6943 Internship in College Teaching). Three years of successful teaching experience in a state-certified school may be substituted for the internship requirement, and credits thus made available may be used for further work in the major, the minor, or in education.
- At least one course selected from three or more of the following: social and/or psychological foundations of education; education technology; counselor education; special education, and community college curriculum. Other areas may be added or substituted at the discretion of the supervisory committee. These courses may be used to comprise a minor.
- Off-campus work: At least 8 to 16 credits (at the academic unit's discretion), including at least 6 credits in one term, must be earned on the Gainesville campus. Beyond that, credits earned in off-campus UF courses approved by the Graduate School are accepted if they are appropriate to the student's degree program as determined by the supervisory committee.
- The student must pass a final comprehensive examination (written, oral, or both). This examination covers the field of concentration and the minor.

At degree completion, the student needs at least 36 credits in the subject area for teaching certification purposes.

Master of Business Administration (M.B.A.)^N

The Master of Business Administration (M.B.A.) degree gives students

1. conceptual knowledge for understanding the functions and behaviors common to business organizations and
2. analytical, problem-solving, and decision-making skills essential for effective management.

Emphasis is on developing the student's capacities and skills for business decision making.

The traditional MBA curriculum is structured so that students may extend their knowledge in a specialized field. The program offers concentrations in business analytics, competitive strategy, finance, human capital, marketing, real estate and supply chain management.

Admission: All program options require at least two years of full-time professional work experience, along with two professional recommendation letters, a resume, written essays, and official transcripts for all previous academic work. Applicants for admission into a Full-Time MBA program must submit official scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) and are required to interview as part of the admissions process. If English is not your native language and you do not have a bachelor's degree or higher from a country where English is the official language, a TOEFL, IELTS, or MELAB score must be submitted.

A diverse student body is seen as an important asset of the program. Accordingly, the backgrounds of students include a wide range of disciplines and cultures. With the exception of our 32-credit programs, the curriculum requires no prerequisites in business coursework.

For more specific information on other aspects of the program, contact the UF MBA Program:

310 Hough Hall, P.O. Box 117152
Gainesville FL 32611-7152

Or, visit the website, <http://www.floridamba.ufl.edu> (<http://www.floridamba.ufl.edu/>)

Coursework: A minimum of 48 qualified credits of coursework is required for the two-year option, and one year for the All Major. The one-year Business Majors program requires a minimum of 32 credits. Credits cannot be transferred from another institution or program.

Options

Traditional MBA Two-Year Option: This 48-credit program requires 4 terms of full-time study over two academic years. Students are admitted for the fall term only; many students spend the summer between academic years working at internships. This option requires at least two years of full-time, post-undergraduate work experience as well as a bachelor's degree from an accredited four-year institution.

Traditional One-Year, All Majors: This 48-credit program starts in late spring/ early summer, and students are expected to complete all coursework within 12 months. Successful candidates are expected to have a bachelor's degree from an accredited four-year institution and two years of post-undergraduate work experience.

Traditional One-Year, Business Majors: This 32-credit program starts in mid-summer, and students are expected to complete all coursework within 10 months. Applicants to this program are required to have a bachelor's degree in business from a four-year accredited institution (conferred within the last seven years) and at least two years of post-undergraduate work experience. Students take primarily graduate business electives during summer B, fall, and spring terms and graduate in May.

Executive MBA Program: A 20-month program for working professionals, students attend classes four weekends per term (Saturday-Sunday). The program is divided into seven terms. The program starts in August and includes a one-week, two-credit international experience. The international study tour is a program requirement; students travel abroad in May for a week of experiential learning through lectures or discussions with local business and government leaders. The tour will include a combination of lectures, group projects, and/or site visits. This option requires eight years of post-undergraduate work experience, and students are expected to have people or project management responsibilities in their current positions.

Professional Two-Year MBA: This 24-month program starts in August and January and is designed for professionals who work full time while pursuing their degrees part time. Students attend classes one weekend per month (Saturday-Sunday) and must complete an immersive experiential learning course for one week during their enrollment. This option requires two years of post-undergraduate work experience.

Professional One-Year MBA: For students with acceptable undergraduate degrees in business (completed within seven years before starting the program), this 16-month option starts in January. Students attend classes one weekend per month (Saturday-Sunday) and must complete an immersive experiential learning course for one week during their enrollment. In order to begin the One Year MBA program, students must complete and pass a Foundations Review course. This option requires two years of post-undergraduate work experience.

Online Two-Year MBA: This 24-month program starts in August and January and allows students to earn their MBA primarily through asynchronous class lectures. Students interact with faculty and classmates via email, synchronous group discussion software,

asynchronous class presentation software, and multimedia courseware. This option requires two years of post-undergraduate work experience.

Online One-Year MBA: For students with acceptable undergraduate degrees in business (completed within seven years before starting this program), this 16-month option starts in August and January and gives students and faculty the same interactive technology as the Online One-Year MBA. In order to begin the One Year MBA program, students must complete and pass a Foundations Review course. This option requires two years of post-undergraduate work experience.

Professional MBA in South Florida: This 24-month program starts during the late summer and is designed for professionals who wish to continue working full time while pursuing their degrees part time. This program includes a one-week, two-credit international experience. The international study tour is a program requirement; students travel abroad in June for a week of experiential learning through lectures or discussions with local business and government leaders. The tour will include a combination of lectures, group projects, and/or site visits. Students attend classes once every three weeks (Saturday-Sunday) at the UF MBA Center in Miramar, Florida. This option requires two years of post-undergraduate work experience.

M.B.A./Ph.D. in medical sciences program: Concurrent studies leading to the Master of Business Administration and Doctor of Philosophy degrees are offered in cooperation with the College of Medicine. This 120-credit program trains research scientists to assume responsibilities as managers of biotechnical industries. The estimated time to complete both degrees is 5 to 7 years. Students must meet the admission and curriculum requirements of both programs. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the MBA program.

MBA./J.D. program: A program of joint studies leading to the Master of Business Administration and Juris Doctor degrees is offered under the joint auspices of the Warrington College of Business Administration and the Levin College of Law. Current M.B.A. or J.D. students must declare their intent to apply for the second degree during their first year. Applications are then due according to admission schedules for that year. Both degrees are awarded after a 4-year course of study. Students must take both the LSAT and the GMAT/GRE before admission and meet the admission and curriculum requirements of both degrees. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the MBA program.

M.B.A./Pharm.D. program in management and pharmacy administration:

A program of concurrent studies culminating in both the Master of Business Administration and Doctor of Pharmacy degrees allows students interested in both management and pharmacy administration to obtain the appropriate education in both areas. Candidates must meet the entrance requirements and follow the entrance procedures of both the Warrington College of Business Administration and the College of Pharmacy. The degrees may be granted after 5 years of study. Requirements of the M.B.A. program are those in effect when an applicant is admitted to the program. Applicants are expected to have previous professional work experience prior to starting the MBA program.

Exchange programs: The Warrington College of Business has many partner institutions from which full-time MBA students may choose to study. Programs vary in length from one semester to a modular format similar to ours. Students who study abroad are able to select a variety

of business courses and options depending on location. Students work closely with their academic advisors to develop a customized plan since careful consideration of the UF MBA curriculum and career planning is necessary to make a study abroad experience successful. For a complete list of exchange partners, see <https://warrington.ufl.edu/academics/global/>

Master of Construction Management (M.C.M.)^N

The Master of Construction Management (M.C.M.) degree is for students pursuing advanced work in construction management, construction techniques, and research problems in the construction field.

General requirements are the same as for the Master of Science in Construction Management degree, except that the M.C.M. requires at least 36 graduate credits. A thesis is not required. All candidates are required to pass a comprehensive examination at the completion of coursework.

Joint Program: The M.C.M./J.D. program is offered in conjunction with the Levin College of Law.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MCM>) within this catalog.

Master of Education (M.Ed.)^N

The Master of Education (M.Ed.) degree program meets the need for professional personnel to serve a variety of functions required in established and emerging educational activities of modern society. A thesis is not required.

All M.Ed. programs require at least 36 credits, with at least half of these credits earned in courses in the College of Education. Up to 6 credits earned from 3000- and 4000-level courses taken outside the academic unit may be counted toward the minimum required for the degree, provided they are part of an approved plan of study. (See also *General Requirements for Master's Degrees*.)

At least 16 credits must be earned while the student is enrolled as a graduate student in courses offered on the Gainesville campus of the University of Florida, including registration for at least 6 credits in a single term. This requirement may deviate where distance education programs are considered.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MED>) within this catalog.

Master of Engineering (M.E.)^{T/N}

Students may choose a thesis or non-thesis option for the Master of Engineering (M.E.) degree. To be eligible for admission to the M.E. program, students must have earned a bachelor's degree from an ABET-accredited college, or they must complete articulation work for equivalence. Admission requirements of the Graduate School must be met. The College of Engineering may use the Fundamentals of Engineering examination in lieu of the GRE to admit students into the non-thesis master's degree programs. Students who do not meet the ABET requirement may be admitted to the Master of Science program (see section on Master of Arts and Master of Science).

The non-thesis M.E. degree is a 30-credit coursework-only degree (a practice-oriented project or capstone course may be included in the 30 credits). At least 15 credits must be in the student's major at the

5000 level or higher. For work outside the major, courses numbered 3000 or above (not to exceed 6 credits) may be taken if they are part of an approved plan of study. If a minor is chosen, at least 6 credits are required. Two 6-credit minors may be taken. At the discretion of individual engineering academic units, an oral or written examination may be required.

The thesis option requires 30 credits of coursework, including up to 6 credits of 6971 (Research for Master's Thesis). At least 12 credits (not counting 6971) must be in the student's major. Courses in the major must be at the 5000 level or higher. For work outside the major, up to 6 credits of courses numbered 3000 or above may be taken if part of an approved plan of study. If a minor is chosen, at least 6 credits are required. Two 6-credit minors may be taken at the discretion of the academic unit. A comprehensive oral and/or written final examination is required.

An off-campus (distance learning) student who is a candidate for the non-thesis M.E. degree must take half the coursework from full-time UF faculty members and must pass a comprehensive written examination administered by a committee from the academic unit. If the student has a minor, the committee must include a member representing that minor.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MED>) within this catalog.

Master of Fine Arts (M.F.A.)^T

The Master of Fine Arts (M.F.A.) degree is offered with majors in art, creative writing, and theatre. Requirements are the same as for the Master of Arts with thesis, except the M.F.A. requires at least 60 credits (54 for creative writing), including 6 to 9 credits in 6971 (Research for Master's Thesis). Students in art and theatre substitute 6973 (Individual Project) creative work in lieu of the written thesis.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#ME>) within this catalog.

Admission: Applicants requesting admission to any of the programs should have an earned baccalaureate degree in the same or a closely related field from an accredited institution. Students must fulfill the admission requirements of their disciplines and the Graduate School's admission criteria. In cases where the undergraduate degree is not in the area chosen for graduate study, the student must demonstrate a level of achievement fully equivalent to the bachelor's degree in the chosen graduate field. A candidate deficient in certain areas must remove the deficiencies by successfully completing appropriate courses.

Art or theatre candidates also must submit a portfolio of their creative work or must audition before being accepted into the program. Creative writing candidates must submit 2 short stories, 2 chapters of a novel, or 6 to 10 poems. Three years of work in residence are usually needed to complete degree requirements. If deficiencies must be removed, the residency could be longer. See the Majors Section of this catalog (<https://gradcatalog.ufl.edu/graduate/programs-college/>) for Art, English, and Theatre.

Art: The M.F.A. degree with a major in art involves advanced visual research for those who wish to attain a professional level of proficiency in studio work. Specialization is offered in the studio areas of art + technology, ceramics, creative photography, drawing, graphic design, painting, printmaking, and sculpture. For studio work, the M.F.A. is

generally the terminal degree and is often the required credential for teachers of art in colleges and universities.

In addition to the general requirements above, students must take at least 60 credits. Requirements include 42 credits in studio courses (24 in specialization, 12 in electives, and 6 in ART 6973C Individual Project (1-10 cr.)); 6 credits in art history; 3 credits in teaching art in higher education (required if the student is to accept a teaching assistantship); 3 credits in aesthetics, criticism, or theory; and 6 credits of electives. The College requires the student to leave documentation of thesis project work for purposes of record, exhibition, or instruction.

Creative writing: The M.F.A. in creative writing develops writers of poetry and fiction through a series of workshops and other courses, including seminars. Candidates are required to produce a thesis (a manuscript of publishable poetry or fiction) at the end of the 3-year program. The degree requires 11 courses (4 workshops, 3 seminars, 1 forms course, and 3 electives), a reading tutorial, and a thesis, along with 9-18 research/thesis hours: 54 credits in all. Students typically take at least 1 workshop each Fall/Spring term for the first two years. The electives may be seminars, approved independent studies, or additional workshops. No coursework is expected in summer.

Theatre: The M.F.A. degree with a major in theatre is for those interested in production-oriented theatrical careers and teaching. Two specializations are offered: acting and design. The craft skills encompassed in the program are later applied in public and studio productions. The program requires 60 credits, including 18 credits of core classes, 17 credits of specialty training, an internship, and a project in lieu of thesis.

Master of Fisheries and Aquatic Sciences (M.F.A.S.)^N

The non-thesis Master of Fisheries and Aquatic Sciences (M.F.A.S.) program trains students in the technical aspects of fisheries and aquatic sciences, emphasizing written and oral communication of scientific information. Requirements are the same as for the Master of Science degree with the non-thesis option, except that the minimum credit requirement is 32 credits, of which at least 26 graduate credits of graded course work (at least 16 in the major), and a technical paper. The final draft of the technical paper must be submitted to all supervisory committee members for approval at least 3 weeks before the scheduled date of the oral and written final examination.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MFA>) within this catalog.

Master of Forest Resources and Conservation (M.F.R.C.)^N

The Master of Forest Resources and Conservation (M.F.R.C.) degree is for additional professional preparation rather than primary research. Requirements are the same as those listed for master's degrees.

Work required: At least 30 credits of letter-graded coursework, with at least 12 credits of graduate coursework in the major are required. A thesis is not required, but the student must complete a technical project in an appropriate field. This project may take various forms, such as a literature review, extension publication, video, training manual, or curriculum. The M.F.R.C. requires a final examination covering the candidate's entire field of study. The student must present the work to the supervisory committee in an on-campus public forum before the final examination.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#MFAS\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#MFAS) within this catalog.

Master of Health Administration (M.H.A.)^N

The Master of Health Administration (M.H.A.), offered by the College of Public Health and Health Professions, trains qualified individuals to become managers and leaders of healthcare organizations. The degree provides a core of business and analytical skills, concepts, and knowledge specific to health administration, opportunities for application and synthesis, and exposure to the field of practice. The M.H.A. program admits students only in the fall term and requires full-time study for 2 years, plus a summer internship between the first and second years. The program requires a total of 57 credits.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#MFRC\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#MFRC) within this catalog.

Master of Health Science (M.H.S.)^N

The Master of Health Science (M.H.S.) degree, offered by the College of Public Health and Health Professions, provides exposure to health research and meets the need for leadership personnel in established and emerging healthcare programs. The College currently offers a program in Environmental and Global Health with or without a concentration in One Health. The M.H.S. concentration program in One Health is part of the portfolio of training programs available through the Environmental and Global Health Department (<https://egh.php.ufl.edu/>) in the College of Public Health and Health Professions. The program requires 39 credits to complete.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#MHA\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#MHA) within this catalog.

Master of Historic Preservation (M.H.P.)^T

The University of Florida College of Design, Construction, and Planning offers a Master of Historic Preservation degree using an interdisciplinary variety of coursework in the basic and applied skills and arts of historic preservation, anthropology, archeology, architecture, building construction, cultural tourism, history, interior design, landscape architecture, museum studies, and urban and regional planning. The coursework totals 42 hours. Students must take 12 hours of core courses 6 hours of pre-approved history electives, and may choose from pre-approved and specially approved electives from across the campus. A true thesis to meet Graduate Requirements relating to historic preservation is required.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#MHS\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#MHS) within this catalog.

Master of Integrated Sustainable Development (M.I.S.D.)^N

The Master of Integrated Sustainable Development (M.I.S.D.) is a 30-credit interdisciplinary graduate degree program offered by the University of Florida (UF) College of Design, Construction and Planning (DCP), Sustainability and the Built Environment (SBE) Program. MISD is a STEM (Science, Technology, Engineering, and Mathematics) degree delivering education within the planning, design, construction, and operations of more sustainable and resilient built environments. Through a mix of pedagogical approaches (e.g., from research to collaborative studio

projects), MISD students will learn the skills and strategies to facilitate a quadruple bottom line of ecological, cultural, social, and economic sustainability across local, state, national, and international scales.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#MHP\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#MHP) within this catalog.

Master of Interior Design (M.I.D.)^T

The Master of Interior Design (M.I.D.) allows students to direct their attention to a variety of topics, including design pedagogy and processes; sustainable, safe, and secure environments; creative performance and innovation; and built heritage conservation.

Work required includes at least 36 credits (no more than 6 thesis credits). Required preparatory courses are in addition to the minimum credits for graduate work.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#MISD\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#MISD) within this catalog.

Master of International Business (M.I.B.)^N

The Master of International Business (M.I.B.) is a non-thesis interdisciplinary graduate business program designed to enhance a student's knowledge and understanding of global business trends and problems.

Admission: All admission requirements of the Graduate School must be met. Applicants must have a U.S. Bachelor's degree (or equivalent) from an accredited institution, with a major or minor in Business. In addition, applicants must complete a statement of purpose and submit two letters of recommendation as well as a resume and all official transcripts and admissions scores.

Work required: Students must complete the 30-credit curriculum, which consists of 14 core credits and 16 elective credits, with a grade point average (major and overall) of 3.0 or higher. The curriculum includes a mandatory global immersion experience and a non-thesis capstone project.

For the full list of available graduate majors and concentrations, please view the [Graduate Degree Table \(https://gradcatalog.ufl.edu/graduate/degrees/table/#MID\)](https://gradcatalog.ufl.edu/graduate/degrees/table/#MID) within this catalog.

Master of Landscape Architecture (M.L.A.)^T

The degree of Master of Landscape Architecture (M.L.A.) is an advanced graduate professional degree for graduates with baccalaureate credentials in landscape architecture and is the first professional degree for graduates from non-landscape architectural backgrounds. Candidates are admitted from related and unrelated fields and backgrounds. An advanced professional life experience track is available for eligible candidates.

Work required: Candidates must complete at least 52 credits, including no more than 6 credits of thesis or project. For students without baccalaureate credentials in landscape architecture, required preparatory courses are in addition to the minimum credits for graduate work. For advanced professional life experience candidates, the minimum requirement is 30 credits, including a thesis. At least 50% of all coursework must be graduate courses in landscape architecture. Some areas allow a project (requiring 6 credits) in lieu of thesis, with permission of the academic unit's Graduate Faculty.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MICM>) within this catalog.

Master of Latin (M.L.)^N

The Classics Department offers the non-thesis Master of Latin (M.L.) degree, a 30-credit program mainly for currently employed and/or certified teaching professionals who wish to widen their knowledge of Latin, broaden their education in the field of Classics, and enhance their professional qualifications. This degree can be attained by students in residence for fall/spring terms or by a program of summer course work at UF and by directed independent study and/or distance learning courses during the regular academic year.

Students registering during summer terms can complete the degree in 4 years by earning 6 graduate credits each summer (total = 24), plus two 3-credit independent study or distance learning courses during the intervening academic years. Those who already have some graduate credit in Latin or who can take more credits during the year can complete the degree more quickly.

Unlike the M.A. degree in Latin, the Master of Latin degree has no thesis requirement, does not prepare students for Ph.D. level studies, and is aimed specifically at currently employed and certified Latin teachers.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MLA>) within this catalog.

Admission: Contact the Department's Graduate Coordinator or Distance Learning Coordinator before applying. Requirements for the admissions process are

- Apply to UF's Graduate School,
- Acceptable GRE scores,
- Three letters of recommendation, and
- Transcripts recording undergraduate courses (and graduate courses, if any; students must demonstrate the ability to take Latin courses at the graduate level).

Degree requirements include at least 30 credits as a UF graduate student. Of these, no more than 8 credits (grade of A, A-, B+, or B) may be transferred from institutions approved for this purpose by the Dean of the Graduate School. At least half of the 30 credits required should be from Latin language and literature courses (LAT or LNW courses at the 5000 level or above). UF graduate-level courses taken before admission to Graduate School (e.g., in the Latin Summer Institutes) may be applied to the 30 credits if approved by the Graduate School. The Department will work closely with individual students to determine how many previous graduate credits at UF or other institutions may be applied to this program.

The student may elect minor work in other academic units (e.g., history, philosophy, art history, religion), although there is no requirement to do so. If a minor is chosen, at least 6 credits are required in the minor field. Two 6-credit minors may be taken with departmental permission. A GPA of 3.0 is required for minor credit and for all work counted toward the degree. All work in a minor must be approved by the supervisory committee.

Examination: The supervisory committee administers a final oral and written comprehensive examination at the completion of the coursework. This examination includes:

1. an oral component on Roman literary tradition and
2. a written component covering
 - a. Latin sight translation and grammar,
 - b. Roman history and civilization, and if applicable
 - c. the minor, or minors.

As preparation for this examination, the student should read the required reading list of secondary works in English.

Language requirement: The Department for this degree plan does not require, but strongly recommends, at least a reading knowledge of one (or more) of the following: German, French, Italian, or Spanish. Such study will facilitate reading important secondary works not translated into English, enhance travel, and perhaps lead to teaching opportunities in the chosen language at the secondary school level.

Master of Music (M.M.)^{T/N}

The Master of Music (M.M.) degree is offered in music or music education. For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#ML>) within this catalog.

The M.M. degree prepares students for careers as teachers in studios, schools, and universities; performers; music historians; music critics; church musicians; composers; conductors; and accompanists. There is also an available online master's program (<https://musiceducation.arts.ufl.edu/>).

Admission: Applicants should have a baccalaureate degree in music or a closely related area from an accredited institution. Students whose undergraduate degree is in another discipline must demonstrate a level of achievement fully acceptable for master's-level work in this discipline. Applicants normally complete at least 4 semesters of music theory, two semesters of music history, and 3-5 semesters of performance study. A candidate deficient in certain undergraduate areas must remove the deficiencies by successfully completing appropriate courses. If remedial work is needed, the residency (usually 4 terms of full-time study) may be longer. An audition or portfolio review is required for all students.

Work required includes at least 32 credits of coursework (not counting prerequisite or deficiency courses), incorporating a core of 9 credits. The core in all emphases includes MUS 6716 Methods of Musical Research and Bibliography (3 cr.) (MUE 6785 Research in Music Education (3 cr.) in the music education program), MUT 6629 Analytical Techniques (3 cr.), and one MUH or MUL graduate course. A thesis or creative project in lieu of thesis is required.

The College of the Arts reserves the right to retain student work for purposes of record, exhibition, or instruction. For more information, see the Majors Section of this catalog (<https://gradcatalog.ufl.edu/graduate/programs-college/>).

Master of Public Health (M.P.H.)^N

The Master of Public Health (M.P.H.) is a non-thesis degree program that prepares students to become effective public health practitioners, scientists, and educators. Graduates can contribute to the health of the local, national, and international communities through advancing public health knowledge and by designing, implementing, and evaluating programs and policies that prevent disease and promote health. Students have the opportunity to develop skills in 1 of 6 public health concentration areas:

- **Biostatistics:** Applying quantitative and analytical methods in public health research and evaluation
- **Environmental health:** Assessing risk levels and protecting the public from environmental threats to health
- **Epidemiology:** Studying the distribution and determinants of health in populations and communities
- **Public health management and policy:** Providing leadership in public health administration and developing policies to promote the public's health
- **Public health practice:** Developing breadth in the field of public health by studying 2 or more of the other concentration areas
- **Social and behavioral sciences:** Exploring the unique issues faced by diverse groups and populations and acquiring skills to achieve social and behavioral change.

The M.P.H. degree program is a 48-credit program for individuals with bachelor's degrees. Those with prior terminal degrees in health-related fields may take the M.P.H. in an accelerated 42-credit format. Several collaborative programs with professional and graduate degrees are available, including D.V.M./M.P.H., J.D./M.P.H., and Pharm.D./M.P.H. A combination degree program for seniors and a 15-credit certificate program are also offered.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MPH>) within this catalog.

Admission: Applicants with any undergraduate major are considered for the program as long as they meet the Graduate School admission requirements and their interests match the program's philosophy and curriculum.

Work required: In the 48-credit program, students take 16 credits of core public health coursework and 5-8 credits of internship. Internships are designed to promote competency in the concentration area and contribute to the student's career goals. The remaining 24-27 credits include required and elective coursework in the concentration area chosen by the student. Specific course requirements vary by concentration area.

Students who have a relevant terminal degree in a health-related field may be eligible for the 42-credit accelerated program, pending M.P.H. admissions committee approval. This program requires completion of 16 credits of core public health coursework, 21 credits of concentration coursework, and a 5-credit internship.

For additional information, visit <http://www.mph.ufl.edu>.

Master of Science (M.S.)^{T/N}

For the full list of available graduate majors and concentrations for the Master of Science (M.S.) degree, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MPH>) within this catalog.

Master of Science in Architectural Studies (M.S.A.S.)^T

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSAS>) within this catalog.

Admission: The Master of Science in Architectural Studies (M.S.A.S.) is a nonprofessional, research degree for students with undergraduate degrees in any field of study who wish to undertake advanced studies and research in architectural specialties. Specialization is offered in

environmental technology, architectural preservation, urban design, history, and theory.

Work required includes at least 32 credits of coursework, incorporating up to 6 credits of (Research for Master's Thesis). Most coursework should be in the School of Architecture, but multidisciplinary electives in planning, history, law, engineering, art history, and real estate are encouraged. Students also may enroll in one of the School's off-campus programs in Nantucket, in the Caribbean, in Hong Kong, or in Vicenza. A thesis is required.

Requirements for level and distribution of credits, supervisory committee, and final examination are the same as for the Master of Arts and Master of Science with thesis.

Master of Science in Business Analytics (M.S.B.A.)^N

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSAS>) within this catalog.

Admission standards: The admission standards will be similar to those already established for the current M.S.I.S.O.M. program. In particular, students will need to submit (a) to transcript certifying a bachelor's degree from an accredited college or university with a minimum GPA of 3.0, (b) GMAT or GRE scores, (c) a current resume, and (d) three letters of recommendation. International students will also need to complete a personal interview and submit TOEFL or IELTS scores. Details for admissions are included in the following: <https://warrington.ufl.edu/master-of-science-in-information-systems-and-operations-management/admissions/>.

Graduation requirements: Students will need to complete 36 credits consisting of 22 credits for required courses, an additional 14 credits of electives and satisfaction of all UF Graduate Council policies governing master level graduate degree programs (including but not limited to the requirements for graduate student oversight, a final comprehensive examination, time limitation, and a minimum 3.0 (truncated) GPA (in overall, major, and, where applicable, minor credits) in order to graduate.

Master of Science in Construction Management (M.S.C.M.)^T

The Master of Science in Construction Management (M.S.C.M.) is a master's degree that requires students to do original experimentation, write a thesis, and defend their thesis before a committee of professors. The MSCM requires nine courses plus three credits of Thesis Research, plus four leveling courses for those without a Construction Management bachelor's degree from an ACCE-accredited program to complete the degree. The research involved with the degree creates a graduate who is an expert in the area of their thesis topic. That research is more complicated than merely completing coursework, and a sound thesis usually takes nine months of work to complete. Students must have a Rinker School professor guide them through their research, producing an approved research proposal prior to engaging in research. Fortunately, the Rinker School has a wide array of faculty members with many areas of specialization, which allows students to research virtually any topic related to construction. The general requirements for the Master of Arts and the Master of Science degrees also apply to the Master of Science in Construction Management.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSBA>) within this catalog.

Master of Science in Entrepreneurship (M.S.E.)^N

The Master of Science in Entrepreneurship (M.S.E.) program is a one-year, 36-credit, campus-based program designed for young and aspiring entrepreneurs and change-makers. Offered to both business and non-business majors alike, the program is a combination of classroom delivery and experiential learning activities with a focus on opportunity assessment, feasibility analysis, lean entrepreneurial concept testing, business plan development, entrepreneurial leadership, and the sourcing of capital. Students are exposed to cutting edge entrepreneurial theory, which they apply immediately by consulting for small business, commercializing UF technology, and creating their own businesses. The M.S.E. program is a non-thesis degree requiring a final exam in lieu of thesis.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSCM>) within this catalog.

Admission: All admission requirements of the Graduate School must be met. In addition, applicants must complete a statement of purpose, submit two letters of recommendation as well as a resume and all official transcripts and admissions scores, and conduct a program interview. Either a GMAT or GRE score will be accepted.

Work required: In order to graduate from the program, students must

- Complete 36 credits with a grade of "C" or better;
- Maintain an overall Graduate GPA of 3.0 or higher;
- Maintain a Major GPA of 3.0 or higher;
- Complete the program final exam: a portfolio of entrepreneurial experiences completed throughout the program demonstrating mastery of entrepreneurial competencies;
- Fulfill all program requirements.

Master of Science in Fire and Emergency Sciences (M.S.F.E.S.)^N

The Master of Science in Fire and Emergency Sciences (M.S.F.E.S.) is a non-thesis, distance education, advanced degree program with a research report/project requirement offered by the Rinker School of Construction Management. The degree focuses on Emergency Services/ Disaster Management (ES/DM) and is designed for individuals who are seeking knowledge in emergency planning, hazard mitigation and preparedness, disaster response and recovery, and homeland security. The goal is to create a broad experience that includes the many elements of current cases in ES/DM and emphasizes both the critical thinking and leadership skills necessary to advance in the field. Major research topics include interdisciplinary studies in material sciences, suppression systems, advanced planning, and geographic systems, pre- and post-disaster mitigation planning, computer applications, and technological innovations.

Admission: All admission requirements of the Graduate School must be met. Applicants must have a U.S. Bachelor's degree (or equivalent) from an accredited institution. In addition, applicants must have:

- at least five years of meaningful supervisory and management-related experience;
- a cumulative verbal and quantitative GRE score of 300 or higher;
- a grade point average of 3.0 on a 4.0 scale (preferred); and

- for international applicants, a TOEFL score of 80 or higher on the Internet-based exam (550 on the Paper-Based) or a 6 (6.5 Effective: Spring 2026) or higher on the IELTS.

Work required: At least 33 credits overall (at least 17 credits in the major) with a GPA of 3.0 or higher, a final comprehensive exam, and a research report.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSE>) within this catalog.

Master of Science in Information Systems and Operations Management (M.S.I.S.O.M.)^N

The Master of Science in Information Systems and Operations Management (M.S.I.S.O.M.) degree program provides computing, analytical, and application skills to be used in a business setting. The primary areas of emphasis in the program are business intelligence and analytics, information technology, and supply chain management. Requirements span traditional academic disciplines to produce a multi-disciplinary focus. The M.S.ISOM program is a non-thesis degree program. Depending on the concentration chosen and the previous business educational background of the student, the minimum credit requirements range from 36 to 42 credits in order to allow students without an undergraduate major in business to participate in an experiential learning experience at the graduate level.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSFES>) within this catalog.

All admission requirements of the Graduate School must be met. There are no prerequisites for the program. However, students without a business background will need additional core business coursework in order to complete the degree.

Preparedness for graduation is based on

- Completing a minimum of 36 credits (including 18 in the major) and all course requirements for the designated track. Letter grades of C-, D+, D, D- or E are not considered passing at the graduate level and therefore any required course for which such grades have been assigned must be repeated.
- Being registered for at least two credits in the semester in which the student intends to graduate.
- Completing all degree requirements, including a minimum grade point average of B (3.00 truncated) in the major (i.e., only courses offered under the Department section of the graduate catalog) and in all work attempted in the graduate program, including a minor where appropriate
- Clearing all incompletes or other unresolved grades by the midpoint deadline published on the Graduate School's Critical Dates (<http://gradcatalog.ufl.edu/graduate/academic-calendar/>) web page.
- Filing a degree application with the Office of the University Registrar by the deadline published on the Graduate School's Critical Dates (<http://gradcatalog.ufl.edu/graduate/academic-calendar/>) web page. The degree application can be accessed on ONE.UF under "My Record." Check the box "Master of Science" on the application.

Master of Science in Pharmacy (M.S.P.)^{T/N}

The College of Pharmacy offers the Master of Science in Pharmacy in Pharmaceutical Sciences. The general requirements for the Master

of Arts and the Master of Science degrees also apply to the Master of Science in Pharmacy.

For the full list of their available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSISOM>) within this catalog.

Master of Science in Statistics (M.S.Stat.)^T

The Master of Science in Statistics (M.S.Stat.) has essentially the same curricular requirements as the Master of Statistics degree.

However, students write a thesis as part of their master's degree program. Students may count up to six thesis credits (STA 6971 Master's Research) toward the master's degree. These credits can be used in place of two elective courses. Students must give copies of their theses to each member of their supervisory committee at least 10 days prior to their oral exam. The student must be registered for STA 6971 during the final semester of study. The requirements for the Master of Arts and the Master of Science degrees also apply to the Master of Science in Statistics.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSP>) within this catalog.

Master of Science in Teaching (M.S.T.)^N

The Master of Science in Teaching (M.S.T.) degree is offered by the College of Liberal Arts and Sciences in a wide array of offerings. For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSSTAT>) within this catalog.

The M.A.T. and the M.S.T. degrees combine graduate study in a discipline with selected education courses and a teaching internship, providing flexible curricula that prepare students for a variety of options, including teaching and further graduate work.

Requirements for both degrees are as follows:

- A reading knowledge of one foreign language if required by the student's major.
- Satisfactory completion of at least 36 credits while registered as a graduate student, with work distributed as follows:
- At least 18 credits in the major and 6 credits in the minor.
- Six credits in an academic unit internship in teaching (6943 Internship in College Teaching). Three years of successful teaching experience in a state-certified school may be substituted for the internship requirement, and credits thus made available may be used for further work in the major, the minor, or in education.
- At least one course selected from three or more of the following: social and/or psychological foundations of education; education technology; counselor education; special education, and community college curriculum. Other areas may be added or substituted at the discretion of the supervisory committee. These courses may be used to comprise a minor.
- Off-campus work: At least 8 to 16 credits (at the academic unit's discretion), including at least 6 credits in one term, must be earned on the Gainesville campus. Beyond that, credits earned in off-campus UF courses approved by the Graduate School are accepted if they are appropriate to the student's degree program as determined by the supervisory committee.

- The student must pass a final comprehensive examination (written, oral, or both). This examination covers the field of concentration and the minor.

At degree completion, the student needs at least 36 credits in the subject area for teaching certification purposes.

Master of Statistics (M.Stat.)^N

The Master of Statistics (M.Stat.) degree requires at least 36 credits, including at least 30 graduate credits in the major. For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSSTAT>) within this catalog.

Courses are selected in consultation with the supervisory committee chair and approved by the supervisory committee. Students must pass two examinations:

1. a first-year examination, given by a committee designated for the purpose, on material covered in statistics courses for first-year graduate students, and
2. a final oral examination consisting of a presentation by the student on a statistical topic not covered in depth in the regular coursework.

The student should consult with their adviser to choose a topic and present a written report on that topic to the supervisory committee at least 1 week before the examination date. A typical report is 8 to 10 pages. During and after the presentation, the student's committee may ask questions related to the topic of the presentation and related to other material covered in the student's program of study.

Master of Sustainable Development Practice (M.D.P.)^N

The Master of Sustainable Development Practice (M.D.P.) at the University of Florida prepares development practitioners to address development challenges in creative and dynamic ways. The UF M.D.P. integrates the academic and development pillars of natural sciences, social sciences, health sciences, and integrated management skills into a vigorous and innovative program curriculum.

The M.D.P. Degree requires 45 credits of coursework, including 24 core credits and 21 elective credits, the latter through which a student focuses on a specialization (for example, entrepreneurship, agriculture, ecotourism, gender, community forest management, nonprofits, or M&E). The M.D.P. Program is a non-thesis degree. Each student must successfully complete a set of requirements, including a summer field practicum, the development of a poster presented in a public poster session, a final practicum report approved by their committee, and a public presentation and private defense with committee members of the final report. All students will be expected to meet defined learning outcome objectives, integrating knowledge, skills, and desired professional behavior.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MSTAT>) within this catalog.

All admission and graduation requirements of the Graduate School must be met. Students are required to develop a study plan approved by the M.D.P. program Graduate Coordinator and by their supervisory committee. Please visit the M.D.P. Program website for additional information on the M.D.P. degree and curriculum <http://mdp.africa.ufl.edu/>.

Master of Urban and Regional Planning (M.U.R.P.)^T

The Department of Urban and Regional Planning offers the degree of Master of Urban and Regional Planning (M.U.R.P.). The 52-credit graduate program is usually completed in two academic years. Students with a master's degree in a related field may obtain approval from the Department to transfer up to 18 credit hours toward the 52-credit requirement. The Department encourages students with any undergraduate degree who are interested in the field of planning to apply for admission.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MDP>) within this catalog.

The M.U.R.P. degree is accredited by the Planning Accreditation Board, a joint undertaking of the American Institute of Certified Planners and the Association of Collegiate Schools of Planning, for having achieved the highest applicable standards for graduate education in the field of planning. Graduates of the Department are prepared to practice urban and regional planning.

Although the general requirements for the Master of Arts and the Master of Science degrees also apply to the above discipline-specific degrees, there are some important differences. For detailed requirements, see the Majors Section of this catalog (<https://gradcatalog.ufl.edu/graduate/programs-college/>). In addition, the Graduate School monitors the following requirements for these specialized degrees. For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#programs>) within this catalog.

Specialist in Education (Ed.S.)^N

Specialist degree requirements: An Ed.S. program develops competencies needed for a professional specialization. Specializations are offered in the School of Teaching and Learning, the School of Special Education, School Psychology, and Early Childhood Studies, and the School of Human Development and Organizational Studies in Education. Ed.S. applicants must apply and be admitted to UF's Graduate School. All work for the degree, including transferred credit, must be completed within 7 years before the degree is awarded.

The Ed.S. degree is awarded on completing a planned program with at least 72 credits beyond the bachelor's degree or at least 36 credits beyond the master's degree. All credits accepted for the program must contribute to the unity and the stated objective of the total program.

Students are tested (no more than three semesters, including the term in which the exam is completed, before graduation) by written and oral examination. A thesis is not required; however, each program includes a research component relevant to the intended profession. With the academic unit's approval, coursework taken as part of the specialist program may count toward a doctoral degree.

Students who enter the program with an appropriate master's degree from another accredited institution must complete at least 36 credits of post-master's study to meet the following requirements:

- At least 36 credits in graduate-level courses
- At least 12 credits in graduate-level professional education courses

Students who enter the program with a bachelor's degree only must (during the 72-credit program) meet these requirements in addition to the requirements of the Master of Education degree or its equivalent.

Only graduate-level (5000-7999) work earned with a grade of B or better is eligible for transfer of credit. A maximum of 15 transfer credits are allowed. These can include no more than 9 credits from institution/s approved by UF, with the balance obtained from postbaccalaureate work at UF. Credits transferred from other universities are applied toward meeting the degree requirements, but the grades earned are not computed in the student's grade point average. Acceptance of transfer of credit requires approval of the student's supervisory committee and the Dean of the Graduate School.

Petitions for transfer of credit for the Ed.S. degree must be made during the student's first term of enrollment in the Graduate School. The supervisory committee is responsible for basing acceptance of graduate transfer credits on established criteria for ensuring the academic integrity of coursework.

Students are tested (no more than 6 months before graduation) by written and oral examination. A thesis is not required; however, each program includes a research component relevant to the intended profession. With the academic unit's approval, coursework taken as part of the specialist program may count toward a doctoral degree.

For the full list of available graduate majors and concentrations, please view the Graduate Degree Table (<https://gradcatalog.ufl.edu/graduate/degrees/table/#MURP>) within this catalog.

Other Degree Combinations

All other degree combinations that involve a graduate degree as at least one component (not addressed in the above definitions) require a formal approval process through the academic units offering the degree programs and the Graduate School. The primary/home academic unit must contact the Graduate School's Student Records Unit for procedural details and deadlines. In all cases, each academic unit must submit appropriate programs of study to the Graduate School for review. Graduate School approval for participation must be obtained prior to the published Midpoint deadline of the term in which the first degree is to be awarded. Retroactive requests will not be considered. Ultimately, it is the student's responsibility to follow up with the academic units to verify that all Graduate School approvals and deadlines have been met.

Nontraditional Combination Degree Programs

Combination, joint, concurrent, and dual degree programs are specialized pathways providing academically qualified students the opportunity to enhance their educational experience and strengthen their career preparation or readiness for future academic pursuits. Please refer to the University of Florida Policy for Combination, Joint, and Dual Degrees (<http://aa.ufl.edu/media/aaufledu/policies/Combination-Joint-and-Dual-Degree-Policy-5.8.2020.pdf>) for the full policy; for additional guidance, please review the Dual Ph.D. Degrees: Principles and Policies (<https://grad.ufl.edu/media/gradufledu/pdf/dual-pp.pdf>) and International Dual Degree Program Development (<http://aa.ufl.edu/policies/academic-degree-programs/developing-programs/international-dual-degree-program/>) documents.

A **combination degree program** is one where the University of Florida awards more than one degree from an overlapping course of study. Combination degrees often allow a shorter time for completion due to the sharing of some coursework between the degree programs (these result in double-counted credits. At the University of Florida, this type of program includes any combination of undergraduate, graduate, and professional degree programs. See also Dual Degree and Joint Degree in the definitions section

of this catalog. Please also refer to the University of Florida Policy for Combination, Joint, and Dual Degrees (<http://aa.ufl.edu/media/aaufledu/policies/Combination-Joint-and-Dual-Degree-Policy-5.8.2020.pdf>) for the full policy and to the Combination Degree Programs: Principles and Policies (<https://grad.ufl.edu/media/gradufledu/pdf/combination-pp.pdf>) document for guidance.

Concurrent Graduate Programs: Any student interested in pursuing two master's degrees in two different programs or two master's degrees in the same program concurrently should discuss the proposed study with Graduate Student Records (392-4643, 116 Grinter) before applying. Written approval is needed from each academic unit and the Graduate School Dean. The student must be officially admitted to both programs through regular procedures. No more than 9 credits from the first program may be applied toward the second. Contact the academic unit(s) for details.

A **dual degree program** (also called a dual academic award) is one whereby students study at the University of Florida and at another institution, and each institution awards a separate program completion credential bearing its own name, seal, and signature.

For more information, please see Dual Ph.D. Degrees: Principles and Policies (<https://grad.ufl.edu/media/gradufledu/pdf/dual-pp.pdf>) and International Dual Degree Program Development (<http://aa.ufl.edu/policies/academic-degree-programs/developing-programs/international-dual-degree-program/>) for guidance. Refer to the University of Florida Policy for Combination, Joint, and Dual Degrees (<http://aa.ufl.edu/media/aaufledu/policies/Combination-Joint-and-Dual-Degree-Policy-5.8.2020.pdf>) for the full policy.

A **joint degree program** (or joint academic award) is one whereby students study at the University of Florida and one or more participant institutions and are awarded a single program completion credential bearing the names, seals, and signatures of each of the participant institutions. Joint programs established before January 1, 2003, may have other requirements.

Other State University System (SUS) Programs

Traveling Scholar program: By mutual agreement of the appropriate academic authorities in both the home and host institutions, traveling scholars' admission requirements are waived and their earned credits are guaranteed acceptance. Traveling scholars are normally limited to 1 term on the host campus, and it cannot be their final term. The program offers special resources on another campus that are not available on the student's home campus. To participate, graduate students need prior approval from their graduate coordinator, their supervisory committee chair, and the Dean of the Graduate School. Interested students should contact Graduate Student Records, 116 Grinter Hall.

Cooperative degree programs: In certain degree programs, faculty from other universities in the State University System hold Graduate Faculty status at UF. In those approved areas, the intellectual resources of these Graduate Faculty members are available to students at UF.

Full Expanded List of UF's Graduate Degree Programs

Degrees are listed in **bold**. Majors are listed in standard type, and *concentrations* are in *italics*. T designates the thesis/dissertation degrees, while an N designation indicates a non-thesis or a degree without a dissertation requirement.

Click the link to the right or the link to follow for the entire expanded list of all UF graduate degree offerings (<https://gradcatalog.ufl.edu/graduate/degrees/table/>).

Note

Updates to catalog pages: The information in this catalog related to the degrees listed is current as of July 2025. Please contact individual programs for additional updates. Updates to this catalog should be submitted by the academic units each term via the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>). Please also feel free to report any revisions or discrepancies via email to grad-catalog@ufl.edu. Updates are appreciated throughout the entire year.

To view all subheadings on a page and print/save the fully expanded PDF of the page, please use the print options button on the orange toolbar at the top of the page.

Definitions

Catalog year refers to the rules in effect during the first year a degree-seeking student enrolls in a program; the set of requirements a student must fulfill. If the student takes time off, then the catalog year is the academic year of readmission.

Co-major is a course of study allowing two majors for one Ph.D. degree. Each co-major must be approved by the Graduate Council.

Combination degree programs are specialized pathways that provide academically qualified students the opportunity to enhance their education experience and strengthen their career preparation or readiness for future academic pursuits. A combination degree program, sometimes referred to as a combined degree program, is one where the University of Florida awards more than one degree from an overlapping course of study. Combination degrees often allow a shorter time for completion due to the sharing of some coursework between the degree programs. At the University of Florida, this type of program includes any combination of undergraduate, graduate, and professional degree programs. Students admitted into combination degree programs normally have above-average GPAs and superior scores on the verbal, quantitative, and analytical writing portions of the GRE (if stipulated by their academic unit as an admission requirement for all candidates). Individual academic units determine whether a combination degree program is an appropriate offering, seeking approval through the Graduate Council. Please also refer to the University of Florida Policy for Combination, Joint, and Dual Degrees (<http://aa.ufl.edu/media/aaufledu/policies/Combination-Joint-and-Dual-Degree-Policy-5.8.2020.pdf>) for the full policy and to the Combination Degree Programs: Principles and Policies (<http://graduateschool.ufl.edu/media/graduate-school/pdf-files/combination-degrees-principles-policies.pdf>) document for guidance. Combination degree programs established before January 1, 2003, may have additional requirements.

Concentration is a subprogram in a major. Concentrations offered at UF are approved by the Graduate Council. The concentration, degree, and program may appear on the student transcript.

Concurrent degree program is simultaneous study on an individualized basis that leads to two master's degrees in two different graduate programs. Such a program is initiated by the student and requires prior approval of each academic unit and the Graduate School. Graduate School approval for participation in a concurrent degree program must be

obtained prior to the published midpoint deadline of the term in which the first degree is to be awarded. Retroactive requests will not be considered. Ultimately, it is the student's responsibility to follow up with the academic units to verify that all Graduate School approvals and deadlines have been met. If the student is approved to pursue two master's degrees, no more than 9 credits of course work from one degree program may be applied toward the second master's degree.

The **degree** is the title conferred by the University on completing the academic program, for example, Doctor of Philosophy. Some degrees include the name of the field of study (Master of Architecture, Master of Education). Others (Master of Arts, Master of Science) do not, while a **Program (also referred to as the major)** is the student's primary field of study. Programs offered at UF are approved by the Graduate Council, Faculty Senate, Board of Trustees, and Florida Board of Governors (specialist and doctoral degrees). The degree and program name appear on the student's transcript. Available programs and participating concentrations are identified under the degree name in the list of graduate degrees and programs on this page of the Graduate Catalog.

Dual degree program (also called a dual academic award) is one whereby students study at the University of Florida and at another institution, and each institution awards a separate program completion credential bearing its own name, seal, and signature. For more information, please see Dual Ph.D. Degrees: Principles and Policies (<http://graduateschool.ufl.edu/media/graduate-school/pdf-files/dual-degree-policy.pdf>) and International Dual Degree Program Development (<http://aa.ufl.edu/policies/academic-degree-programs/developing-programs/international-dual-degree-program/>) for guidance. Refer to the University of Florida Policy for Combination, Joint, and Dual Degrees (<http://aa.ufl.edu/media/aaufledu/policies/Combination-Joint-and-Dual-Degree-Policy-5.8.2020.pdf>) for the full policy.

Graduate certificate is a formal collection of courses that form a coherent program of study offered through an academic unit. They are certified by the college, approved by the Graduate Council, and listed on the transcript.

Graduate faculty: See Graduate Faculty Appointment Policy (<http://graduateschool.ufl.edu/media/graduate-school/pdf-files/graduate-faculty-policy.pdf>).

Joint degree program (or joint academic award) is one whereby students study at the University of Florida and one or more participant institutions and are awarded a single program completion credential bearing the names, seals, and signatures of each of the participant institutions. Joint programs established before January 1, 2003, may have other requirements.

Lockstep programs are defined as cohorts who move together in the same enrollment sequence with courses taught in a particular order, on a particular schedule. Students have no flexibility in their program or sequence, and may not drop in and out of courses independently.

Minor is a block of course work completed in any academic unit outside the major. The minor must be approved by the student's academic unit and the academic unit offering the minor. If a minor is chosen, the supervisory committee must include a representative from the minor field. A minor requires at least 6 to 15 credits depending on the degree level. The minor appears on the student's transcript along with the program name and the degree awarded.

Multi-college program is a degree program offered through more than one college.

Specialization is an informal designation used by academic units to indicate areas of research or scholarly strength, and has no formal significance. Track and emphasis are similar unofficial terms. No tracks, emphases, or specializations appear in official lists in this catalog or on the student transcript.

Supervisory Committee (thesis and dissertation degrees): All graduate degrees must have graduate faculty oversee the student's program of study and progress. For thesis and dissertation degrees, this oversight authority is accomplished by a formal committee. These committees have slightly different criteria based on the particular degree. Thesis and dissertation committees are monitored by the Graduate School as part of degree certification using information entered into the Graduate Information Management System (GIMS).

Supervisory Committee (non-thesis degrees): For non-thesis degree programs, the oversight is at the academic unit/department/college level only. Non-thesis programs may choose to have a formal committee or an alternate structure as determined by the program's graduate faculty and consistent with academic unit policies. The oversight authority will be considered as the supervisory committee. Units are able to enter their internal information into GIMS as a convenience. Regardless of degree program, any student with a minor must have the name of the graduate faculty member overseeing the minor entered into GIMS.

Graduate Degree Table

The following academic graduate degrees are available through the University of Florida Graduate School at this time. For the complete list of their accompanying graduate majors and concentrations offerings, click on the degree name or consult the full list of available programs below.

Also see the listing of graduate majors within this catalog (<https://gradcatalog.ufl.edu/graduate/programs-college/>) for hyperlinks to more information about the numerous majors and concentrations available through UF's many traditional or interdisciplinary graduate programs.

On the list below,

- Master's degrees are followed by the Specialist degree, with doctoral degrees listed last.
- **Degree names and their abbreviations** are listed in **bold**.
- Majors are listed in standard type, with *concentrations* listed in *italics* under the name of the major.
- Superscripted T = Thesis or dissertation required
- Superscripted N = Non-thesis or no dissertation required

Master's Degrees

Master of Accounting (M.Acc.)^N

- Accounting^N
 - Auditing^N
 - Taxation^N

Master of Agribusiness (M.AB.)^N

- Food and Resource Economics^N
 - Tropical Conservation and Development^N

Master of Architecture (M.Arch.)^T

- Architecture^T
 - *Historic Preservation*^T
 - *Sustainable Architecture*^T
 - *Sustainable Design*^T

Master of Arts (M.A.)^{T/N}

- Anthropology^{T/N}
 - *Historic Preservation*^{T/N}
 - *Tropical Conservation and Development*^{T/N}
- Art^T
 - *Digital Arts and Sciences*^T
- Art Education^{T/N}
- Art History^T
- Arts in Medicine^N
- Business Administration^{T/N}
 - *Marketing*^{T/N}
- Communication Sciences and Disorders^{T/N}
- Criminology, Law, and Society^{T/N}
- Digital Arts and Sciences^{T/N}
- Economics^{T/N}
 - *Econometric and Data Analysis*^N
 - *Financial Economics*^{T/N}
- English^{T/N}
- French and Francophone Studies^{T/N}
- Geography^T
 - *Applications of Geographic Technologies*^T
 - *Climate Science*
 - *Climate Science*^T
 - *Geographic Information Systems*^T
 - *Climate Science*
 - *Tropical Conservation and Development*^T
 - *Climate Science*
 - *Wetland Sciences*^T
 - *Climate Science*
- German^{T/N}
- History^{T/N}
 - *Historic Preservation*^{T/N}
 - *Jewish Studies*^{T/N}
- Latin^T
- Latin American Studies^{T/N}
 - *Tropical Conservation and Development*^{T/N}
- Linguistics^{T/N}
- Museology^T
 - *Historic Preservation*^T
- Philosophy^{T/N}
- Political Science^{T/N}
 - *Political Campaigning*^{T/N}
 - *Public Affairs*^{T/N}
 - *Tropical Conservation and Development*^{T/N}
- Political Science - International Relations^{T/N}
- Psychology^{T/N}
- Sociology^{T/N}
 - *Tropical Conservation and Development*^{T/N}

- Spanish^{T/N}
- Women's Studies^{T/N}

Master of Arts in Education (M.A.E.)^T

- Curriculum and Instruction^T
 - *Computer Science Education*^T
 - *Educational Technology*^T
 - *Media and Digital Literacy Education*
 - *Media and Digital Literacy Education*^T
 - *Teaching English as an Additional Language (K-12)*^T
- Early Childhood Education^T
- Educational Leadership^T
- Elementary Education^T
- English Education^T
 - *Media and Digital Literacy Education*^T
- Marriage and Family Counseling^T
- Mathematics Education^T
- Mental Health Counseling^T
- Program Evaluation in Educational Environments^T
- Reading Education^T
- Research and Evaluation Methodology^T
- School Counseling and Guidance^T
- School Psychology^T
- Science Education^T
- Social Studies Education^T
- Special Education^T
- Student Personnel in Higher Education^T

Master of Arts in Mass Communication (M.A.M.C.)^{T/N}

- Mass Communication^{T/N}
 - *Audience Analytics*^N
 - *Digital Journalism and Multimedia Storytelling*^N
 - *Digital Strategy*^N
 - *Global Strategic Communication*^N
 - *Political Communication*^N
 - *Professional Communication*^N
 - *Public Interest Communication*^N
 - *Public Relations*^T
 - *Public Relations and Communication Management*^N
 - *Science and Health Communication*^T
 - *Social Media*^N
 - *Web Design and Online Communication*^N

Master of Arts in Teaching (M.A.T.)^N

- Anthropology^N
 - *Tropical Conservation and Development*^N
- French and Francophone Studies^N
- Mathematics^N
- Spanish^N

Master of Business Administration (M.B.A.)^N

- Business Administration^N
 - *#Competitive Strategy*
 - *#Entrepreneurship*

- #Finance
- #Global Management
- #Graham-Buffett Security Analysis
- #Human Resource Management
- #Information Systems and Operations Management
- #International Studies
- #Latin American Business
- #Management
- #Marketing
- #Real Estate
- #Sports Administration
- #Supply Chain Management
- Business Analytics^N
 - Competitive Strategy
 - Finance
 - Human Capital
 - Marketing
 - Real Estate
 - Supply Chain Management
- Competitive Strategy^N
 - Business Analytics
 - Entrepreneurship
 - Finance
 - Global Management
 - Graham-Buffett Security Analysis
 - Human Capital
 - Human Resource Management
 - Information Systems and Operations Management
 - International Studies
 - Latin American Business
 - Management
 - Marketing
 - Real Estate
 - Sports Administration
 - Supply Chain Management
- Finance^N
 - Business Analytics
 - Competitive Strategy
 - Entrepreneurship
 - Global Management
 - Graham-Buffett Security Analysis
 - Human Capital
 - Human Resource Management
 - Information Systems and Operations Management
 - International Studies
 - Latin American Business
 - Management
 - Marketing
 - Real Estate
 - Sports Administration
 - Supply Chain Management
- Human Capital^N
- Business Analytics
- Competitive Strategy
- Entrepreneurship
- Finance
- Global Management
- Graham-Buffett Security Analysis
- Human Resource Management
- International Studies
- Latin American Business
- Management
- Marketing
- Real Estate
- Sports Administration
- Supply Chain Management
- Marketing^N
 - Business Analytics
 - Competitive Strategy
 - Entrepreneurship
 - Finance
 - Global Management
 - Graham-Buffett Security Analysis
 - Human Capital
 - Human Resource Management
 - Information Systems and Operations Management
 - International Studies
 - Latin American Business
 - Management
 - Real Estate
 - Sports Administration
 - Supply Chain Management
- Real Estate^N
 - Business Analytics
 - Competitive Strategy
 - Entrepreneurship
 - Finance
 - Global Management
 - Graham-Buffett Security Analysis
 - Human Capital
 - Human Resource Management
 - Information Systems and Operations Management
 - International Studies
 - Latin American Business
 - Management
 - Marketing
 - Sports Administration
 - Supply Chain Management
- Supply Chain Management^N
 - Business Analytics
 - Competitive Strategy
 - Finance
 - Human Capital

- *Marketing*
- *Real Estate*

Master of Construction Management (M.C.M.)^N

- Construction Management^N
 - *Hydrologic Sciences*^N

Master of Education (M.Ed.)^N

- Curriculum and Instruction^N
 - *Educational Technology*^N
 - *Teacher Leadership for School Improvement*^N
 - *Teaching English as an Additional Language (K-12)*^N
- Early Childhood Education^N
- Educational Leadership^N
- Elementary Education^N
- English Education^N
- Marriage and Family Counseling^N
- Mental Health Counseling^N
- Reading Education^N
- Research and Evaluation Methodology^N
- School Counseling and Guidance^N
- School Psychology^N
- Science Education^N
- Social Studies Education^N
- Special Education^N
- Student Personnel in Higher Education^N

Master of Engineering (M.E.)^{T/N}

- Agricultural and Biological Engineering^{T/N}
 - *Geographic Information Systems*^{T/N}
 - *Hydrologic Sciences*^{T/N}
 - *Wetland Sciences*^{T/N}
- Biomedical Engineering^{T/N}
- Chemical Engineering^{T/N}
- Civil Engineering^{T/N}
 - *Geographic Information Systems*^{T/N}
 - *Hydrologic Sciences*^{T/N}
 - *Structural Engineering*^{T/N}
 - *Transportation Leadership*^N
 - *Wetland Sciences*^{T/N}
- Coastal and Oceanographic Engineering^{T/N}
- Computer Engineering^{T/N}
- Electrical and Computer Engineering^{T/N}
- Environmental Engineering Sciences^{T/N}
 - *Geographic Information Systems*^{T/N}
 - *Hydrologic Sciences*^{T/N}
 - *Wetland Sciences*^{T/N}
- Industrial and Systems Engineering^{T/N}
 - *Data Analytics*^N
 - *Engineering Management*^N
 - *Human Systems Engineering*^N
 - *Operations Research*^N
 - *Production and Service Operations*^N

- Materials Science and Engineering^{T/N}
- Nuclear Engineering Sciences^{T/N}

Master of Fine Arts (M.F.A.)^T

- Art^T
- Creative Writing^T
- Design and Visual Communications^T
- Theatre^T

Master of Fisheries and Aquatic Sciences (M.F.A.S.)^N

- Fisheries and Aquatic Sciences^N
 - *Ecological Restoration*^N
 - *Geographic Information Systems*^N
 - *Natural Resource Policy and Administration*^N
 - *Wetland Sciences*^N

Master of Forest Resources and Conservation (M.F.R.C.)^N

- Forest Resources and Conservation^N
 - *Agroforestry*^N
 - *Ecological Restoration*^N
 - *Geographic Information Systems*^N
 - *Geomatics*^N
 - *Natural Resource Policy and Administration*^N
 - *Tropical Conservation and Development*^N
 - *Wetland Sciences*^N

Master of Health Administration (M.H.A.)^N

- Health Administration^N

Master of Health Science (M.H.S.)^N

- Environmental and Global Health^N
 - *One Health*^N

Master of Historic Preservation (M.H.P.)^T

- Historic Preservation^T

Master of Integrated Sustainable Development (M.I.S.D.)^N

- Integrated Sustainable Development^N

Master of Interior Design (M.I.D.)^T

- Interior Design^T
 - *Historic Preservation*^T
 - *Sustainable Design*^T

Master of International Business (M.I.B.)^N

- International Business^N
 - *Human Resources*^N

Master of Landscape Architecture (M.L.A.)^T

- Landscape Architecture^T
 - *Geographic Information Systems*^T
 - *Historic Preservation*^T
 - *Sustainable Design*^T
 - *Wetland Sciences*^T

Master of Latin (M.L.)^N

- Latin^N

Master of Music (M.M.)^{T/N}

- Music^T
 - Choral Conducting^T
 - Composition
 - Electronic Music
 - Ethnomusicology
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music Education
 - Music History and Literature
 - Music Theory
 - Performance
 - Piano Pedagogy
 - Sacred Music
- Composition^T
 - Choral Conducting
 - Electronic Music
 - Ethnomusicology
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music Education
 - Music History and Literature
 - Music Theory
 - Performance
 - Piano Pedagogy
- Electronic Music^T
 - Choral Conducting
 - Composition
 - Ethnomusicology
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music Education
 - Music History and Literature
 - Music Theory
 - Performance
 - Piano Pedagogy
 - Sacred Music
- Ethnomusicology^T
 - Choral Conducting
 - Composition
 - Electronic Music
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music Education
 - Music History and Literature
 - Music Theory
 - Performance
 - Piano Pedagogy
 - Sacred Music
- Instrumental Conducting^T

- Choral Conducting
- Composition
- Electronic Music
- Ethnomusicology
- Music Business and Entrepreneurship
- Music Education
- Music History and Literature
- Music Theory
- Performance
- Piano Pedagogy
- Sacred Music
- Jazz Studies^T
 - Music Business and Entrepreneurship
- Music Education^T
 - Choral Conducting
 - Composition
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music History and Literature
 - Music Theory
 - Performance
 - Sacred Music
- Music History and Literature^T
 - Choral Conducting
 - Composition
 - Electronic Music
 - Ethnomusicology
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music Education
 - Music Theory
 - Performance
 - Piano Pedagogy
 - Sacred Music
- Music Theory^T
 - Choral Conducting
 - Composition
 - Electronic Music
 - Ethnomusicology
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music Education
 - Music History and Literature
 - Performance
 - Piano Pedagogy
- Performance^T
 - Choral Conducting
 - Composition
 - Electronic Music
 - Ethnomusicology
 - Instrumental Conducting
 - Music Business and Entrepreneurship
 - Music Education

- *Music History and Literature*
 - *Music Theory*
 - *Piano Pedagogy*
 - *Sacred Music*
 - *Sacred Music*^T
 - *Choral Conducting*
 - *Composition*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music Education*
 - *Music History and Literature*
 - *Music Theory*
 - *Performance*
 - *Piano Pedagogy*
 - *Music Education*^{T/N}
 - *Choral Conducting*^{T/N}
 - *Composition*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music History and Literature*
 - *Music Theory*
 - *Performance*
 - *Piano Pedagogy*
 - *Composition*^{T/N}
 - *Choral Conducting*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music History and Literature*
 - *Music Theory*
 - *Performance*
 - *Piano Pedagogy*
 - *Electronic Music*^{T/N}
 - *Choral Conducting*
 - *Composition*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music History and Literature*
 - *Music Theory*
 - *Performance*
 - *Piano Pedagogy*
 - *Ethnomusicology*^{T/N}
 - *Choral Conducting*
 - *Composition*
 - *Electronic Music*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
- *Music History and Literature*
 - *Music Theory*
 - *Performance*
 - *Piano Pedagogy*
 - *Instrumental Conducting*^{T/N}
 - *Choral Conducting*
 - *Composition*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Music Business and Entrepreneurship*
 - *Music History and Literature*
 - *Music Theory*
 - *Performance*
 - *Piano Pedagogy*
 - *Music History and Literature*^{T/N}
 - *Choral Conducting*
 - *Composition*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music Theory*
 - *Performance*
 - *Piano Pedagogy*
 - *Music Theory*^{T/N}
 - *Choral Conducting*
 - *Composition*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music History and Literature*
 - *Performance*
 - *Piano Pedagogy*
 - *Performance*^{T/N}
 - *Choral Conducting*
 - *Composition*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music History and Literature*
 - *Music Theory*
 - *Piano Pedagogy*
 - *Sacred Music*
 - *Piano Pedagogy*^{T/N}
 - *Choral Conducting*
 - *Composition*
 - *Electronic Music*
 - *Ethnomusicology*
 - *Instrumental Conducting*
 - *Music Business and Entrepreneurship*
 - *Music History and Literature*

- Music Theory
- Performance

Master of Preventive Veterinary Medicine (M.P.V.M.)^N

- Preventive Veterinary Medicine^N

Master of Public Health (M.P.H.)^N

- Public Health^N
 - Biostatistics^N
 - Environmental Health^N
 - Epidemiology^N
 - Population Health Management^N
 - Public Health Practice^N
 - Social and Behavioral Sciences^N

Master of Science (M.S.)^{T/N}

- Aerospace Engineering^{T/N}
- Agricultural and Biological Engineering^{T/N}
 - Agroecology^{T/N}
 - Geographic Information Systems^{T/N}
 - Hydrologic Sciences^{T/N}
 - Wetland Sciences^{T/N}
- Agricultural Education and Communication^{T/N}
- Agronomy^{T/N}
 - Agroecology^{T/N}
 - Geographic Information Systems^T
 - Tropical Conservation and Development^{T/N}
- Anatomical Sciences Education^N
 - Medical Anatomy and Physiology^N
- Animal Sciences^{T/N}
 - Animal Molecular and Cellular Biology^T
 - Domestic Animal Genomics^T
 - Reproductive Biotechnology^T
- Applied Data Science^N
- Applied Physiology and Kinesiology^{T/N}
 - Biobehavioral Science^{T/N}
 - Clinical Exercise Physiology^{T/N}
 - Exercise Physiology^{T/N}
 - Human Performance^{T/N}
- Artificial Intelligence Systems^N
- Astronomy^{T/N}
- Biochemistry and Molecular Biology^T
 - Reproductive Biotechnology^T
- Biomedical Engineering^{T/N}
- Biostatistics^N
 - Biostatistical Methods and Practice^N
 - Health Data Science^N
- Botany^T
 - Tropical Conservation and Development^T
 - Wetland Sciences^T
- Business Administration^{T/N}
 - Marketing^{T/N}
 - Retailing^{T/N}
- Chemical Engineering^{T/N}
- Chemistry^{T/N}

- Civil Engineering^{T/N}
 - Geographic Information Systems^{T/N}
 - Hydrologic Sciences^{T/N}
 - Structural Engineering^{T/N}
 - Transportation Leadership^N
 - Wetland Sciences^{T/N}
- Coastal and Oceanographic Engineering^{T/N}
- Comparative Biomedical Sciences^T
- Computer Engineering^{T/N}
 - Digital Arts and Sciences^{T/N}
- Computer Science^{T/N}
- Dental Sciences^T
 - Endodontics^T
 - Operative and Esthetic Dentistry^T
 - Orthodontics^T
 - Periodontics^T
 - Prosthodontics^T
- Digital Arts and Sciences^T
- Electrical and Computer Engineering^{T/N}
- Engineering Education^{T/N}
- Entomology and Nematology^{T/N}
 - Agroecology^{T/N}
- Environmental Engineering Sciences^{T/N}
 - Geographic Information Systems^{T/N}
 - Hydrologic Sciences^{T/N}
 - Wetland Sciences^{T/N}
- Epidemiology^T
- Family, Youth and Community Sciences^{T/N}
 - Community Studies^{T/N}
 - Family and Youth Development^{T/N}
 - Nonprofit Organizational Development^{T/N}
- Finance^{T/N}
- Finance and Technology^N
- Fisheries and Aquatic Sciences^T
 - Ecological Restoration^T
 - Geographic Information Systems^T
 - Natural Resource Policy and Administration^T
 - Wetland Sciences^T
- Food and Resource Economics^{T/N}
 - Agribusiness^{T/N}
 - Tropical Conservation and Development^{T/N}
- Food Science and Human Nutrition^{T/N}
 - Nutritional Sciences^{T/N}
- Forest Resources and Conservation^{T/N}
 - Agroforestry^{T/N}
 - Ecological Restoration^{T/N}
 - Geographic Information Systems^{T/N}
 - Geomatics^{T/N}
 - Hydrologic Sciences^{T/N}
 - Natural Resource Policy and Administration^{T/N}
 - Tropical Conservation and Development^{T/N}
 - Wetland Sciences^{T/N}
- Genetics and Genomics^N
- Geography^T

- Applications of Geographic Technologies^T
 - Climate Science^T
- Climate Science^T
- Geographic Information Systems^T
 - Climate Science^T
- Hydrologic Sciences^T
 - Climate Science^T
- Tropical Conservation and Development^T
 - Climate Science^T
- Wetland Sciences^T
 - Climate Science^T
- Geology^T
 - Climate Science^T
 - Hydrologic Sciences^T
 - Climate Science^T
 - Tropical Conservation and Development^T
 - Climate Science^T
 - Wetland Sciences^T
 - Climate Science^T
- Health Education and Behavior^{T/N}
- Horticultural Sciences^{T/N}
 - Environmental Horticulture^{T/N}
 - Horticultural Sciences^{T/N}
- Industrial and Systems Engineering^{T/N}
 - Data Analytics^N
 - Engineering Management^N
 - Human Systems Engineering^N
 - Operations Research^N
 - Production and Service Operations^N
- Interdisciplinary Ecology^{T/N}
 - Agricultural and Biological Engineering^{T/N}
 - Agricultural Education and Communication^{T/N}
 - Agronomy^{T/N}
 - Anthropology^{T/N}
 - Architecture^{T/N}
 - Biochemistry and Molecular Biology^{T/N}
 - Botany^{T/N}
 - Business Administration^{T/N}
 - Chemistry^{T/N}
 - Civil Engineering^{T/N}
 - Climate Science^{T/N}
 - Coastal and Oceanographic Engineering^{T/N}
 - Economics^{T/N}
 - English^{T/N}
 - Entomology and Nematology^{T/N}
 - Environmental Engineering Sciences^{T/N}
 - Family, Youth and Community Sciences^{T/N}
 - Farming Systems^{T/N}
 - Fisheries and Aquatic Sciences^{T/N}
 - Food and Resource Economics^{T/N}
 - Food Science^{T/N}
 - Forest Resources and Conservation^{T/N}
 - Foundations of Education^{T/N}
 - Geographic Information Systems^{T/N}
- Geography^{T/N}
- Geology^{T/N}
- Health and Human Performance^{T/N}
- Horticultural Sciences^{T/N}
- Hydrologic Sciences^{T/N}
- Landscape Architecture^{T/N}
- Mathematics^{T/N}
- Microbiology and Cell Science^{T/N}
- Nuclear and Radiological Engineering^{T/N}
- Philosophy^{T/N}
- Political Science^{T/N}
- Religion^{T/N}
- Sociology^{T/N}
- Soil and Water Sciences^{T/N}
- Statistics^{T/N}
- Tropical Conservation and Development^{T/N}
- Urban and Regional Planning^{T/N}
- Veterinary Medical Sciences^{T/N}
- Wetland Sciences^{T/N}
- Wildlife Ecology And Conservation^{T/N}
- Women's/Gender Studies^{T/N}
- Zoology^{T/N}
- Management^{T/N}
 - Human Resources^{T/N}
- Materials Science and Engineering^{T/N}
- Mathematics^{T/N}
- Mechanical Engineering^{T/N}
- Medical Sciences^T
 - Biomedical Informatics^T
 - Biomedical Neuroscience^N
 - Domestic Animal Genomics^T
 - Forensic Medicine^{T/N}
 - Genetics and Genomics^T
 - Health Outcomes and Implementation Science^{T/N}
 - Innovative Aging Studies^N
 - Medical Physiology and Pharmacology
 - Medical Anatomy and Physiology^N
 - Medical Pharmacology and Toxicology^N
 - Medical Physics^{T/N}
 - Medical Physiology and Aging^N
 - Medical Anatomy and Physiology
 - Medical Physiology and Pharmacology^N
 - Reproductive Biotechnology
 - Medical Anatomy and Physiology
 - Molecular Cell Biology^T
 - Reproductive Biotechnology
 - Molecular Genetics and Microbiology^T
 - Neuroscience^T
 - Pharmacology^T
 - Reproductive Biotechnology
 - Reproductive Biotechnology^T
- Microbiology and Cell Science^T

- *Microbial and Cellular Data Science*^T
- *Microbiome in Health & Disease*^T
- Nuclear Engineering Sciences^T
- Physics^T
- Plant Pathology^T
- Psychology^T
- Real Estate^{T/N}
- Soil and Water Sciences^{T/N}
 - *Agroecology*^{T/N}
 - *Research Methods*
 - *Climate Science*^{T/N}
 - *Research Methods*
 - *Geographic Information Systems*^{T/N}
 - *Research Methods*
 - *Hydrologic Sciences*^{T/N}
 - *Research Methods*
 - *Research Methods*^T
 - *Tropical Conservation and Development*^{T/N}
 - *Research Methods*
 - *Wetland Sciences*^{T/N}
 - *Research Methods*
- Soil, Water, and Ecosystem Sciences^{T/N}
 - *Agroecology*^{T/N}
 - *Climate Science*^{T/N}
 - *Geographic Information Systems*^{T/N}
 - *Hydrologic Sciences*^{T/N}
 - *Research Methods*^T
 - *Tropical Conservation and Development*^{T/N}
 - *Wetland Sciences*^{T/N}
- Sport Management^{T/N}
 - *Historic Preservation*^{T/N}
 - *Tropical Conservation and Development*^{T/N}
- Tourism, Hospitality and Event Management^{T/N}
 - *Natural Resource Recreation*^{T/N}
 - *Tourism*^{T/N}
- Tourism and Recreation Management^{T/N}
 - *Natural Resource Recreation*^{T/N}
 - *Tourism*^{T/N}
- Urban Analytics^T
- Veterinary Medical Sciences^T
 - *Animal Molecular and Cellular Biology*^T
 - *Domestic Animal Genomics*^T
 - *Forensic Toxicology*^{T/N}
 - *Veterinary Forensic Sciences*
 - *Shelter Medicine*^{T/N}
 - *Veterinary Forensic Sciences*
 - *Veterinary Forensic Sciences*^{T/N}
- Wildlife Ecology and Conservation^{T/N}
 - *Geographic Information Systems*^{T/N}
 - *Tropical Conservation and Development*^{T/N}
 - *Wetland Sciences*^{T/N}
 - *Wildlife Forensic Sciences and Conservation*^{T/N}
- Zoology^{T/N}

- *Tropical Conservation and Development*^{T/N}
- *Wetland Sciences*^{T/N}

Master of Science in Architectural Studies (M.S.A.S.)^T

- Architecture^T
 - *Historic Preservation*^T
 - *Sustainable Architecture*^T
 - *Sustainable Design*^T
 - *Themed Environments Integration*^T

Master of Science in Business Analytics (M.S.B.A.)^N

- Business Analytics^N

Master of Science in Construction Management (M.S.C.M.)^T

- Construction Management^T
 - *Hydrologic Sciences*^T

Master of Science in Entrepreneurship (M.S.E.)^N

- Entrepreneurship^N

Master of Science in Fire and Emergency Sciences (M.S.F.E.S.)^N

- Fire and Emergency Sciences^N

Master of Science in Information Systems and Operations Management (M.S.I.S.O.M.)^N

- Information Systems and Operations Management^N
 - *Business Analytics*^N
 - *Data Science*^N
 - *Information Technology*^N
 - *Supply Chain Management*^N

Master of Science in Pharmacy (M.S.P.)^{T/N}

- Pharmaceutical Sciences^{T/N}
 - *Clinical Pharmaceutical Sciences*^{T/N}
 - *Clinical Pharmacogenomics and Precision Medicine*^{T/N}
 - *Clinical Toxicology*^{T/N}
 - *Drug Development and Optimized Pharmacotherapy*^N
 - *Forensic DNA and Serology*^{T/N}
 - *Forensic Drug Chemistry*^{T/N}
 - *Forensic Science*^{T/N}
 - *Individualized Medicine*^{T/N}
 - *Medication Therapy Management*^{T/N}
 - *Medicinal Chemistry*^{T/N}
 - *Personalized Medicine*^{T/N}
 - *Pharmaceutical Chemistry*^{T/N}
 - *Pharmaceutical Outcomes and Policy*^{T/N}
 - *Pharmaceutics*^{T/N}
 - *Pharmacodynamics*^{T/N}

Master of Science in Statistics (M.S.Stat.)^T

- Statistics^T

Master of Science in Teaching (M.S.T.)^N

- Astronomy^N
- Botany^N
 - Tropical Conservation and Development^N
 - Wetland Sciences^N
- Chemistry^N
- Geology^N
 - Climate Science^N
 - Tropical Conservation and Development^N
 - Climate Science
 - Wetland Sciences^N
 - Climate Science
- Mathematics^N
- Physics^N
- Zoology^N
 - Tropical Conservation and Development^N
 - Wetland Sciences^N

Master of Statistics (M.Stat.)^N

- Statistics^N

Master of Sustainable Development Practice (M.D.P.)^N

- Sustainable Development Practice^N
 - Climate Science^N

Master of Urban and Regional Planning (M.U.R.P.)^T

- Urban and Regional Planning^T
 - Geographic Information Systems^T
 - Historic Preservation^T
 - Sustainable Design^T
 - Tropical Conservation and Development^T
 - Wetland Sciences^T

Specialist Degree

Specialist in Education (Ed.S.)^N

- Curriculum and Instruction^N
 - Educational Technology^N
 - Teacher Leadership for School Improvement^N
- Educational Leadership^N
- Marriage and Family Counseling^N
- Mental Health Counseling^N
- School Counseling and Guidance^N
- School Psychology^N
- Special Education^N

Doctoral Degrees

Doctor of Audiology (Au.D.)^N

- Audiology^N

Doctor of Education (Ed.D.)^T

- Counseling and Counselor Education^T
 - Marriage and Family Counseling^T
 - Mental Health Counseling^T
 - School Counseling and Guidance^T
- Curriculum and Instruction^T

- Computer Science Education^T
- Critical Study of Race, Ethnicity and Culture In Education^T
- Educational Technology^T
- Languages and Literacies in Education^T
- Teachers, Schools, & Society^T
- Educational Leadership^T
 - Educational Policy^T
- Higher Education Administration^T
 - Educational Policy^T
- Research and Evaluation Methodology^T
- School Psychology^T
- Special Education^T

Doctor of Musical Arts (D.M.A.)^N

- Music^N
 - Choral Conducting^N
 - Composition^N
 - Instrumental Conducting^N
 - Performance^N

Doctor of Philosophy (Ph.D.)^T

- Aerospace Engineering^T
 - Clinical and Translational Science^T
- Agricultural and Biological Engineering^T
 - Geographic Information Systems^T
 - Global Systems Agroecology^T
 - Hydrologic Sciences^T
 - Wetland Sciences^T
- Agricultural Education and Communication^T
- Agronomy^T
 - Global Systems Agroecology^T
 - Toxicology^T
 - Tropical Conservation and Development^T
- Anatomical Sciences Education^T
- Animal Molecular and Cellular Biology^T
 - Domestic Animal Genomics^T
 - Reproductive Biotechnology^T
- Animal Sciences^T
 - Animal Molecular and Cellular Biology^T
 - Domestic Animal Genomics
 - Domestic Animal Genomics^T
 - Reproductive Biotechnology^T
- Anthropology^T
 - Clinical and Translational Science^T
 - Historic Preservation^T
 - Tropical Conservation and Development^T
 - Women's/Gender Studies^T
- Art History^T
- Astronomy^T
- Biomedical Engineering^T
 - Clinical and Translational Science^T
- Biostatistics^T
- Botany^T
 - Tropical Conservation and Development^T
 - Wetland Sciences^T

- Business Administration^T
 - Accounting^T
 - Finance^T
 - Information Systems and Operations Management^T
 - Insurance^T
 - Management^T
 - Marketing^T
 - Quantitative Finance^T
 - Real Estate and Urban Analysis^T
- Chemical Engineering^T
- Chemistry^T
 - Clinical and Translational Science^T
 - Imaging Science and Technology^T
- Civil Engineering^T
 - Hydrologic Sciences^T
 - Wetland Sciences^T
- Classical Studies^T
- Coastal and Oceanographic Engineering^T
- Communication Sciences and Disorders^T
- Comparative Biomedical Sciences^T
- Computer Engineering^T
- Computer Science^T
- Counseling and Counselor Education^T
 - Marriage and Family Counseling^T
 - Mental Health Counseling^T
 - School Counseling and Guidance^T
- Counseling Psychology^T
- Criminology, Law, and Society^T
- Curriculum and Instruction^T
 - Critical Study of Race, Ethnicity and Culture In Education^T
 - Educational Technology^T
 - Critical Study of Race, Ethnicity and Culture In Education
 - Languages and Literacies in Education^T
 - Critical Study of Race, Ethnicity and Culture In Education
 - Science Education^T
 - Critical Study of Race, Ethnicity and Culture In Education
 - Teachers, Schools, & Society^T
 - Critical Study of Race, Ethnicity and Culture In Education
- Design, Construction and Planning^T
 - Architecture^T
 - Construction Management^T
 - Geographic Information Systems
 - Hydrologic Sciences
 - Geographic Information Systems^T
 - Historic Preservation^T
 - Geographic Information Systems
 - Hydrologic Sciences^T
 - Interior Design^T
 - Geographic Information Systems
 - Landscape Architecture^T
 - Geographic Information Systems
 - Urban and Regional Planning^T
 - Geographic Information Systems
- Economics^T
- Educational Leadership^T
- Educational Policy^T
- Electrical and Computer Engineering^T
 - Clinical and Translational Science^T
- Engineering Education^T
- English^T
- Entomology and Nematology^T
 - Global Systems Agroecology^T
- Environmental Engineering Sciences^T
 - Clinical and Translational Science^T
 - Geographic Information Systems^T
 - Hydrologic Sciences^T
 - Wetland Sciences^T
- Epidemiology^T
 - Cancer Epidemiology^T
 - Data Sciences Epidemiology
 - Genetic Epidemiology
 - Gero-Epidemiology
 - Infectious Disease Epidemiology
 - Psychiatric Epidemiology
 - Clinical and Translational Science^T
 - Cancer Epidemiology
 - Data Sciences Epidemiology
 - Genetic Epidemiology
 - Gero-Epidemiology
 - Infectious Disease Epidemiology
 - Psychiatric Epidemiology
 - Data Sciences Epidemiology^T
 - Genetic Epidemiology^T
 - Cancer Epidemiology
 - Data Sciences Epidemiology
 - Gero-Epidemiology
 - Infectious Disease Epidemiology
 - Psychiatric Epidemiology
 - Gero-Epidemiology^T
 - Cancer Epidemiology
 - Data Sciences Epidemiology
 - Genetic Epidemiology
 - Infectious Disease Epidemiology
 - Psychiatric Epidemiology
 - Infectious Disease Epidemiology^T
 - Cancer Epidemiology
 - Data Sciences Epidemiology
 - Genetic Epidemiology
 - Gero-Epidemiology
 - Psychiatric Epidemiology
 - Psychiatric Epidemiology^T
 - Cancer Epidemiology
 - Data Sciences Epidemiology
 - Genetic Epidemiology
 - Gero-Epidemiology
 - Infectious Disease Epidemiology
- Fisheries and Aquatic Sciences^T
 - Ecological Restoration^T
 - Geographic Information Systems^T

- *Natural Resource Policy and Administration*^T
- *Wetland Sciences*^T
- Food and Resource Economics^T
 - *Tropical Conservation and Development*^T
- Food Science^T
 - *Toxicology*^T
- Forest Resources and Conservation^T
 - *Agroforestry*^T
 - *Ecological Restoration*^T
 - *Geographic Information Systems*^T
 - *Geomatics*^T
 - *Hydrologic Sciences*^T
 - *Natural Resource Policy and Administration*^T
 - *Toxicology*^T
 - *Tropical Conservation and Development*^T
 - *Wetland Sciences*^T
- Genetics and Genomics^T
 - *Clinical and Translational Science*^T
 - *Domestic Animal Genomics*^T
- Geography^T
 - *Climate Science*^T
 - *Geographic Information Systems*^T
 - *Climate Science*
 - *Hydrologic Sciences*
 - *Hydrologic Sciences*^T
 - *Climate Science*
 - *Tropical Conservation and Development*^T
 - *Climate Science*
 - *Wetland Sciences*^T
 - *Climate Science*
- Geology^T
 - *Climate Science*^T
 - *Hydrologic Sciences*^T
 - *Climate Science*
 - *Tropical Conservation and Development*^T
 - *Climate Science*
 - *Wetland Sciences*^T
 - *Climate Science*
- Health and Human Performance^T
 - *Biobehavioral Science*^T
 - *Clinical and Translational Science*
 - *Clinical and Translational Science*^T
 - *Exercise Physiology*^T
 - *Clinical and Translational Science*
 - *Health Behavior*^T
 - *Clinical and Translational Science*
 - *Historic Preservation*^T
 - *Recreation, Parks and Tourism*^T
 - *Sport Management*^T
 - *Tourism, Hospitality, and Event Management*^T
- Higher Education Administration^T
 - *Educational Policy*^T
- History^T
 - *Historic Preservation*^T
 - *Women's/Gender Studies*^T
- Horticultural Sciences^T
 - *Environmental Horticulture*^T
 - *Horticultural Sciences*^T
 - *Toxicology*^T
- Human-Centered Computing^T
- Industrial and Systems Engineering^T
 - *Quantitative Finance*^T
- Interdisciplinary Ecology^T
 - *Agricultural and Biological Engineering*^T
 - *Agricultural Education and Communication*^T
 - *Agronomy*^T
 - *Anthropology*^T
 - *Architecture*^T
 - *Biochemistry and Molecular Biology*^T
 - *Botany*^T
 - *Business Administration*^T
 - *Chemistry*^T
 - *Civil Engineering*^T
 - *Climate Science*^T
 - *Coastal and Oceanographic Engineering*^T
 - *Economics*^T
 - *English*^T
 - *Entomology and Nematology*^T
 - *Environmental Engineering Sciences*^T
 - *Family, Youth and Community Sciences*^T
 - *Farming Systems*^T
 - *Fisheries and Aquatic Sciences*^T
 - *Food and Resource Economics*^T
 - *Food Science*^T
 - *Forest Resources and Conservation*^T
 - *Foundations of Education*^T
 - *Geographic Information Systems*^T
 - *Geography*^T
 - *Geology*^T
 - *Global Systems Agroecology*^T
 - *Health and Human Performance*^T
 - *Horticultural Sciences*^T
 - *Hydrologic Sciences*^T
 - *Landscape Architecture*^T
 - *Mathematics*^T
 - *Microbiology and Cell Science*^T
 - *Nuclear and Radiological Engineering*^T
 - *Philosophy*^T
 - *Political Science*^T
 - *Religion*^T
 - *Sociology*^T
 - *Soil and Water Sciences*^T
 - *Statistics*^T
 - *Tropical Conservation and Development*^T
 - *Urban and Regional Planning*^T
 - *Veterinary Medical Sciences*^T
 - *Wetland Sciences*^T
 - *Wildlife Ecology And Conservation*^T

- Women's/Gender Studies^T
- Zoology^T
- Linguistics^T
- Mass Communication^T
 - Clinical and Translational Science^T
- Materials Science and Engineering^T
 - Clinical and Translational Science^T
- Mathematics^T
 - Clinical and Translational Science^T
- Mechanical Engineering^T
 - Clinical and Translational Science^T
- Medical Sciences^T
 - Biochemistry and Molecular Biology^T
 - Clinical and Translational Science
 - Health Outcomes and Policy
 - Health Outcomes and Implementation Science
 - Reproductive Biotechnology
 - Biomedical Informatics^T
 - Cancer Biology^T
 - Clinical and Translational Science
 - Clinical and Translational Science^T
 - Health Outcomes and Implementation Science
 - Domestic Animal Genomics^T
 - Genetics^T
 - Cancer Biology
 - Clinical and Translational Science
 - Health Outcomes and Implementation Science
 - Health Outcomes and Policy
 - Health Outcomes and Implementation Science^T
 - Clinical and Translational Science
 - Imaging Science and Technology^T
 - Immunology and Microbiology^T
 - Clinical and Translational Science
 - Health Outcomes and Policy
 - Health Outcomes and Implementation Science
 - Reproductive Biotechnology
 - Medical Physics^T
 - Molecular Cell Biology^T
 - Clinical and Translational Science
 - Health Outcomes and Policy
 - Health Outcomes and Implementation Science
 - Reproductive Biotechnology
 - Neuroscience^T
 - Clinical and Translational Science
 - Health Outcomes and Policy
 - Health Outcomes and Implementation Science
 - Pharmacology and Therapeutics^T
 - Clinical and Translational Science
 - Reproductive Biotechnology
 - Physiology and Aging^T
 - Clinical and Translational Science
 - Reproductive Biotechnology
 - Physiology and Functional Genomics^T
 - Clinical and Translational Science
 - Reproductive Biotechnology
- Reproductive Biotechnology^T
- Toxicology^T
- Microbiology and Cell Science^T
 - Microbial and Cellular Data Science^T
 - Toxicology^T
- Music^T
 - Composition^T
 - Music History and Literature^T
- Music Education^T
- Nuclear Engineering Sciences^T
 - Imaging Science and Technology^T
- Nursing Sciences^T
 - Clinical and Translational Science^T
- Nutritional Sciences^T
 - Clinical and Translational Science^T
- Pharmaceutical Sciences^T
 - Clinical and Translational Science^T
 - Clinical Pharmaceutical Sciences^T
 - Clinical and Translational Science
 - Medicinal Chemistry^T
 - Clinical and Translational Science
 - Toxicology
 - Pharmaceutical Outcomes and Policy^T
 - Clinical and Translational Science
 - Pharmaceutics^T
 - Clinical and Translational Science
 - Pharmacodynamics^T
 - Clinical and Translational Science
- Philosophy^T
 - Ethics of Technology^T
- Physics^T
 - Imaging Science and Technology^T
- Plant Breeding^T
- Plant Molecular and Cellular Biology^T
 - Toxicology^T
- Plant Pathology^T
 - Toxicology^T
- Political Science^T
 - Educational Policy^T
 - Tropical Conservation and Development^T
- Psychology^T
 - Clinical and Health Psychology^T
 - Clinical and Translational Science
 - Clinical and Translational Science^T
 - Clinical and Health Psychology
 - Women's/Gender Studies^T
- Public Health^T
 - Environmental Health^T
 - Clinical and Translational Science
 - Health Services Research^T
 - Clinical and Translational Science
 - One Health^T
 - Clinical and Translational Science
 - Social and Behavioral Sciences^T
 - Clinical and Translational Science
- Rehabilitation Science^T

- *Clinical and Translational Science*^T
- *Communication and Swallowing Sciences and Disorders*^T
- *Disability, Health, and Participation*^T
- *Neuromuscular Plasticity*^T
- Research and Evaluation Methodology^T
- Romance Languages^T
 - *French and Francophone Studies*^T
 - *Spanish*^T
- School Psychology^T
 - *Early Childhood Studies*^T
- Sociology^T
 - *Clinical and Translational Science*^T
 - *Tropical Conservation and Development*^T
 - *Clinical and Translational Science*
 - *Women's/Gender Studies*^T
 - *Clinical and Translational Science*
- Soil and Water Sciences^T
 - *Climate Science*^T
 - *Geographic Information Systems*^T
 - *Global Systems Agroecology*^T
 - *Hydrologic Sciences*^T
 - *Tropical Conservation and Development*^T
 - *Wetland Sciences*^T
- Soil, Water, and Ecosystem Sciences^T
 - *Climate Science*^T
 - *Geographic Information Systems*^T
 - *Global Systems Agroecology*^T
 - *Hydrologic Sciences*^T
 - *Tropical Conservation and Development*^T
 - *Wetland Sciences*^T
- Special Education^T
 - *Clinical and Translational Science*^T
 - *Early Childhood Studies*^T
 - *Clinical and Translational Science*
- Statistics^T
 - *Quantitative Finance*^T
- Veterinary Medical Sciences^T
 - *Animal Molecular and Cellular Biology*^T
 - *Clinical and Translational Science*^T
 - *Domestic Animal Genomics*^T
 - *Toxicology*^T
- Wildlife Ecology and Conservation^T
 - *Geographic Information Systems*^T
 - *Tropical Conservation and Development*^T
 - *Wetland Sciences*^T
- Youth Development and Family Sciences^T
 - *Clinical and Translational Science*^T
- Zoology^T
 - *Animal Molecular and Cellular Biology*^T
 - *Tropical Conservation and Development*^T
 - *Wetland Sciences*^T

Doctor of Plant Medicine (D.P.M.)^N

- Plant Medicine^N
 - *Tropical Conservation and Development*^N

Graduate Faculty

Appointment to the Graduate Faculty

All faculty members who serve on supervisory committees or direct master's theses and doctoral dissertations must first be appointed to the Graduate Faculty. University of Florida faculty members who are appointed to full-time faculty positions in tenured or tenure-accruing positions are appointed to the Graduate Faculty as a matter of course, shortly after the time of their appointment to the university faculty. For all others, a graduate degree program's academic unit nominates faculty members for appointment to the Graduate Faculty. Nominations must be approved by the Department Chair/Director, the College Dean, and a vote of the current graduate faculty members in the nominating unit. The appointment is formally made by the Graduate Dean. The academic unit determines the level of duties for each Graduate Faculty member, though it is expected that all Graduate Faculty members should be available and willing to serve as external members of doctoral dissertation committees throughout the University of Florida.

Below, one can find the current list of Graduate Faculty Members. For information regarding the organization and governance of the UF Graduate School, please visit <https://gradcatalog.ufl.edu/graduate/school/>

A

Aaron, Jessica Elana
Associate Professor

Aaron, Jessica Elana
Associate Professor
Spanish and Portuguese Studies

Aaron, Tiffany S.
Assistant Professor
Human Development and Organizational Studies in Education

Abd-Elrahman, Amr H.
Professor

Abd-Elrahman, Amr H.
Professor
Forest, Fisheries, & Geomatics Sciences

Abdollahi Biron, Zoleikha
Assistant Professor
Electrical and Computer Engineering

Abdulhameed, Nader Farhan
Clinical Associate Professor

Abil, Zhanar
Assistant Professor

Abil, Zhanar
Assistant Professor
Biology

Abisambra, Jose Francisco
Associate Professor

Abisambra, Jose Francisco
Associate Professor
Neuroscience

Abraczinskas, Michelle
Assistant Professor
Family, Youth and Community Sciences

Abranches, Jacqueline
Associate Professor

Abranches, Jacqueline
Associate Professor
Oral Biology

Abreu, Roberto L.
Associate Professor
Psychology

Abu Arqub, Sarah H.
Clinical Assistant Professor

Abu-Rustum, Reem S.
Clinical Professor

Acevedo Torres, Miguel A.
Assistant Professor

Acevedo Torres, Miguel A.
Assistant Professor
Wildlife Ecology and Conservation

Adams, Alison Eve
Associate Professor

Adams, Alison Eve
Associate Professor
Agricultural and Life Sciences

Adams, Alyson Joyce
Clinical Professor
Teaching and Learning

Adams, Carrie R.
Associate Professor

Adams, Carrie R.
Associate Professor
Environmental Horticulture

Adams, Damian
Professor

Adams, Damian
Professor
Forest, Fisheries, & Geomatics Sciences

Adams, George
Assistant Professor
Music

Adams, Henry
Assistant Professor

Mathematics

Adams, Jonathan
Assistant Professor
Economics

Adams, Olivia Rose
Assistant Professor
Gender, Sexualities, and Women's Studies

Adams, Peter N.
Professor

Adams, Peter N.
Professor
Geological Sciences

Adams, Sean P.
Professor
History

Adams, Thomasenia L.
Professor
Teaching and Learning

Adesogan, Adegbola Tolulope
Professor

Adesogan, Adegbola Tolulope
Professor
Animal Sciences

Adin, Christopher A.
Professor
Veterinary Medicine

Adin, Darcy Brittain
Clinical Professor
Veterinary Medicine

Adler, Jeffrey S.
Professor
History

Adolphs, Max
Assistant Professor
Applied Physiology and Kinesiology

Agapaki, Evangelia
Assistant Professor

Agapaki, Evangelia
Assistant Professor
Construction Management

Agarwal, Nithin K.
Associate Engineer
Civil and Coastal Engineering

Agehara, Shinsuke
Associate Professor
Horticultural Sciences

Aguilar, Maria L.
Clinical Professor

Aguirre, Jose I.

Associate Professor

Aherne, Michael
Clinical Assistant Professor
Veterinary Medicine

Ahlberg, Jaime
Associate Professor
Philosophy

Ahlgren, Joslyn Korrin
Master Lecturer
Applied Physiology and Kinesiology

Ahmed, Mustafa Mohammed
Professor

Ahmed, Mustafa Mohammed
Professor
Medicine

Ahn, Jaehyun
Assistant Professor
Agricultural Education and Communication

Ahn, Sang-Joon
Research Associate Scientist

Ahn, Sang-Joon
Research Associate Scientist
Oral Biology

Ahn, Soohyoun
Lecturer
Food Science and Human Nutrition

Aifantis, Katerina Elias
Associate Professor
Mechanical and Aerospace Engineering

Ainsworth, Robert M.
Assistant Professor
Economics

Aitkaliyeva, Assel
Associate Professor

Aitkaliyeva, Assel
Associate Professor
Materials Science and Engineering

Aitsahlia, Farid
Clinical Associate Professor
Finance, Insurance and Real Estate

Akcali, Elif
Associate Professor
Industrial and Systems Engineering

Akinyemi, Akintunde
Professor
Language, Literature and Culture

Akpan, Celestine L.
Associate Professor
English

Akyapi, Berkay
Clinical Assistant Professor
Information Systems and Operations Management

Al Mardini, Mamoun Tawfiq Hashim
Assistant Professor

Al Mardini, Mamoun Tawfiq Hashim
Assistant Professor
Health Outcomes and Biomedical Informatics

Al-Ani, Mohammad Ahmad Zaki
Clinical Assistant Professor

Alacevich, Caterina
Research Assistant Professor
Health Outcomes and Biomedical Informatics

Alakshendra, Abhinav
Associate Professor

Alakshendra, Abhinav
Associate Professor
Urban and Regional Planning

Alappattu, Meryl J.
Research Associate Professor

Alappattu, Meryl J.
Research Associate Professor
Physical Therapy

Alarian, Hannah M.
Assistant Professor
Political Science

Alba, Joseph W.
Distinguished Professor
Marketing

Alborn, Hans T.
Courtesy Professor
Entomology and Nematology

Albrecht, Ute
Associate Professor
Horticultural Sciences

Aldrich, Jane V.
Professor
Medicinal Chemistry

Aleksion Madrzak, Natalia D.
Professor
History

Alexander, Amanda B.
Clinical Associate Professor
Veterinary Medicine

Alferez, Fernando Miguel
Associate Professor
Horticultural Sciences

Ali, Afsar
Research Associate Professor

Ali, Afsar
Research Associate Professor
Public Health and Health Professions

Alladi, Krishnaswami
Professor
Mathematics

Allan, Sandra A.
Courtesy Professor

Allen, Jessica Lynn
Assistant Professor

Allen, Jessica Lynn
Assistant Professor
Mechanical and Aerospace Engineering

Allen, Josephine
Professor

Allen, Josephine
Professor
Materials Science and Engineering

Allen, Kyle
Professor
Biomedical Engineering

Allen, Micheal S.
Professor

Allen, Micheal S.
Professor
Fisheries and Aquatic Sciences

Allen, William L.
Associate Professor

Alli, Abdel
Associate Professor

Alli, Abdel
Associate Professor
Physiology and Aging (IDP)

Allison, Andrew J.
Assistant Professor
Veterinary Medicine

Almeyda Zambrano, Angelica Maria
Research Assistant Scientist
Latin American Studies

Alread, Jason Scott
Professor
Architecture

Altieri, Andrew H.
Assistant Professor

Altieri, Andrew H.
Assistant Professor
Environmental Engineering Sciences

Altmeyer, Timothy
Associate Professor

Theatre and Dance

Alto, Barry Wilmer
Associate Professor
Entomology and Nematology

Altpeter, Fredy
Professor

Altpeter, Fredy
Professor
Agronomy

Alvarez-Castro, Luis
Professor

Alvarez-Castro, Luis
Professor
Spanish and Portuguese Studies

Alvina, Karina A.
Research Assistant Professor

Alvina, Karina A.
Research Assistant Professor
Neuroscience

Alwisy, Aladdin
Assistant Professor

Alwisy, Aladdin
Assistant Professor
Design, Construction and Planning

Amberson, Deborah
Associate Professor
Language, Literature and Culture

Amini, Leo Hamed
Associate Professor
Industrial and Systems Engineering

Amoko, Apollo Obonyo
Associate Professor
English

Ampatzidis, Ioannis
Associate Professor
Agricultural and Biological Engineering

Anderson, Thomas Moylan
Assistant Professor
Food and Resource Economics

Anderson, Benjamin D.
Assistant Professor
Environmental and Global Health

Anderson, James L.
Professor
Food and Resource Economics

Anderson, Leslie Elin
Professor

Anderson, Leslie Elin
Professor

Political Science

Anderson, Travis J.
Professor
Chemical Engineering

Andrade, Jeanette Mary
Assistant Professor

Andrade, Jeanette Mary
Assistant Professor
Food Science and Human Nutrition

Andrade, Juan Emilio
Associate Professor

Andrade, Juan Emilio
Associate Professor
Food Science and Human Nutrition

Andreu, Michael G.
Associate Professor

Andreu, Michael G.
Associate Professor
Forest, Fisheries, & Geomatics Sciences

Andrew, Jennifer
Professor

Andrew, Jennifer
Professor
Materials Science and Engineering

Andrews, Allison Miche
Associate Professor

Andrews, Allison Miche
Associate Professor
Pathology, Immunology and Laboratory Medicine

Andrews, Jeffrey J.
Assistant Professor
Physics

Angelini, Thomas Ettor
Professor

Angelini, Thomas Ettor
Professor
Mechanical and Aerospace Engineering

Angerhofer, Alexander
Professor
Chemistry

Angle, Jay Scott
Professor
Soil, Water, and Ecosystem Sciences

Annable, Michael D.
Professor

Annable, Michael D.
Professor
Environmental Engineering Sciences

Antes, Theresa A.
Associate Professor

Antes, Theresa A.
Associate Professor
Language, Literature and Culture

Anthony, Christopher James
Associate Professor
Special Education, School Psychology and Early Childhood Studies

Anthony, Lisa
Associate Professor
Computer and Information Science and Engineering

Anton, Stephen D.
Professor

Anton, Stephen D.
Professor
Physiology and Aging (IDP)

Antonelli, Joseph L.
Assistant Professor
Statistics

Antonelli, Patrick J.
Professor

Antonelli, Patrick J.
Professor
Communication Sciences and Disorders

Antonenko, Pavlo
Professor
Teaching and Learning

Anumba, Chinemelu J.
Professor

Anumba, Chinemelu J.
Professor
Construction Management

Aponick, Aaron
Professor
Chemistry

Applebaum, Jennifer W.
Assistant Professor

Applebaum, Jennifer W.
Assistant Professor
Environmental and Global Health

Arakawa, Mariko Jasmin
Associate Professor
Music

Arakere, Nagaraj Keshavamurthy
Professor
Mechanical and Aerospace Engineering

Ardelt, Monika
Professor
Sociology and Criminology & Law

Arfi, Badredine
Professor
Political Science

Arias, Francesca
Assistant Professor
Clinical and Health Psychology

Aris, John Phillip
Associate Professor

Aris, John Phillip
Associate Professor
Anatomy and Cell Biology

Armaghani, Bahar A.
Senior Lecturer
Construction Management

Armstrong, Melissa Jo
Professor

Arnold, David P.
Professor
Electrical and Computer Engineering

Arreola, Manuel Munoz
Clinical Assistant Professor

Arthington, John David
Professor
Animal Sciences

Artz, Mark Edward
Clinical Assistant Professor

Asadi Zanjani, Navid
Associate Professor
Electrical and Computer Engineering

Asare, Stephen K.
Professor
Accounting

Asche, Frank
Professor

Asche, Frank
Professor
Forest, Fisheries, & Geomatics Sciences

Ash, Kevin D.
Assistant Professor

Ash, Kevin D.
Assistant Professor
Geography

Ashkanazi, Glenn Steven
Clinical Associate Professor
Clinical and Health Psychology

Asken, Breton M.
Assistant Professor
Clinical and Health Psychology

Athienitis, Demetris

Senior Lecturer
Statistics

Atkinson, Mark A.
Eminent Scholar

Atkinson, Mark A.
Eminent Scholar
Pathology, Immunology and Laboratory Medicine

Austin, James D.
Professor

Austin, James D.
Professor
Fisheries and Aquatic Sciences

Austin, Sharon Denise
Professor
Political Science

Averesch, Nils Jonathan Helmuth
Assistant Professor
Microbiology and Cell Science

Aytug, Haldun
Professor
Information Systems and Operations Management

Azad, Hassan
Assistant Professor

Azad, Hassan
Assistant Professor
Design, Construction and Planning

Azeredo, Francine Johansson
Research Assistant Professor
Pharmaceutics

B

Babaeian, Ebrahim
Assistant Professor
Soil, Water, and Ecosystem Sciences

Babajani-Feremi, Abbas
Associate Professor

Babanikos, James
Professor
Journalism and Communications

Babar, Md Ali
Associate Professor

Babar, Md Ali
Associate Professor
Agronomy

Bacher, Rhonda Leigh
Associate Professor

Bacher, Rhonda Leigh
Associate Professor
Public Health and Health Professions

Baciak, James Edward
Professor

Baciak, James Edward
Professor
Nuclear and Radiological Engineering

Bacon, Allan
Assistant Professor

Bacon, Allan
Assistant Professor
Soil, Water, and Ecosystem Sciences

Bae, Jaehan
Assistant Professor
Astronomy

Baer, Charles
Professor

Baer, Charles
Professor
Biology

Bahder, Brian W.
Associate Professor
Entomology and Nematology

Bai, Jinhe
Courtesy Assistant Professor
Horticultural Sciences

Bai, Xiaofei
Assistant Professor

Bai, Xiaofei
Assistant Professor
Genetics (IDP)

Baiser, Benjamin H.
Associate Professor

Baiser, Benjamin H.
Associate Professor
Wildlife Ecology and Conservation

Baisley, Amie N.
Lecturer
Engineering Education

Baker, Terrell T.
Professor
Forest, Fisheries, & Geomatics Sciences

Baker, Bridget Brewer
Research Assistant Professor
Wildlife Ecology and Conservation

Baker, Lauri May
Associate Professor
Agricultural Education and Communication

Baker, Shirley M.
Professor

Baker, Shirley M.

Professor
Fisheries and Aquatic Sciences

Baker, Tracie R.
Associate Professor

Baker, Tracie R.
Associate Professor
Environmental and Global Health

Balachandar, Sivaramakrishnan
Distinguished Professor
Mechanical and Aerospace Engineering

Balaguera-Reina, Sergio
Research Assistant Scientist

Balaguera-Reina, Sergio
Research Assistant Scientist
Wildlife Ecology and Conservation

Baldwin, Rebecca W.
Associate Professor
Entomology and Nematology

Ballard, Sarah
Assistant Professor
Astronomy

Balmant, Kelly Mayrink
Assistant Professor
Horticultural Sciences

Balser, Walter F.
Clinical Assistant Professor
Human Development and Organizational Studies in Education

Bambauer, Jane
Eminent Scholar
Journalism and Communications

Bandyopadhyay, Subhajyoti
Professor
Information Systems and Operations Management

Banerjee, Arunava
Associate Professor
Computer and Information Science and Engineering

Baquero Melo, Jairo
Assistant Professor
Latin American Studies

Barbazuk, William Bradley
Professor

Barbazuk, William Bradley
Professor
Biology

Barmpoutis, Angelos
Associate Professor
Digital Worlds

Barnard, Alison M.
Research Assistant Professor

Barnard, Alison M.
Research Assistant Professor
Public Health and Health Professions

Barnes, Riche J Daniel
Associate Professor

Barnes, Riche J Daniel
Associate Professor
Liberal Arts and Sciences

Barnett, Cynthia Lynn
Senior Lecturer

Barreto, Izabella Lipnharski
Clinical Associate Professor

Barry, Debra Marie-Hope
Assistant Professor

Barry, Debra Marie-Hope
Assistant Professor
Agricultural and Life Sciences

Barry, Savanna C.
Other

Barry, Savanna C.
Other
Forest, Fisheries, & Geomatics Sciences

Bartels, Wendy Lin
Research Assistant Scientist

Bartels, Wendy Lin
Research Assistant Scientist
Forest, Fisheries, & Geomatics Sciences

Bartlett, Rodney J.
Graduate Research Professor
Chemistry

Bartley, Emily Jo
Assistant Professor

Bartley, Emily Jo
Assistant Professor
Dentistry

Barton, Elisabeth R.
Professor

Barton, Elisabeth R.
Professor
Applied Physiology and Kinesiology

Bartos, Imre
Associate Professor
Physics

Bartosova, Dana
Associate Professor
Mathematics

Baruzzi, Carolina
Assistant Professor

Baruzzi, Carolina
Assistant Professor
Wildlife Ecology and Conservation

Basler, Paul D.
Professor
Music

Basset, Gilles J.
Associate Professor

Basset, Gilles J.
Associate Professor
Horticultural Sciences

Basso, Kari B.
Scientist
Chemistry

Batista Dubeux, Jose Carlos
Professor

Batista Dubeux, Jose Carlos
Professor
Agronomy

Batistel, Fernanda
Assistant Professor
Animal Sciences

Batuman, Ozgur
Associate Professor
Plant Pathology

Bauck, Anje G.
Clinical Assistant Professor

Bauer, William
Professor
Music

Baweja, Vandana
Associate Professor

Baweja, Vandana
Associate Professor
Architecture

Bayabil, Haimanote Kebede
Associate Professor

Bayabil, Haimanote Kebede
Associate Professor
Agricultural and Biological Engineering

Bayer, Allison
Associate Professor

Bayer, Allison
Associate Professor
Pathology, Immunology and Laboratory Medicine

Baysal, Can
Assistant Professor
Horticultural Sciences

Bean, Eban Zachary

Associate Professor

Bean, Eban Zachary
Associate Professor
Agricultural and Biological Engineering

Beattie, Peyton Nicole
Assistant Professor
Agricultural Education and Communication

Beatty, Garrett Freeman
Lecturer
Applied Physiology and Kinesiology

Beatty, Norman Laurence
Clinical Assistant Professor

Beau De Rochars, Valery E.
Research Assistant Professor

Beau De Rochars, Valery E.
Research Assistant Professor
Health Services Research, Management, and Policy

Bechtel, Sandra Marie
Associate Professor
Veterinary Medicine

Becker, Torben Kim
Clinical Associate Professor

Becker, Torben Kim
Clinical Associate Professor
Medicine

Beckett, Blake Mickle
Clinical Assistant Professor
Teaching and Learning

Beddor, Robert
Assistant Professor
Philosophy

Bedenbaugh, Michelle N.
Assistant Professor

Bedenbaugh, Michelle N.
Assistant Professor
Neuroscience

Behdad, Sara
Associate Professor
Environmental Engineering Sciences

Behm, Anthea Christina
Associate Professor
Art and Art History

Behringer, Donald Charles
Professor

Behringer, Donald Charles
Professor
Fisheries and Aquatic Sciences

Bejleri, Ilir

Research Associate Professor

Bejleri, Ilir
Research Associate Professor
Urban and Regional Planning

Belletti, Gabriele
Assistant Professor
Language, Literature and Culture

Belton, Stephen Clair
Associate Professor
Architecture

Bender, Stephen D.
Lecturer
Architecture

Bendixen, Marion M.
Assistant Professor
Nursing

Beneciuk, Jason M.
Research Assistant Professor

Beneciuk, Jason M.
Research Assistant Professor
Physical Therapy

Benge, Matthew Paul
Associate Professor
Agricultural Education and Communication

Benos, Panagiotis
Professor

Benos, Panagiotis
Professor
Epidemiology

Benson, Keith
Clinical Professor

Benson, Keith
Clinical Professor
Health Services Research, Management, and Policy

Berceli, Scott A.
Professor

Berceli, Scott A.
Professor
Medicine

Berkovich, Alexander
Professor
Mathematics

Bernhard, Michael H.
Eminent Scholar
Political Science

Bernier, Angelina Valladares
Associate Professor

Bernstein, Seth Franklin
Associate Professor

History

Berry, Meredith S.
Assistant Professor

Berry, Meredith S.
Assistant Professor
Health Education and Behavior

Bertran, Judit
Assistant Professor
Veterinary Medicine

Berube, Sophie Christine
Assistant Professor
Biostatistics

Best, Cora M.
Assistant Professor

Best, Cora M.
Assistant Professor
Food Science and Human Nutrition

Bet, Carlos German
Assistant Professor

Bet, Carlos German
Assistant Professor
Economics

Beucher, Colleen
Assistant Professor
Music

Beuzelin, Julien M.
Associate Professor
Entomology and Nematology

Bhadha, Jehangir
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Vyas, Diwakar
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Waddell, Thomas F.
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Wagner, Hubert
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Mathematics

Waisome, Jeremy Alexis Magruder
Assistant Professor

Waisome, Jeremy Alexis Magruder
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Walden, Heather D.
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Special Education, School Psychology and Early Childhood Studies

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Walker, Ashby Farmer
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Health Services Research, Management, and Policy

Walker, Robert T.
Professor

Walker, Robert T.
Professor
Geography

Wall, Nathalie A.
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Wall, Nathalie A.
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Materials Science and Engineering

Wallace, Margaret R.
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Wallace, Margaret R.
Professor
Molecular Genetics and Microbiology

Wallet, Shannon Margaret
Professor

Wallet, Shannon Margaret
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Oral Biology

Wallis, Neill Jansen
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Walsh-Childers, Kimberly B.
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Geography

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Wang, Baolian
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Wang, Chaofeng
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Assistant Professor
Design, Construction and Planning

Wang, Chunmei
Assistant Professor
Mathematics

Wang, Danxin
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Pharmacotherapy and Translational Research

Wang, Dengjun
Assistant Professor
Agricultural and Biological Engineering

Wang, Eric Tzy-Shi
Professor

Wang, Eric Tzy-Shi
Professor
Molecular Genetics and Microbiology

Wang, Gary P.
Professor

Wang, Gary P.
Professor

Medicine

Wang, Hongwu
Assistant Professor

Wang, Hongwu
Assistant Professor
Occupational Therapy

Wang, Jianping
Professor

Wang, Jianping
Professor
Agronomy

Wang, Jinping
Assistant Professor
Journalism and Communications

Wang, Lixia
Clinical Assistant Professor
Biostatistics

Wang, Mo
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Management

Wang, Nian
Eminent Scholar

Wang, Nian
Eminent Scholar
Microbiology and Cell Science

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Wang, Richard G.
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Wang, Shenhao
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Wang, Shenhao
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Urban and Regional Planning

Wang, Shifeng
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Wang, Shuo
Professor
Electrical and Computer Engineering

Wang, Xin
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Microbiology and Cell Science

Wang, Xu

Assistant Professor

Wang, Xu
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Agricultural and Biological Engineering

Wang, Yan
Assistant Professor

Wang, Yan
Assistant Professor
Urban and Regional Planning

Wang, Yan
Associate Professor
Epidemiology

Wang, Yao-Chin
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Tourism, Hospitality & Event Management

Wang, Ying
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Wang, Ying
Associate Professor
Plant Pathology

Wang, Yu
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Food Science and Human Nutrition

Wang, Yuxuan
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Wang, Zhe
Professor

Wang, Zhe
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Computer and Information Science and Engineering

Wang, Zheng
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Wang, Zheng
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Warren, Brandon Lee
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Pharmacodynamics

Warren, Lori Kay
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Animal Sciences

Washburn, Scott Stuart
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Washington, Elizabeth Anne
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Wass, Peter James
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Waters, Gifford J.
Assistant Professor
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Watkins, John M.
Associate Professor
Music

Watson, Jonathan A.
Assistant Professor
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Watson, Justin C.
Associate Professor

Watson, Justin C.
Associate Professor
Materials Science and Engineering

Watson, Maria Katherine
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Watson, Maria Katherine
Assistant Professor
Construction Management

Watt, Mary A.
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Watt, Mary A.
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Language, Literature and Culture

Waxenberg, Lori B.
Clinical Professor

Clinical and Health Psychology

Waybright, David Allen
Professor
Music

Wayland, Ratree
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Linguistics

Wayne, Marta L.
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Biology

Weaver, Jason F.
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Webster, Gregory Daniel
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English

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Chemistry

Wei-LaPierre, Lan
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Applied Physiology and Kinesiology

Weiner, Irving David
Professor

Weiner, Irving David
Professor
Medicine

Weisberg, Steven M.
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Psychology

Weisbrod, Tatiana
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Wellehan, James F.
Professor
Veterinary Medicine

Wells, Houston A.
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Wells, Randall Stewart

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Wells, Randall Stewart
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Welt, Bruce Ari
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Weltman-Aron, Brigitte
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Weltman-Aron, Brigitte
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Wen, Tony Soo-Tung
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Wen, Yixin
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Wheeler, Gregory S.

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Whisler, Yan G.
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Whitaker, Vance M.
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White, Ethan P.
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White, Ethan P.
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White, Frank F.
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Xing, Chengguo
Professor

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Xu, Heng
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Xu, Siyao
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Xue, BingKan
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Biology

Yan, Xiang
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Yang, Di
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Yang, Huiping
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Yang, Huiping
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Yang, Lijun
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Yang, Lijun
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Yang, Yang
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Marketing

Yang, Yang
Courtesy Professor
Biostatistics

Yang, Yong
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Yang, Yong
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Nuclear and Radiological Engineering

Yang, Yu
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Industrial and Systems Engineering

Yanong, Roy P.
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Yanong, Roy P.
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Fisheries and Aquatic Sciences

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Yao, Zepeng
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Yu, Xiao
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Yu, Ziwen
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Yue, Feng
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Zajac-Kaye, Maria
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Anatomy and Cell Biology

Zapletal, Jindrich

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Zarrinpar, Ali
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Zawahry, Iman Kamal
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Chemistry

Zeng, Lin
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Oral Biology

Zeng, Yong
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Chemistry

Zhang, Boce
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Food Science and Human Nutrition

Zhang, Fan
Assistant Professor

Zhang, Fan
Assistant Professor
Pharmaceutics

Zhang, Lei
Associate Professor
Mathematics

Zhang, Nan
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Management

Zhang, Rong
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Computer and Information Science and Engineering

Zhang, Sai
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Epidemiology

Zhang, Shouan
Professor
Plant Pathology

Zhang, Weizhou
Professor

Zhang, Weizhou
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Pathology, Immunology and Laboratory Medicine

Zhang, Xiaoguang
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Physics

Zhang, Xiao-Xiao

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Zhang, Xumin
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Zhang, Yawei
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Zhao, Chen
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Zhao, Chen
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Zhao, Xin
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Zhao, Xin
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Horticultural Sciences

Zheng, Guangrong
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Zhong, Xiang
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Industrial and Systems Engineering

Zhou, Anne Q.

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Psychology

Zhou, Juannan
Assistant Professor
Biology

Zhou, Lei
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Zhou, Liang
Professor

Zhou, Liang
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Zhuang, Yilin
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Zhuang, Yilin
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Zimmerman, Andrew R.
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Geological Sciences

Zimmermann, Ellen Mary
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Zori, Roberto T.

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Zori, Roberto T.

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Zotarelli, Lincoln

Professor

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Zou, Hui

Professor

Zou, Hui

Professor

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Zou, Jian

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Zou, Tianxin

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Marketing

Zsembik, Barbara Ann

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Zubcevic, Jasenka

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Zucker, Alyssa N.

Professor

Gender, Sexualities, and Women's Studies

Graduate Majors by College

Below is the full list of graduate majors available through the University of Florida's Graduate School. Clicking on the major's name in the list below will take you to the program's information pages in this catalog. For a full list of graduate degrees offered (including concentrations), please also visit the list of available graduate degree offerings (<https://gradcatalog.ufl.edu/graduate/degrees/table/>) within this catalog.

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Note

For information about **the colleges and departments**, visit <https://gradcatalog.ufl.edu/graduate/colleges-departments/>.

Printing/saving a catalog page to PDF: To expand all subheadings on a page and to print/save the fully expanded page, use the print to PDF options button on the orange toolbar at the top of each page.

Catalog updates: Please report any revisions or discrepancies via email to grad-catalog@ufl.edu. Updates are very much appreciated.

Graduate School Academic Calendars

Spring 2025 GRADUATE SCHOOL CALENDAR

December 2024

Date	Hour	Event
December 4, Wednesday	5:00 p.m.	Deadline for requesting transfer of credit (for spring degree candidates)

January 2025

Date	Hour	Event
January 10, Friday	5:00 p.m.	Last day for thesis and dissertation students to clear prior to the spring semester with the Graduate School Editorial Office—visit https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/) for more information
	11:59 p.m.	Registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 1/10/25)
January 13, Monday		Classes start
		Drop/add starts
		Late registration starts
January 17, Friday	11:59 p.m.	Drop/add ends
		Late registration ends. (Late fee assessed.)
		Deadline to withdraw with no fee liability
January 20, Monday, Martin Luther King Jr. Day		No classes
January 24, Friday	3:30 p.m.	Fee payment deadline
	11:59 pm	Residency reclassification deadline for receiving requests and all documents
January 31, Friday	5:00 p.m.	Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme

February 2025

Date	Hour	Event
February 7, Friday	11:59 pm	Degree application deadline for degree award this term https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/) https://one.ufl.edu
	11:59 pm	Deadline to withdraw all courses with 25% refund (W symbol assigned) https://registrar.ufl.edu/services/withdrawal.html
February 12, Wednesday	5:00 p.m.	Last day to submit Transmittal Letter and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for review by Graduate School Editorial Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
February 26, Wednesday	11:59 pm	Midpoint of Term
		Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants
		Late degree application deadline for degree award this term https://registrar.ufl.edu/services/degreeapp.html

March 2025

Date	Hour	Event
March 7, Friday		Master's Thesis First Submission Deadline: Last day to submit successfully defended master's thesis for review by Graduate School Editorial Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
		Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students
		Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)
March 15-22, Saturday-Saturday, Spring Break		No classes

April 2025

Date	Hour	Event
April 4, Friday	5:00 p.m.	Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project, and project-in-lieu-of-thesis students https://grad.ufl.edu/media/gradufledu/pdf/checklist-graduation.pdf
		Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students

Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)

		Deadline for thesis and dissertation students to submit final pdf document for review by the Graduate School Editorial Office in order to qualify for degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/) https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
	11:59 p.m.	Deadline for pending grades and current term enrollment for all degree applicants to be finalized
April 11, Friday	11:59 p.m.	Drop Deadline (W assigned to individual course(s). Drops of individual courses must be approved by the student's college).
		Last day to withdraw (all courses) via ONE.UF without failing grades https://registrar.ufl.edu/services/withdrawal.html
April 23, Wednesday		Classes end
	5:00 pm	Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Editorial Office to remain eligible for a degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/)
		Deadline for requesting transfer of credit (for summer degree candidates)
	11:59 pm	Last day to drop a course and receive W on transcript via College petition to the Registrar
		Last day to withdraw (all courses) without failing grades via College petition to the Registrar
April 24-25, Thursday-Friday		Examination reading days (no classes)
April 26-May 2 Saturday-Friday		Final examinations

May 2025

Date	Hour	Event
May 2-4, Friday-Sunday		Commencement Ceremonies
		See commencement schedule for specific dates: https://commencement.ufl.edu/ ¹
May 5, Monday	12:00 noon	Final term grades are due
May 6, Tuesday		Degree certification

May 7, Wednesday Unofficial transcripts with grades and remarks are available via ONE.UF

¹Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at [https:// \(https://www commencement.ufl.edu/\)](https://www commencement.ufl.edu/) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

SUMMER 2025 GRADUATE SCHOOL CALENDAR

April 2025

Date	Hour	Event
April 23, Wednesday	5:00 p.m.	Deadline for requesting transfer of credit (for summer degree candidates)

May 2025

Date	Hour	Event
May 9, Friday	5:00 p.m.	Last day for thesis and dissertation students to clear prior to the summer semester with the Graduate School Editorial Office https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/)
	11:59 p.m.	Summer A & C registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 5/9/25)
May 12, Monday		Summer A & C classes start
		Summer A & C drop/add starts
		Summer A & C late registration starts (Late fee assessed)
May 13, Tuesday	11:59 p.m.	Summer A & C late registration ends (Late fee assessed)
		Summer A & C drop/add ends
		Summer A & C deadline to drop or withdraw with no fee liability
May 21, Wednesday	5:00 p.m.	Summer A Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme
	11:59 p.m.	Summer A deadline to withdraw (all courses) with 25% refund (W symbol assigned) https://registrar.ufl.edu/services/withdrawal.html
May 23, Friday	3:30 p.m.	Summer A & C fee payment deadline
	11:59 p.m.	Summer A & C residency reclassification deadline for receiving the request and all documents
May 26, Monday, Memorial Day		No classes

May 30, Friday	5:00 pm	Summer C Deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme
	11:59 p.m.	Summer C deadline to withdraw all courses with 25% refund (W symbol assigned) https://registrar.ufl.edu/services/withdrawal.html

June 2025

Date	Hour	Event
June 13, Friday	5:00 p.m.	Last day to submit Transmittal Letters and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for initial review by Graduate School Editorial Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
	11:59 p.m.	Last day to drop or withdraw (all courses) via ONE.UF for Summer A without failing grades https://registrar.ufl.edu/services/withdrawal.html
June 19, Thursday, Juneteenth		Holiday
June 20, Friday		Summer A classes end
		Summer A final examinations during regular class periods
	11:59 pm	Last day to drop a course and receive W on transcript for Summer A term via College petition to the Registrar
		Last day to withdraw (all courses) without failing grades for Summer A term via College petition to the Registrar
June 23, Monday	12:00 p.m.	Summer A final term grades are due
June 23-27, Monday-Friday, Summer Break		No classes
June 25, Wednesday		Final grades viewable via ONE.UF for Summer A courses (choose Student Self Service > My Online Services > Transcripts)
June 27, Friday	11:59 pm	Summer B Registration (Late registration fee assessed after 11:59 p.m., 6/27/25)
June 30, Monday		Summer B classes start
		Summer B drop/add starts
		Summer B late registration starts (Late registration fee assessed)

July 2025

Date	Hour	Event
July 1, Tuesday	11:59 p.m.	Summer B drop/add ends
		Summer B late registration ends (Late fee assessed)

		Summer B deadline to drop or withdraw with no fee liability
July 2, Wednesday	11:59 p.m.	Midpoint of Summer Term, tentative
		Summer B/C degree application deadline—no exceptions will be granted after this date https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/) https://one.ufl.edu Choose Student Self Service > My Record > Certificate/Degree Application
		Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants
July 4, Friday, Independence Day		No classes
July 9, Wednesday	5:00 pm	Summer B deadline for Graduate Student Records to review/approve S/U Option Application for courses with this grading scheme
	11:59 p.m.	Summer B deadline to withdraw all courses with 25% refund (W symbol assigned): https://registrar.ufl.edu/services/withdrawal.html
July 11, Friday	3:30 p.m.	Summer B fee payment deadline
	5:00 p.m.	Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students
		Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)
		Last day to submit successfully defended master's thesis via GIMS (the Graduate Information Management System) for intended review by the Graduate School Editorial Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
	11:59 pm	Summer B residency reclassification deadline for receiving the request and all documents
July 25, Friday	5:00 p.m.	Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project and project-in-lieu-of-thesis students https://grad.ufl.edu/media/gradufledu/pdf/checklist-graduation.pdf
		Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students
		Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)

Deadline for thesis and dissertation students to submit their final pdf document via GIMS (the Graduate Information Management System) for review by the Graduate School Editorial Office in order to qualify for degree award this term. No exceptions can be granted. <https://grad.ufl.edu/academics/editorial/etd-dates> (<https://grad.ufl.edu/academics/editorial/etd-dates/>) <https://grad.ufl.edu/academics/editorial/etd-tools> (<https://grad.ufl.edu/academics/editorial/etd-tools/>)

August 2025

Date	Hour	Event
August 1, Friday	11:59 p.m.	Last day to drop or withdraw (all courses) for Summer B or Summer C via ONE.UF without failing grades http://www.registrar.ufl.edu/currents/withdraw.html
August 7, Thursday	5:00 p.m.	Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Editorial Office to remain eligible for a degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
August 8, Friday		Summer B and C classes end
		Final examinations are during regular class periods
	11:59 pm	Last day to drop a course and receive W on transcript for Summer B or Summer C via College petition to the Registrar
		Last day to withdraw (all courses) without failing grades for Summer B or Summer C via College petition to the Registrar
		Deadline for requesting transfer of credit (for fall degree candidates)
August 8-9, Friday-Saturday		Commencement Ceremonies
		See commencement schedule for specific dates: https://commencement.ufl.edu/ ¹
August 11, Monday	12:00 noon	Summer B and C final term grades are due
August 12, Tuesday		Degree certification
August 13, Wednesday		Unofficial transcripts with grades and remarks are available via ONE.UF

¹ **Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at [https://](https://www.commencement.ufl.edu/) ([https://](https://www.commencement.ufl.edu/)) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.**

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

Fall 2025 GRADUATE SCHOOL CALENDAR

August 2025

Date	Hour	Event
August 1, Friday	5:00 p.m.	Deadline for requesting transfer of credit (for fall degree candidates)
August 20, Wednesday	5:00 p.m.	Last day for thesis and dissertation students to clear prior to the fall semester with the Graduate School Thesis, Dissertation, and Publication Office. See https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/) for more information
	11:59 p.m.	Registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 8/20/25)
August 21, Thursday		Classes start
		Drop/add starts
		Late registration starts (Late fee assessed for registrations occurring after 11:59 p.m., 8/20/25)
August 27, Wednesday	11:59 p.m.	Drop/add ends
		Late registration ends (Late fee assessed)
		Deadline to withdraw with no fee liability

September 2025

Date	Hour	Event
September 1, Monday, Labor Day		No classes
September 5, Friday	3:30 p.m.	Fee payment deadline
	5:00 p.m.	Deadline for Graduate Student Academic Career Tracking to review/approve S/U Option Application for courses with this grading scheme
	11:59 p.m.	Residency reclassification deadline for receiving the request and all documents
September 12, Friday	11:59 p.m.	Deadline to withdraw with 25% refund (W symbol assigned) https://registrar.ufl.edu/services/withdrawal.html
	11:59 p.m.	Degree application deadline for degree award this term https://one.ufl.edu/
September 30, Tuesday	5:00 p.m.	Last day to submit Transmittal Letter and doctoral dissertation for initial review by the Graduate School Thesis, Dissertation, and Publication Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)

October 2025

Date	Hour	Event
October 14, Tuesday	11:59 p.m.	Midpoint of Term

		Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants
		Late degree application deadline for degree award this term http://www.registrar.ufl.edu/currents/latdegreeinfo.html
October 17 Friday, Homecoming		No classes
October 28, Tuesday	5:00 p.m.	Last day to submit successfully defended master's thesis for review by the Graduate School Thesis, Dissertation, and Publication Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
		Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students
		Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)

November 2025

Date	Hour	Event
November 11, Tuesday, Veterans Day		No classes
November 17, Monday	11:59 p.m.	Drop Deadline (W assigned to individual course(s). Drops of individual courses must be approved by the student's college.)
		Last day to withdraw (all courses) without failing grades via ONE.UF https://registrar.ufl.edu/services/withdrawal.html
		Deadline for pending grades and current term enrollment for all degree applicants to be finalized
November 18, Tuesday	5:00 p.m.	Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project and project-in-lieu-of-thesis students https://grad.ufl.edu/media/gradufl.edu/pdf/checklist-graduation.pdf
		Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students
		Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)

	Deadline for thesis and dissertation students to submit final pdf document for review by the Graduate School Thesis, Dissertation, and Publication Office in order to qualify for degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/) https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
November 24-29, Monday-Saturday, Thanksgiving	No classes

December 2025

Date	Hour	Event
December 1, Monday	5:00 p.m.	Deadline for Conditional or Special Admission Petitions for Spring 2025 applicants to be submitted to the Graduate School. https://grad.ufl.edu/work/petition (https://grad.ufl.edu/work/petition/)
December 3, Wednesday		Classes end
		Deadline for requesting transfer of credit (for spring degree candidates)
	11:59 pm	Last day to drop a course and receive a W on the transcript via College petition to the Registrar
		Last day to withdraw (all courses) without failing grades via College petition to the Registrar
December 4-5, Thursday-Friday		Examination reading days (no classes)
December 6-12, Saturday-Friday		Final examinations
December 9, Tuesday	5:00 p.m.	Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Thesis, Dissertation, and Publication Office to remain eligible for a degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/)
December 12-13, Friday-Saturday		Commencement Ceremonies ¹
		See commencement schedule for specific dates: https://commencement.ufl.edu/
December 15, Monday	12:00 noon	Final term grades are due
December 16, Tuesday		Degree certification

December 17, Wednesday	Unofficial transcripts with grades and remarks available via ONE.UF

¹Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at <https://www.commencement.ufl.edu/> (<https://www.commencement.ufl.edu/>) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

Spring 2026 GRADUATE SCHOOL CALENDAR

December 2025

Date	Hour	Event
December 3, Wednesday	5:00 p.m.	Deadline for requesting transfer of credit (for spring degree candidates)

January 2026

Date	Hour	Event
January 9, Friday	5:00 p.m.	Last day for thesis and dissertation students to clear prior to the spring semester with the Graduate School Thesis, Dissertation, and Publication Office—visit https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/) for more information
	11:59 p.m.	Registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 1/9/26)
January 12, Monday		Classes start
		Drop/add starts
		Late registration starts
January 16, Friday	11:59 p.m.	Drop/add ends
		Late registration ends. (Late fee assessed.)
		Deadline to withdraw with no fee liability
January 19, Monday, Martin Luther King Jr. Day		No classes
January 23, Friday	3:30 p.m.	Fee payment deadline
	11:59 pm	Residency reclassification deadline for receiving requests and all documents
January 30, Friday	5:00 p.m.	Deadline for Graduate Student Academic Career Tracking to review/approve S/U Option Application for courses with this grading scheme

February 2026

Date	Hour	Event
February 6, Friday	11:59 pm	Degree application deadline for degree award this term https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/) https://one.ufl.edu
	11:59 pm	Deadline to withdraw all courses with 25% refund (W symbol assigned) https://registrar.ufl.edu/services/withdrawal.html
February 17, Tuesday	5:00 p.m.	Last day to submit Transmittal Letter and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for review by the Graduate School Thesis, Dissertation, and Publication Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
February 25, Wednesday	11:59 pm	Midpoint of Term
		Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants
		Late degree application deadline for degree award this term https://registrar.ufl.edu/services/degreeapp.html

March 2026

Date	Hour	Event
March 10, Tuesday		Master's Thesis First Submission Deadline: Last day to submit successfully defended master's thesis for review by the Graduate School Thesis, Dissertation, and Publication Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
		Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students
		Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)
March 14-21, Saturday-Saturday, Spring Break		No classes
March 31, Tuesday	5:00 p.m.	Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project, and project-in-lieu-of-thesis students https://grad.ufl.edu/media/gradufledu/pdf/checklist-graduation.pdf
		Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students

Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)

Deadline for thesis and dissertation students to submit final pdf document for review by the Graduate School Thesis, Dissertation, and Publication Office in order to qualify for degree award this term. No exceptions can be granted. <https://grad.ufl.edu/academics/editorial/etd-dates> (<https://grad.ufl.edu/academics/editorial/etd-dates/>) <https://grad.ufl.edu/academics/editorial/etd-tools> (<https://grad.ufl.edu/academics/editorial/etd-tools/>)

April 2026

Date	Hour	Event
April 10, Friday	11:59 p.m.	Deadline for pending grades and current term enrollment for all degree applicants to be finalized
		Drop Deadline (W assigned to individual course(s). Drops of individual courses must be approved by the student's college).
		Last day to withdraw (all courses) via ONE.UF without failing grades https://registrar.ufl.edu/services/withdrawal.html
April 21, Tuesday	5:00 pm	Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School Editorial Office to remain eligible for a degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/)
April 22, Wednesday		Classes end
		Deadline for requesting transfer of credit (for summer degree candidates)
	11:59 pm	Last day to drop a course and receive W on transcript via College petition to the Registrar
		Last day to withdraw (all courses) without failing grades via College petition to the Registrar
April 23-24, Thursday-Friday		Examination reading days (no classes)
April 25-May 1, Saturday-Friday		Final examinations

May 2026

Date	Hour	Event
May 1-3, Friday-Sunday		Commencement Ceremonies
		See commencement schedule for specific dates: https://commencement.ufl.edu/ ¹

May 4, Monday	12:00 noon	Final term grades are due
May 5, Tuesday		Degree certification
May 6, Wednesday		Unofficial transcripts with grades and remarks are available via ONE.UF

¹Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at [https:// \(https://www commencement.ufl.edu/\)](https://www commencement.ufl.edu/) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

SUMMER 2026 GRADUATE SCHOOL CALENDAR

April 2026

Date	Hour	Event
April 22, Wednesday	5:00 p.m.	Deadline for requesting transfer of credit (for summer degree candidates)

May 2026

Date	Hour	Event
May 8, Friday	5:00 p.m.	Last day for thesis and dissertation students to clear prior to the summer semester with the Graduate School Thesis, Dissertation, and Publication Office https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/)
	11:59 p.m.	Summer A & C registration deadline (Late fee assessed for registrations occurring after 11:59 p.m., 5/8/26)
May 11, Monday		Summer A & C classes start
		Summer A & C drop/add starts
		Summer A & C late registration starts (Late fee assessed)
May 12, Tuesday	11:59 p.m.	Summer A & C late registration ends (Late fee assessed)
		Summer A & C drop/add ends
		Summer A & C deadline to drop or withdraw with no fee liability
May 20, Wednesday	5:00 p.m.	Summer A Deadline for Graduate Student Academic Career Tracking to review/approve S/U Option Application for courses with this grading scheme
	11:59 p.m.	Summer A deadline to withdraw (all courses) with 25% refund (W symbol assigned) https://registrar.ufl.edu/services/withdrawal.html
May 22, Friday	3:30 p.m.	Summer A & C fee payment deadline

	11:59 p.m.	Summer A & C residency reclassification deadline for receiving the request and all documents
May 25, Monday, Memorial Day		No classes
May 29, Friday	5:00 pm	Summer C Deadline for Graduate Student Academic Career Tracking to review/approve S/U Option Application for courses with this grading scheme
	11:59 p.m.	Summer C deadline to withdraw all courses with 25% refund (W symbol assigned) https://registrar.ufl.edu/services/withdrawal.html

June 2026

Date	Hour	Event
June 12, Friday	11:59 p.m.	Last day to drop or withdraw (all courses) via ONE.UF for Summer A without failing grades https://registrar.ufl.edu/services/withdrawal.html
June 16, Tuesday	5:00 p.m.	Last day to submit Transmittal Letters and doctoral dissertation pdf documents via GIMS (the Graduate Information Management System) for initial review by the Graduate School Thesis, Dissertation, and Publication Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
June 18, Thursday		Summer A classes end
		Summer A final examinations during regular class periods
	11:59 pm	Last day to drop a course and receive W on transcript for Summer A term via College petition to the Registrar
		Last day to withdraw (all courses) without failing grades for Summer A term via College petition to the Registrar
June 19, Thursday, Juneteenth		Holiday – No classes
June 22, Monday	12:00 p.m.	Summer A final term grades are due
June 22-26, Monday-Friday, Summer Break		No classes
June 24, Wednesday		Final grades viewable via ONE.UF for Summer A courses (choose Student Self Service > My Online Services > Transcripts)
June 26, Friday	11:59 pm	Summer B Registration (Late registration fee assessed after 11:59 p.m., 6/26/26)
June 29, Monday		Summer B classes start
		Summer B drop/add starts
		Summer B late registration starts (Late registration fee assessed)

June 30, Tuesday	11:59 p.m.	Summer B drop/add ends
		Summer B late registration ends (Late fee assessed)
		Summer B deadline to drop or withdraw with no fee liability

July 2026

Date	Hour	Event
July 1, Wednesday	11:59 p.m.	Midpoint of Summer Term, tentative
		Summer B/C degree application deadline—no exceptions will be granted after this date https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/) https://one.ufl.edu Choose Student Self Service > My Record > Certificate/Degree Application
		Deadline to finalize all data (except Final Exam) in SIS (the Student Information System) for all degree applicants
July 3, Friday, Independence Day (Observed)		No classes
July 8, Wednesday	5:00 pm	Summer B deadline for Graduate Student Academic Career Tracking to review/approve S/U Option Application for courses with this grading scheme
	11:59 p.m.	Summer B deadline to withdraw all courses with 25% refund (W symbol assigned): https://registrar.ufl.edu/services/withdrawal.html
July 7, Tuesday	5:00 p.m.	Deadline for final exam milestone to be completed in SIS (the Student Information System) for thesis students
		Deadline for thesis students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)
		Last day to submit successfully defended master's thesis via GIMS (the Graduate Information Management System) for intended review by the Graduate School Editorial Office https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
July 10, Friday	3:30 p.m.	Summer B fee payment deadline
	11:59 pm	Summer B residency reclassification deadline for receiving the request and all documents
July 21, Tuesday	5:00 p.m.	Deadline for final exam milestone to be completed in SIS (the Student Information System) for dissertation, non-thesis, project and project-in-lieu-of-thesis students https://grad.ufl.edu/media/gradufl.edu/pdf/checklist-graduation.pdf
		Deadline for ETD Signature Pages to be posted in GIMS (the Graduate Information Management System) for thesis and dissertation students

		Deadline for doctoral dissertation students to submit the UF Publishing Agreement in GIMS (the Graduate Information Management System)
		Deadline for thesis and dissertation students to submit their final pdf document via GIMS (the Graduate Information Management System) for review by the Graduate School Thesis, Dissertation, and Publication Office in order to qualify for degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-dates (https://grad.ufl.edu/academics/editorial/etd-dates/) https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
July 31, Friday	11:59 p.m.	Last day to drop or withdraw (all courses) for Summer B or Summer C via ONE.UF without failing grades http://www.registrar.ufl.edu/currents/withdraw.html

August 2026

Date	Hour	Event
August 6, Thursday	5:00 p.m.	Deadline for thesis and dissertation students to receive confirmation of Final Clearance status with the Graduate School EThesis, Dissertation, and Publication Office to remain eligible for a degree award this term. No exceptions can be granted. https://grad.ufl.edu/academics/editorial/etd-tools (https://grad.ufl.edu/academics/editorial/etd-tools/)
August 7, Friday		Summer B and C classes end
		Final examinations are during regular class periods
	11:59 pm	Last day to drop a course and receive W on transcript for Summer B or Summer C via College petition to the Registrar
		Last day to withdraw (all courses) without failing grades for Summer B or Summer C via College petition to the Registrar
		Deadline for requesting transfer of credit (for fall degree candidates)
August 7-8, Friday- Saturday		Commencement Ceremonies
		See commencement schedule for specific dates: https://commencement.ufl.edu/ ¹
August 10, Monday	12:00 noon	Summer B and C final term grades are due
August 11, Tuesday		Degree certification
August 12, Wednesday		Unofficial transcripts with grades and remarks are available via ONE.UF

¹Projected dates. Specific dates and times of ceremonies for colleges and schools will be made available at <https://www.commencement.ufl.edu/> (<https://www.commencement.ufl.edu/>)

(<https://commencement.ufl.edu/>) once approved by the University Commencement Committee and as soon as plans are finalized. Please do not anticipate exact dates and times until the website has been updated.

NOTES: All dates and deadlines are subject to change and will be updated accordingly. Prospective students should contact the appropriate academic unit for admission application deadlines.

Previous Graduate Catalogs

See our catalog's publication policy by visiting <https://gradcatalog.ufl.edu/graduate/catalog-publication-policy/>. (<https://gradcatalog.ufl.edu/graduate/catalog-publication-policy/>)

2023-2024 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2023-2024.pdf>)

2022-2023 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2023-2024.pdf>)

2021-2022 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2021-2022.pdf>)

2020-2021 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2020-2021.pdf>)

2019-2020 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2019-2020.pdf>)

2018-2019 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2018-2019.pdf>)

2017-2018 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2017-2018.pdf>)

2016-2017 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2016-2017.pdf>)

2015-2016 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2015-2016.pdf>)

2014-2015 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2014-2015.pdf>)

2013-2014 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2013-2014.pdf>)

2012-2013 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2012-2013.pdf>)

2011-2012 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2011-2012.pdf>)

2010-2011 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2010-2011.pdf>)

2009-2010 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2009-2010.pdf>)

2008-2009 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2008-2009.pdf>)

2007-2008 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2007-2008.pdf>)

2006-2007 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2006-2007.pdf>)

2005-2006 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2005-2006.pdf>)

2004-2005 UF Graduate Catalog (<https://grad.ufl.edu/media/gradufl.edu/catalogs/catalog-2004-2005.pdf>)

2003-2004 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00063/>)

2002-2003 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00060/>)

2001-2002 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00057/>)

2000-2001 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00055/>)

1999-2000 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00053/>)

1998-1999 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00050/>)

1997-1998 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00048/>)

1996-1997 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00044/>)

1995-1996 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00042/>)

1994-1995 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00040/>)

1993-1994 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00038/>)

1992-1993 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00036/>)

1991-1992 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00034/>)

1990-1991 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00032/>)

1989-1990 UF Graduate Catalog (<https://ufdc.ufl.edu/UF00075594/00030/>)

1905-1906 to 1988-1989 Archived Copies (<http://ufdc.ufl.edu/UF00075594/00001/allvolumes/>)

Resources Available to Graduate Students

University Galleries

University Galleries is comprised of three art galleries that play an integral role in the cultural life of the University of Florida and the entire greater Gainesville community. Housed in the College of the Arts at the University of Florida, and in association with the School of Art + Art History, the University Galleries bring together town and gown.

University Gallery, located at the intersection of SW 13th Street and SW 4th Avenue, just south of Tigert Hall, presents primarily contemporary exhibitions that rotate every two to eight weeks. For the past 16 years University Gallery has collaborated with myriad UF colleges, community and regional entities in creating a trans-disciplinary venue for visual arts. Exhibitions feature nationally and internationally known artists in fall, a bi-annual studio art faculty exhibition, juried student art show MFA graduating thesis project shows in the spring. The 3,000 square foot space is a lively, exciting and beautiful venue that is utilized for many interesting events throughout the academic year.

University Gallery is open Tuesdays, Wednesdays and Fridays 10 am–6 pm; Thursdays 10 am–7 pm; and Saturdays 12–4 pm.

The gallery is closed Mondays, Sundays and academic holidays.

arts.ufl.edu/galleries (<http://arts.ufl.edu/galleries/>)
(352) 273-3000

UFIT Computer Labs

Services available to graduate students from the UF Computing Help Desk include electronic thesis and dissertation computing support, phone and walk-in application support, technical & mobile device consulting, email and Wi-Fi support, software distribution (including statistical software) and GatorLink account help.

UFIT also provides computer classrooms are available for personal and academic use. They are equipped with both Windows and Macintosh computers, laser printers, plotters, scanners, and a wide variety of software. Students can find a complete list of each lab's hours, services, and software available for use at <https://labs.at.ufl.edu/>.

Instructors and Teaching Assistants may use the online, e-Learning course management system, e-Learning in Canvas, to provide online course tools such as syllabus, content and secure grade posting. Instructors may reserve a computer classroom or multimedia lecture classroom for class sessions.

For more information about these, other UFIT services, and contact information, please see our site: <https://it.ufl.edu> (<https://it.ufl.edu/>)

Field and Fork Food Pantry

The Field and Fork Campus Food Program is a university-wide collaboration to provide experiential learning opportunities in sustainable agriculture and food systems, and offer spaces at UF where individuals can take courses, engage with demonstrations, and participate in activities focusing on sustainable agriculture and food systems at multiple scales from a home, community garden, or small/urban farm to large-scale production. An interdisciplinary program housed within UF/IFAS College of Agricultural and Life Sciences, it runs the on-campus farm and provides healthy food for those in need through the Alan and Cathy Hitchcock Pantry.

- **The Pantry**

The Alan and Cathy Hitchcock Pantry is intended to assist members of our campus community who experience food insecurity. We will not ask guests of The Pantry to verify income or need. We will trust that guests will use The Pantry only when they have a need to use the service. We recognize that some people who use The Pantry will have a chronic need for food while others may only have a temporary need that may not be reflected in a financial statement of need.

- **The Farm and Gardens**

The Teaching Farm hosts a variety of productions systems that can be used for experiential learning. From Art and History to Engineering and Agronomy, the farm is designed to allow for all disciplines to be able to explore and experience food systems concepts and sustainable agriculture in practice. At the farm and gardens, volunteers and interns work together to manage the space and to provide food for themselves, as well as to donate food to the Alan and Cathy Hitchcock Pantry and local charities. This space also offers demonstrations that showcase world cultures and their relationships to plants, home gardening, and the link between agriculture and natural resources. The Gardens can also be used for classes, tours, and events.

Contact

aprizia@ufl.edu; (352) 294-1780

The Pantry is located at 564 Newell Drive, adjacent to McCarty and the Food Science and Human Nutrition buildings. The Farm and Gardens are located on Museum Drive, next to the Bat Houses and across from Lake Alice.

fieldandfork@ufl.edu

Florida Museum of Natural History

The **Florida Museum of Natural History** was created by the Legislature in 1917 as a department of the University of Florida. Through its affiliation with the University, it carries dual responsibility as the official State Museum of Florida and as the University museum. The public education and exhibits division of the Museum is in Powell Hall, on Hull Road at the western edge of campus, situated between the Harn Museum of Art and the Phillips Center for the Performing Arts. Powell Hall is devoted exclusively to permanent and traveling exhibits, educational and public programs, special events, and includes the "Butterfly Rainforest." It is staffed by specialists in interpreting natural history through exhibits and educational programs. Consult the website for hours and admission fees (<https://www.floridamuseum.ufl.edu>). The Museum also operates as a center of research in anthropology and natural science. The research and collections division is in Dickinson Hall, at the corner of Museum Road and Newell Drive. This building is not open to the public. The Department of Natural History houses the state's natural history collections and is staffed by scientists and support personnel concerned with the study of modern and fossil plants and animals and historic and prehistoric people and their cultures. Scientific and educational faculty curators hold appointments in appropriate UF academic units. Through these appointments, they participate in both undergraduate and graduate teaching programs. The Museum's McGuire Center for Lepidoptera and Biodiversity opened in 2004. This world-class facility features a 46,000-square-foot Lepidoptera center housing one of the world's largest and most comprehensive Lepidoptera collections, and state-of-the-art research facilities for their study. It also contains dynamic public exhibitions and a live "Butterfly Rainforest" exhibit with a walking trail, educational exhibits and hundreds of living butterflies.

The **Randell Research Center** at the Pineland archaeological site near Fort Myers, Florida, is dedicated to learning and teaching the archaeology, history and ecology of Southwest Florida.

The **Herbarium at UF** is also a division of the Museum. It contains specimens of vascular and nonvascular plants. The research collections are in the care of curators who encourage scientific study of the Museum's holdings. Materials are constantly being added to the collections both through gifts from friends and as a result of research activities by Museum staff. The archaeological and ethnographic collections are noteworthy, particularly in the aboriginal and Spanish

colonial material remains from the southeastern United States and the Caribbean. There are extensive study collections of birds, mammals, mollusks, reptiles, amphibians, fish, invertebrate and vertebrate fossils, plant fossils, tissue and genetic material, and a bioacoustic archive of original recordings of animal sounds. Opportunities are provided for students, staff and visiting scientists to use the collections. Research and field work are presently sponsored in the archaeological, paleontological and zoological fields.

Students interested in these specialties should apply to the appropriate academic units. Graduate assistantships are available in the Museum in areas emphasized in its research programs.

Gator 1 Card

The Gator 1 Card is the official photo ID of the University of Florida. A valid Gator 1 Card must be presented to transact business at the University Bursar, ride the RTS buses for free, secure athletic event tickets, and check out materials at the University Libraries.

Students can link their Gator 1 Card to a number of vital campus accounts for those who would like to access their meal plans, purchase snacks on campus, or buy books at the UF Bookstore. Students can even link to their Wells Fargo Checking account and use their Gator 1 Card as an ATM card.

Students, faculty, staff, retirees and spouses/domestic partners of UF students, faculty and staff, can purchase their Gator 1 Card for \$15.00 at any of the three Gator 1 Central Office locations. Payment can be made with cash, check, or a credit card.

<https://businessservices.ufl.edu/services/gator-1-card/>
Gator1Central@bsd.ufl.edu
(352) 392-8343

Graduate Student Email Listserv and GIMS

The Graduate School communicates directly with enrolled graduate students via email using UF business email addresses — as a norm, the student's GatorLink account. Students must establish a GatorLink account and must check it regularly. Students can set up their required GatorLink accounts online at this website: <http://www.gatorlink.ufl.edu>. The Graduate School cannot maintain personal email addresses.

The UF business email addresses of all currently enrolled graduate students are automatically added to the Graduate School's Graduate Student listserv. **A student cannot opt out of receiving these messages.** Messages contain time-sensitive information about important deadlines. An archive of messages is online at <http://lists.ufl.edu/archives/gradstudent-l.html>.

The Graduate Information Management System (GIMS) (<https://gradschool.ufl.edu/gimsportal/gatorlink/portal.asp>) has information about important milestones, grants and fellowships, workshops, and many other pertinent items relevant to graduate education. Students must check GIMS on a regular basis.

Graduate Student Handbook

The Graduate School provides additional information in the online Graduate Student Handbook: <https://grad.ufl.edu/academics/handbook/>

Housing

Graduate students and their families are housed in graduate and family housing villages. All applicants must apply to the University and have a UF ID number. Due to limited space, all students are not guaranteed on campus housing.

For information, go to the Housing website, <https://www.housing.ufl.edu/housing/>.

To be eligible for Graduate and Family housing, all residents must make normal progress toward a degree in consultation with academic departments and Graduate and Family Housing policies. Please inquire at villages@housing.ufl.edu for more information about general eligibility and/or eligibility as it relates to academic status.

Applying for Housing

Each student must make personal arrangements for housing, either by applying to the Department of Housing and Residence Education for assignment to University housing facilities or by obtaining accommodations off campus.

For application information and to submit an application for campus housing:
<https://housing.ufl.edu/>

For off-campus housing information:
<https://offcampus.ufl.edu/>

Graduate and Family Housing

Village apartments are unfurnished. Residents in all villages must provide their own linens, dishes, rugs, curtains, or other similar items. Electricity is an additional expense and is billed with the rent. For questions about Graduate and Family Housing, please email villages@housing.ufl.edu, or call 352.392.2161.

The Continuum is UF affiliated off-campus Housing. To qualify for residency, Continuum residents must be matriculated, full-time or part-time (or equivalent) students enrolled in a graduate or professional school or a faculty or staff member at UF.

Additional information about all Graduate and Family Housing facilities is available at the following website:
<https://www.housing.ufl.edu> (<https://housing.ufl.edu/>)

Off Campus Life

Off Campus Life is a UF office that provides resources, services, education and support for students living off-campus.

Off Campus Life resources & services include:

Off Campus Housing Locator: <http://housing.offcampus.ufl.edu> this online service allows students to search for apartments, post and search for subleases, and search for roommates.

Gator Guide to Off Campus Life: <https://offcampus.ufl.edu/resources/gator-guide/> the Gator Guide includes everything you need to know about living off-campus including tips for finding off-campus housing, average rental costs, lease information, safety information, transportation information and much more.

Individual Meetings: <https://offcampus.ufl.edu/connect/appointment-request/> Off Campus Life also provides one-on-one meetings for students searching for off-campus housing.

To schedule an appointment or for questions:

- visit the OCL website www.offcampus.ufl.edu (<http://www.offcampus.ufl.edu>)
- complete the appointment request form <https://offcampus.ufl.edu/connect/appointment-request/>
- call Off Campus Life at (352) 392-1207
- visit the Off Campus Life office located inside the Housing Office at 1304 Diamond Road, Bldg. 753.

Off Campus Life also hosts monthly events for students, to learn more visit OCL's social media pages.

Like OCL on Facebook:

www.facebook.com/UFOffCampusLife (<http://www.facebook.com/UFOffCampusLife/>)

Follow OCL on Twitter:

<https://twitter.com/UFOffCampusLife> (<https://twitter.com/UFOffCampusLife/>)

Follow OCL on Instagram:

www.instagram.com/ufoffcampuslife (<http://www.instagram.com/ufoffcampuslife/>)

UF Libraries

The libraries of the University of Florida (UF Libraries) form the largest information resource system in the state of Florida and include seven libraries. Six are in the system known as the George A. Smathers Libraries (<http://cms.uflib.ufl.edu/>), and one (the Lawton Chiles Legal Information Center (<https://www.law.ufl.edu/library/>)) is part of the College of Law. The University of Florida Gator1 card provides access to library services at all libraries.

All of the libraries serve the entire community, but each has a special mission to be the primary support of specific colleges, degree programs and research initiatives. Because of the interdisciplinary nature of research, scholars may find collections held in one library to serve a specific discipline or constituency to be of great importance to their own research in a different field.

The Smathers Libraries home page offers a wealth of information about the libraries and links to a vast array of resources. Print and electronic collections can be accessed through the library catalog (<https://uflib.ufl.edu/>) as well as through general and subject-specific databases (<http://www.uflib.ufl.edu/databases.html>). Library Guides (<http://guides.uflib.ufl.edu/?b=s>) are available by subject and topic to assist with the location and use of appropriate resources. Many online resources can be accessed both on and off campus. Print materials not available locally can be quickly located and borrowed through Interlibrary Loan (<http://cms.uflib.ufl.edu/accesssupport/InterlibraryLoan/>). Reference service is available in each library as well as via phone, email and chat (<http://cms.uflib.ufl.edu/ask/>). All of the libraries provide special services to help students and faculty with disabilities (<http://www.uflib.ufl.edu/accessibility/>).

The Libraries participate in UBBorrow which allows users to request materials through the online library catalog directly from participating libraries in the State University System (SUS) and the Florida College System (FCS). If a book is unavailable in the University of Florida collection but is available elsewhere in the SUS or FCS, the UBBorrow icon will appear on the library catalog search page. Clicking this link will take users to the statewide catalog, where they can provide their

library credentials, and specify a pickup site. UBBorrow loans usually arrive within a few days. This unmediated borrowing service creates a virtual statewide library of over 16 million items.

The Smathers Libraries' hours (<http://www.uflib.ufl.edu/ps/hours/>) are at the top of the homepage. Hours differ for each library building.

Lactation Rooms are located in Library West (second floor), Marston Science Library (third floor) and the Education Library (first floor). The key can be requested at the Information Desk in each of these libraries. Gender Neutral/Family Restrooms are located in Library West (second floor), Marston Science Library (first floor) Smathers Library (second floor) and the Education Library (first floor).

Workstations in UF libraries provide access to the whole array of electronic resources and services, most of which can be accessed from a classroom, office, lab or any other on-campus location with access to the UF network as well. Licensing for library databases, e-journals and e-books restricts off-campus access (<http://web.uflib.ufl.edu/ufproxy.html>) to staff, students, and faculty. Instructions for remote access (<http://www.uflib.ufl.edu/ufproxy.html>) are available.

Library orientation programs (http://guides.uflib.ufl.edu/workshops_instruction/) are offered at the beginning of each term. In addition, instruction and liaison librarians will work with faculty and teaching assistants to develop and present course-specific library instruction sessions for their students. Subject specialists (<http://apps.uflib.ufl.edu/staffdir/SubjectSpecialist.aspx>), who work closely with faculty and graduate students to select materials for the collections, also advise graduate students and other researchers who need specialized bibliographic knowledge to define local and global information resources available to support specific research. The Academic Research & Consulting Services, known as ARCS (<http://arcs.uflib.ufl.edu/>), is comprised of functional specialists who offer unique expertise and services to support research activities in all disciplines, through data collection to dissemination of results to evaluation of outputs to archiving.

Library West houses most of the humanities and social science collections; professional collections in support of business, health and human performance, journalism and public relations; as well as the circulating collections for African Studies, Asian Studies, and the Isser and Rae Price Library of Judaica. Library West offers 200 public computers, a KIC Bookeye high speed scanner, 18 group study rooms and 39 individual graduate study carrels that are assigned for the academic year. Priority is given to those graduate students completing doctoral dissertations in the humanities or social sciences. An online application form (<https://librarywest.uflib.ufl.edu/spaces/study-spaces-in-library-west/study-rooms/>) is available. In addition, the sixth floor of Library West is a study area reserved for graduate students. Access is provided after students register at the Circulation Desk.

Marston Science Library houses collections in agriculture, life sciences, engineering and physical sciences. The first floor Collaboration Commons includes a multipurpose conference room with a multi-touch visualization wall. It is also the location for the MADE@UF lab, a collaboration space created by the Libraries and Academic Technology to be used for creative activities such as mobile app development, and other "maker" initiatives including virtual and augmented reality. Marston offers more than 130 public computers, 24 study rooms, a KIC Bookeye high speed scanner, 3D printing services (including printers you can borrow), and both quiet and collaborative study spaces.

Health Science Center Libraries (HSCL) serve the academic, research and clinical information needs of the Colleges of Dentistry, Medicine, Nursing, Pharmacy, Public Health, Health Professions and Veterinary Medicine, as well as the affiliated research institutes, hospitals and clinics. The library in Gainesville is located in the Communicore. The Veterinary Medicine Education Center in the College of Veterinary Medicine Building, while not a branch library, is supported by the HSCL. The Gainesville location has 160 public computers, including 26 big screen monitors, 18 individual study and 14 group study rooms. A 24/7 space is available with preapproved Gator 1 card access. The Borland Library serves UF Health Jacksonville. The library has 24 public computers, a practice/large group study room and 24 individual carrels. The HSCL was an early leader among health sciences libraries in providing liaison librarian services, is integrated into the curricula of the health science colleges and collaborates with faculty in the provision of instruction and on other projects. Librarians at the HSCL also provide clinical rounding, basic bioinformatics, data management support and systematic review services.

Smathers Library (formerly known as Library East) holds the Latin American and Caribbean Collection, the Map & Imagery Library and Special and Area Studies Collections, including rare books and manuscripts, the Baldwin Library of Historical Children's Literature, P. K. Yonge Library of Florida History, and the University Archives (custodian of the University's historically significant public records including the administrative files of its past presidents). It also is the location of the Grand Reading Room (the original library), the Judaica Suite (a beautiful multipurpose space that houses about 8,000 rare and non-circulating books from the Price Library of Judaica), and the Panama Canal Gallery.

Architecture & Fine Arts Library, located on the second floor in Fine Arts Building A, holds research materials in architecture, art, art history, historic preservation, interior design, landscape architecture, museum studies and music, with key resources for building construction and urban & regional planning. In addition to bound volumes (books, journals, musical scores), the library holds over 12,000 sound and video recordings. Special equipment available to users includes multi-format audio listening equipment, scanners for documents up to 18x24" and a 3D scanner. Tripods, small video cameras and digital projectors are available for checkout. The library's mid-century interior, with its 20-ft high ceiling reading room and double-decker carrels is a popular destination for quiet study.

The **Education Library**, located in Norman Hall, holds education, child development, higher education, school psychology and school counseling collections. In addition to electronic and print research materials, there are other specialized collections such as the Children's and Young Adult Literature Collection and the K-12 Textbook Collection. The library has 44 public computers, seven group study rooms, 3D printing and a KIC Bookeye high speed scanner. A makerspace includes die cuts for students to create visual learning aids for K-12 education.

Lawton Chiles Legal Information Center holds resources for law and related social sciences with over 595,000 volumes and equivalents. It is named in honor of the former governor and senator and housed in a completely renovated facility. The Lawton Chiles Legal Information Center occupies the bottom three floors of Holland Hall with computer support on the top floor. The facility includes 13 student study rooms, a lactation/meditation room, lounge seating, an open reserve area, and carrels, as well as a beautiful rare book room.

UF Digital Collections (<http://ufdc.ufl.edu/>) (UFDC) comprises a constantly growing collection of digital resources from the University of

Florida's library collections, as well as partner institutions. The collection hosts more than 300 outstanding digital collections, containing nearly 14 million pages, covering over 78,000 subjects in rare books, manuscripts, antique maps, children's literature, newspapers, theses and dissertations, data sets, photographs, oral histories, and more, for permanent access and preservation. Among the preeminent collections in UFDC are the Florida Digital Newspaper Library (<http://www.uflib.ufl.edu/fnp/>) and the Digital Library of the Caribbean (<http://www.dloc.com/>) (dLOC).

Offsite Storage Facilities near the Gainesville Regional Airport offer an extensive collection of federal government documents as well as other low-use books and journals. The 2.2 million items located in the facilities can be requested through the catalog.

Oak Ridge Associated Universities

Since 1948, UF students and faculty of the University of Florida have benefited from its membership in Oak Ridge Associated Universities (ORAU). ORAU is a consortium of more than 160 Ph.D.-granting colleges and universities and a contractor of the U.S. Department of Energy in Oak Ridge, Tennessee. ORAU works with its member institutions to help their students and faculty gain access to federal research facilities throughout the country; to keep its members informed about opportunities for fellowship, scholarship, and research appointments; and to organize research alliances among its members.

Through the Oak Ridge Institute for Science and Education (ORISE), the DOE facility that ORAU operates, undergraduates, graduates, postgraduates, and faculty enjoy access to a multitude of opportunities for study and research. Students can participate in programs covering a wide variety of disciplines, including business, earth sciences, epidemiology, engineering, physics, geological sciences, pharmacology, ocean sciences, biomedical sciences, nuclear chemistry, and mathematics. Appointment and program lengths range from 1 month to 4 years. Many of these programs aim to increase the number of underrepresented minority students pursuing degrees in science- and engineering-related disciplines. A comprehensive list of these programs and other opportunities, their disciplines, and details on locations and benefits can be found in the *ORISE Catalog of Education and Training Programs*, which is available at <https://orise.orau.gov/about/index.html> (<https://orise.orau.gov/about/>) or by calling either of the contacts below.

ORAU's Office of Partnership Development seeks opportunities for partnerships and alliances among ORAU's members, private industry, and major federal facilities. Activities include faculty development programs, such as the Ralph E. Powe Junior Faculty Enhancement Awards, the Visiting Industrial Scholars Program, consortium research funding initiatives, faculty research, and support programs, as well as services to chief research officers.

For more information:

The Office of Institutional Planning and Research website provides access to the Florida ExpertNet searchable database of Centers and Institutes. Go to the search function (<https://expertnet.org/>) and choose "University of Florida" from the "Limit By" drop-down menu toward the bottom of the page. Finally, click "search" for a complete list of UF Interdisciplinary Research Centers. For more information about ORAU and its programs, visit the ORAU home page at <http://www.orau.org>.

Office of Research

The University of Florida's Office of Research facilitates and manages the university's external research funding enterprise. The office provides many services for UF faculty, staff, and students, from identifying a

grant opportunity to managing proposals and awards and protecting and promoting intellectual property. The Division of Sponsored Programs facilitates institutional approval for all extramural proposal submissions, accepts and administers grant awards, and negotiates contracts and other research-related agreements on behalf of the University of Florida. The Division of Research Program Development identifies funding opportunities for faculty, manages internal funding programs, and assists in planning and coordinating large, interdisciplinary research initiatives.

The Division of Research Compliance assists faculty, staff, and students in conducting research in compliance with applicable research regulatory requirements and institutional policies. The goal of the Division of Research Compliance is to promote compliance while facilitating research. The Division of Research Operations and Services provides support that underpins the campus-wide services that are part of the Office of Research portfolio.

The University of Florida Research Foundation is a non-profit, direct-support organization that manages the university's royalty and licensing enterprise. The Office of Technology Licensing (<http://innovate.research.ufl.edu/tech-licensing/>) handles patenting, marketing, and licensing of intellectual property. OTL works closely with UF inventors in identifying and protecting new inventions. All patents, copyrights, and trademarks are processed and managed by OTL, which also helps researchers develop confidentiality, mutual secrecy, and material transfer agreements.

The Office of Research provides funds for the Grinter Fellowship program. These fellowships are part of funding packages awarded by academic units to support the recruitment of outstanding new graduate students. The Office of Research also supports individual graduate students by offering competitive travel grants and other types of awards. This office also provides an important centralized location for other internal and external funding opportunities by offering a host of resources at <https://research.ufl.edu/research-lifecycle/find-funding.html>.

Ombuds

The Office of the University Ombuds was established by the state legislature and reports through the Provost to the President. The Office helps students resolve problems and conflicts. It offers an informal avenue of redress for students' problems and grievances that arise in the course of interacting with the institution. By considering the problems in an unbiased way, the Ombuds works to achieve a fair resolution while protecting the rights of all involved parties.

Resolving student academic issues: The Office of the Ombuds deals with student concerns of an academic nature. In almost all instances, students should first contact the instructor, the academic unit chair, and the college dean before seeking help from the Ombuds, although in some rare circumstances earlier contact with the University Ombuds is beneficial.

Resolving student non-academic issues: In many instances, non-academic issues can be easily and readily resolved for students merely by facilitating direct communication and effective listening. For other problems not related to academic issues, the Offices of the Dean of Students and the University Ombuds may provide help or direct students to contact the appropriate campus office.

For more information, visit <http://www.ombuds.ufl.edu>.

Performing Arts Venues

University of Florida Performing Arts brings a diverse range of events to its venues each season, including theater, musicals, chamber, classical, dance, jazz, world performances and more. The 1,700-seat Phillips Center features computerized lighting and sound systems. Upstage performances feature both artist and audience seated on the Main Stage in a cabaret-style setting. The Squitieri Studio Theatre is used for experimental and more intimate productions, recitals and receptions. The historic University Auditorium seats 849 and provides a classic setting for concerts, spoken word engagements and lectures. The Baughman Center, a breathtaking pavilion on the shores of Lake Alice, is an inspirational setting for both contemplation and celebration.

UFPA offers discounted tickets (for most events) to students with a valid Gator 1 card. For more information about student tickets, please visit the website.

- For information about UFPA:
Administrative offices
Phone (352) 273-2457
- For event information or tickets:
Phillips Center Box Office
Phone (352) 392-ARTS
Website <http://www.performingarts.ufl.edu>

University Press of Florida

The University Press of Florida is the official scholarly publishing agency of the State University System of Florida. The Press (just off campus, at 15 NW 15th Street) reports to the Provost of the University of Florida, who supervises the Press on behalf of the 11 state universities. The statewide Council of Academic Vice Presidents is the governing board for the Press.

An advisory board, consisting of representatives from each of the 11 state universities, determines whether manuscripts submitted to it reflect appropriate academic, scholarly, and programmatic standards of the Press.

In 2013, a new press was created specifically to meet the needs of UF faculty. The University of Florida Press has 11 board members from various colleges throughout the UF campus. In addition to the Books division, it also features a full-service Journals division.

The Press publishes scholarly works and journals of intellectual distinction and significance, books that contribute to improving the quality of higher education in Florida, and books of general and regional interest and usefulness to the people of Florida, reflecting their rich historical, cultural, and intellectual heritage and resources. The Press publishes works in the following fields:

- the Caribbean and Latin America;
- archaeology, American history and culture;
- African-American history and culture;
- forensic anthropology;
- medical geography;
- modernist and medieval literature;
- architecture;
- ethnicity;
- natural history;
- conservation biology;
- gardening;

- space history and studies;
- the fine arts; and
- Floridiana.

Submit manuscripts to:

The Editor-in-Chief,
University Press of Florida,
15 NW 15th Street,
Gainesville, FL 32611

Workshops for Teaching Assistants

The Graduate School and the Teaching Center offer an orientation and a series of workshops for teaching assistants to improve their instructional skills. Orientation is mandatory for all graduate students starting teaching assignments. Some topics included in the workshop series are oral presentation skills and lecture planning, techniques for improving student attention and motivation, group dynamics, testing and grading, use of technology to enhance learning, how to be a great online/hybrid TA, the flipped classroom, and tips for international TAs in UF classrooms. TAs who complete a significant percentage of the workshops are awarded certificates. To register or for more information go to TA Development at <https://teach.ufl.edu/grow-your-teaching/for-teaching-assistants/>, call the Teaching Center, 392-2010, or visit the office on the ground level, Southwest Broward Hall. Teaching at the University of Florida: A Handbook for Teaching Assistants is available at <https://academicresources.clas.ufl.edu/ta-development/>

Additional Centers, Institutes, and Other Research Facilities

Career Resource Center (<https://career.ufl.edu/>), Student Health Care Center (<https://shcc.ufl.edu/>), and University Writing Studio (<http://www.writing.ufl.edu/>) information may be found by visiting the Student Services (<https://gradcatalog.ufl.edu/graduate/student-services/>) section of this catalog.

Note

Contact individual programs for further guidance. Updates to this catalog should be submitted via the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>). Please also feel free to report any revisions or discrepancies via email to grad-catalog@ufl.edu.

Student Services

Career Connections Center

The Career Connections Center has award-winning services to help graduate students identify their interests that will guide them into professional opportunities beyond graduation.

The center prepares graduate students for their next steps by helping them:

- Assess interests, values, and skills to explore a career path
- Polish CVs and statements
- Make meaning of experiences, including research and teaching

The Career Connections Center also hosts several career fairs, attracting recruiters from hundreds of organizations to network with students about full-time positions.

Located on the first level of the Reitz Union, the office welcomes walk-in students from 9 a.m. - 4 p.m. daily on weekdays. For more information, please visit career.ufl.edu (<http://career.ufl.edu/graduate/>) (<http://gradcatalog.ufl.edu/graduate/student-services/career.ufl.edu/graduate/>) (<http://career.ufl.edu/graduate/>).

Counseling and Wellness Center

The Counseling and Wellness Center (CWC) offers services to currently enrolled graduate students for personal and educational concerns. Graduate students who are not currently registered may be eligible to pay an off-semester fee for services (please inquire for details).

Professional counselors offer short-term individual, couples, and group counseling. There is no charge for the Center's confidential services. Topics of services for graduate students often include help with concerns related to academic success, time and stress management skills, anxiety and depression, personal and family relationships, adjustment to the culture, and other issues associated with transition.

Counseling and Wellness Center clinicians also provide a range of consultation and outreach programs to the campus community. Phone or in-person consultation is available for students, parents, faculty, and staff regarding any issues related to student development. The CWC clinicians serve as program resources for a wide variety of student organizations and academic departments. The Center has an extensive training program for selected graduate students. The clinical staff teaches undergraduate and graduate courses in the Departments of Psychology and Counselor Education and guest lectures on a variety of psychological and wellness topics.

All CWC activities are conducted with sensitivity to the diversity of the students on a large, multicultural campus.

For more information, phone (352) 392-1575, or visit <http://www.counseling.ufl.edu>. The CWC is located at 3190 Radio Road (down the street from Lakeside and SW Rec Center).

Gatorwell

Since its inception in 1972, GatorWell has applied health promotion strategies to educate UF students on health and wellness topics relevant to the college experience. Our mission is to empower UF students to be healthy and well through prevention. As health education leaders, GatorWell works with campus partners and community stakeholders to best meet the health needs of UF students and provide a continuation of care.

All of GatorWell's services are free to UF students. From individual appointments to group workshops focusing on Time Management, the Health Promotion Specialists at GatorWell target information, skills, and behavior change to the needs of college students.

Free and confidential individual appointments are provided to currently enrolled students, as well as comprehensive programming and outreach on various health topics, including stress reduction, healthy eating, sexual health, sleep, time management, alcohol and other drugs, and interpersonal violence prevention. GatorWell also offers presentations and outreach, health communication campaigns, and skill development on various health topics.

As health education leaders, GatorWell works with campus partners and community stakeholders to best meet the health needs of UF students and provide a continuation of care. Through our collaborations and

advocacy, we aim to support student wellness to positively impact academic success. Be Well. Do Well. GatorWell.

<https://gatorwell.ufsa.ufl.edu/>

Graduate Student Council

The Graduate Student Council was formed in 1989 to foster interaction among graduate students on campus and to provide an agency for coordinating graduate student activities and programs. The GSC seeks the improvement of graduate student education through active and permanent communication with the Graduate School, the University administration, and the University of Florida Board of Trustees. It also represents the interests of graduate students at the student government, administration, local, state, and national levels. GSC is a dues-paying member of the National Association of Graduate and Professional Students.

Graduate Student Success Center

The Graduate Student Success Center was created with the graduate student at its core. We are here to enhance your graduate student experience by promoting holistic development and creating a community of belonging.

Graduate education is a decentralized model in which your department and in some cases your college take a leading role in your academic program. However, the departments cannot do it all; and our focus is on helping to identify and provide support to you so that you can navigate your journey successfully.

The Graduate Student Success Center was established to support potential graduate students, current students, faculty, and staff in the areas of

- Graduate Student Support & Engagement
- Office of Graduate Professional Development
- Graduate Recruitment
- Postdoc Affairs & Prestigious Awards
- Grad Care
- Thesis, Dissertation, and Publications

With any project we work on or whomever we are assisting, values frame our efforts. The values that shape our work include

- Integrity
- Service
- Advocacy
- Empathy
- Collaboration
- Innovation

For further information about the Graduate Student Success Center, please visit <https://grad.ufl.edu/gss/gssc/>

Student Health Care Center

Building a Healthy Foundation for The Gator Nation

The Student Health Care Center (SHCC) is an accredited outpatient clinic offering a wide variety of student-focused services, including Primary Care (Illness & Injury Care); Allergy Shots & Immunizations (seasonal flu shots, vaccinations for travel, etc.); Gynecological Services; LGBTQ+ Care; Sports Medicine Clinic; Sexual Health services (STD/STI Testing,

GYT Clinic) and Nutrition Services. Additionally, SHCC has an in-house Pharmacy, Lab, X-ray & EKG services.

Students are encouraged to review basic information about scheduling an appointment with SHCC by visiting <http://shcc.ufl.edu/newstudents/>. Call FIRST before coming for same-day appointment availability (main phone: 352-392-1161), or request an appointment more than 24 hours prior through your MyUFHealth portal at mychart.shands.org (<http://mychart.shands.org>) (for established patients). **PLEASE NOTE:** To avoid a no-show fee, call your primary care team or specialty clinic directly to cancel at least 24 hours before your scheduled appointment.

The health fee, paid as part of tuition, helps pay for basic evaluations but does not cover all possible charges at the SHCC. Patients are financially responsible for items including, but not limited to, physicals; procedures; X-rays; lab tests; medications; medical equipment; and physical therapy. Private health insurance plans are accepted for payment of covered services, so be sure to bring all health insurance information to your first appointment. For more information about charges, billing, and health insurance, please visit <http://shcc.ufl.edu/fees-and-insurance> (<http://shcc.ufl.edu/fees-and-insurance/>).

About Health Compliance

Students must comply with the University's immunization and health insurance requirements. More information and submission instructions about both of these prerequisites can be found at: <http://healthcompliance.shcc.ufl.edu/>.

Immunizations: Vaccine-preventable diseases do still exist, and contracting these illnesses can have an adverse effect on a student's health, well-being, and ability to reach optimal academic performance. Students shall be required to show documentation of specific vaccinations or proof of immunity for Measles/Mumps/Rubella (MMR), Hepatitis B, and Meningitis. Please note that international students and those entering most academic health professions may have additional requirements, including tuberculosis screening. Find the immunization form and instructions online at: <http://healthcompliance.shcc.ufl.edu/immunizations/>

Insurance: The University follows an Opt Out system where students who don't opt out by providing documentation of adequate health insurance will be automatically enrolled in the school-sponsored plan. They may either purchase outside health insurance that meets the requirements for comparable coverage, or they can be auto-enrolled in the school-sponsored Student Health Insurance Plan.

If a student currently has insurance, they will be required to review their insurance coverage and check that it meets the requirements set forth as comparable coverage. They will then need to submit a waiver with their policy information for verification by the end of drop/add but ideally much earlier. The charge for the school-sponsored Student Health Insurance Plan will be removed once the submission is completed and verified. Once verified, the waiver is good for one year. All this can be done online at <http://healthcompliance.shcc.ufl.edu/insurance/waiver/>

Still have questions? You can contact the health compliance office for further assistance: healthcompliance@shcc.ufl.edu or (352) 294-2925.

Thesis and Dissertation Formatting Assistance

The Thesis and Dissertation Support Team (<http://helpdesk.ufl.edu/application-support-center/>), a division of Academic Technology and

UFIT, provides assistance to students seeking help with the guidelines of the Thesis, Dissertation, and Publications Office (<https://grad.ufl.edu/academics/tdp/>) free of charge. Although not a part of the Graduate School's Thesis, Dissertation, and Publications Team, they do work hand-in-hand with that office's editors. The Support Team's services are invaluable to students concerned about meeting the Electronic Thesis and Dissertation (ETD) submission standards required by the Graduate School. Students should avail themselves of their formatting assistance services well in advance of making their first submission (<https://grad.ufl.edu/academics/editorial/etd-dates/>) of the thesis or dissertation document to the Graduate School's Thesis, Dissertation, and Publications Office. Appointments are encouraged, particularly in advance of all submission deadlines, as appointments are extremely limited and will only be conducted via remote electronic means. The Support Center can be reached by telephone (352.392.4357) or by emailing T&DSupport-hd@ufl.edu (<http://gradcatalog.ufl.edu/graduate/student-services/T&DSupport-hd@ufl.edu>). To set an appointment with their offices, visit their website <https://helpdesk.ufl.edu/application-support-center/>, selecting the option to "Book an appointment" from their menu on the left.

University Writing Studio

The Writing Studio is part of the University Writing Program, located in 302 Tigert Hall. The Studio's graduate student tutors provide one-on-one writing help for both undergraduate and graduate students. In 30-minute sessions, the Studio advises students on papers written for graduate school classes and theses or dissertations. The Studio also provides help with application essays and personal statements for graduate school applications. Students can make appointments—for daytime sessions in Tigert or evening sessions in Library West—at www.writing.ufl.edu (<http://www.writing.ufl.edu>). Phone: (352) 846-1138.

Additional Resources

For information about the Gator1 Card (<https://businessservices.ufl.edu/services/gator-1-card/>), Office of the University Ombuds (<https://www.ombuds.ufl.edu/>), and Workshops for Teaching Assistants, (<https://academicresources.clas.ufl.edu/ta-development/>) visit the Resources section of this catalog. (<https://gradcatalog.ufl.edu/graduate/resources/>)

Please contact individual units for additional information. Updates to this catalog can be submitted via the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>). Please also feel free to report any revisions or discrepancies via email to grad-catalog@ufl.edu. Updates are appreciated throughout the entire year.

The Graduate School

Missions, Visions, and Values

Mission of the University

The University of Florida is a comprehensive learning institution built on a land-grant foundation. We are The Gator Nation, a diverse community dedicated to excellence in education and research and shaping a better future for Florida, the nation, and the world.

Our mission is to enable our students to lead and influence the next generation and beyond for economic, cultural, and societal benefit.

The University welcomes the full exploration of its intellectual boundaries and supports its faculty and students in the creation of new knowledge and the pursuit of new ideas.

- **Teaching** is a fundamental purpose of this University at both the undergraduate and graduate levels.
- **Research and scholarship** are integral to the educational process and to the expansion of our understanding of the natural world, the intellect and the senses.
- **Service** reflects the University's obligation to share the benefits of its research and knowledge for the public good. The University serves the nation's and the state's critical needs by contributing to a well-qualified and broadly diverse citizenry, leadership and workforce.

The University of Florida must create the broadly diverse environment necessary to foster multicultural skills and perspectives in its teaching and research for its students to contribute and succeed in the world of the 21st century.

These three interlocking elements — teaching, research and scholarship, and service — span all the University's academic disciplines and represent the University's commitment to lead and serve the state of Florida, the nation, and the world by pursuing and disseminating new knowledge while building upon the experiences of the past. The University aspires to advance by strengthening the human condition and improving the quality of life.

Vision, Mission, and Values of the Graduate School

Our Vision

To be a model of excellence for supporting and advancing graduate education worldwide

Our Mission

To ensure the integrity and value of graduate education and elevate the overall graduate student experience

Our Core Values

Integrity
Advocacy
Inclusion
Collaboration
Innovation

Graduate School Administration

Nicole L. P. Stedman

Ph.D. (University of Florida), Dean of the Graduate School and Associate Provost

Tom Kelleher

Ph.D. (University of Florida), Associate Dean, Academic Affairs

Judy Traveis

Ph.D. (University of Florida), Associate Dean, Student Affairs

Please find information regarding the Graduate School's current organization (p. 943) of offices and historical information about the previous Deans and history (p. 944) below. For biographical and contact information for the Graduate School's staff, consult the Graduate School Personnel (<https://grad.ufl.edu/about/team/teammates/>) pages on the UF Graduate School's website (<https://grad.ufl.edu>). For assistance, please reach out using the Graduate School's Contact Form (<https://grad.ufl.edu/contact-us/>).

Organization

The Graduate School currently consists of the Dean (<https://grad.ufl.edu/about/dean/>), (<https://grad.ufl.edu/about/contact-us/>) an Associate Dean for Academic Affairs (<https://grad.ufl.edu/academics/ad-academics/>), (<https://grad.ufl.edu/about/contact-us/>) an Associate Dean for Student Affairs (<https://grad.ufl.edu/gss/ad-students/>), the Graduate Council (<https://grad.ufl.edu/academics/gc/>), (p.) the Graduate Faculty (<https://gradcatalog.ufl.edu/graduate/faculty/>), and the Graduate School staff (<https://grad.ufl.edu/about/team/teammates/>). The Graduate School is responsible for establishing, monitoring, and enforcing minimum general standards of graduate study in the University and for coordinating the graduate programs of the various colleges and divisions of the University.

Responsibility for the detailed operation of graduate programs is vested in individual colleges, schools, divisions, and academic units. In most colleges, an associate dean or other administrator is directly responsible for graduate studies in that college. General policies and standards of the Graduate School are established by the Graduate Faculty as represented by the Graduate Council. Policy changes must be approved by the graduate dean(s) and the Graduate Council. The Graduate Council (chaired by the Graduate Dean) considers graduate education policy and policy changes and the creation of or revisions to graduate degree programs, majors, concentrations, certificates, and other graduate education initiatives. For information regarding appointment to the graduate faculty, please visit <https://gradcatalog.ufl.edu/graduate/faculty> (<https://gradcatalog.ufl.edu/graduate/faculty/>).

The Graduate School Staff

The Graduate School is organized into two central units:

- Academic Affairs, which includes
 - IT Systems
 - Curriculum and Programs
 - Admissions and Transfer Credits
 - Academic Career Tracking
- Graduate Student Success Center, which includes
 - Graduate Student Support and Engagement
 - Graduate Professional Development
 - Postdoctoral Affairs & Prestigious Awards
 - Grad Care
 - Graduate Student Recruitment
 - Thesis, Dissertation, and Publication

Graduate Academic Affairs

The Academic Affairs team serves graduate programs across campus by implementing policies and best practices for units to develop curriculum and support students in successful academic journeys from admission to graduation.

- IT Systems (<https://graduateschool.ufl.edu/academics/it/>) maintains and enhances online database systems that track both individual and institutional performance in graduate education at UF.
- Curriculum and Programs (<https://graduateschool.ufl.edu/academics/cp/>) manages graduate curricular proposals, coaches academic units through the proposal process, provides logistical support for the Graduate Council and

Graduate Curriculum Committee meetings, and curates, updates, and publishes the Graduate Catalog and its academic calendar.

- Admissions and Transfer Credits (<https://graduateschool.ufl.edu/academics/at/>) manages graduate conditional and special exception admissions, transfers of credit, and master's degree acknowledgments.
- Academic Career Tracking (<https://graduateschool.ufl.edu/academics/act/>) oversees graduate students' academic careers, including graduate degree audits, degree evaluation, and degree certification.

Graduate Student Success Center

The Graduate Student Success Center was created with the graduate student at its core. The center is here to enhance the graduate student experience by promoting holistic development and creating a culture of belonging. The values that shape their work include integrity, service, advocacy, empathy, collaboration, and innovation

The Graduate Student Success Center was established to support potential graduate students, current students, faculty, and staff in the areas of

- Graduate Student Support and Engagement (<https://grad.ufl.edu/gss/ogsse/>) by building and sustaining an inclusive community that provides comprehensive graduate student support and engagement services to promote academic success, personal development, and social well-being so our graduates can transform the global economy
- Graduate Professional Development (<https://gradadvance.graduateschool.ufl.edu/>) by providing professional development activities and programs for UF graduate students
- Postdoctoral Affairs & Prestigious Awards (<https://grad.ufl.edu/postdoc/>) by offering direction to UF's Post-Doctoral Affairs Office, maintaining oversight of individual development plans and human resource needs and creating and maintaining active lists of funding opportunities for graduate students, as well as providing assistance in the completion of funding award packets
- Grad Care (<https://success.grad.ufl.edu/help/grad-care/>), a non-clinical case manager role created through the collaboration of the UF Graduate School and UF Student Life Office, by helping graduate students overcome challenges impacting their personal and academic success at the University of Florida
- Graduate Student Recruitment by assisting and advising graduate programs on ways to increase domestic and international graduate student enrollment
- Thesis, Dissertation, and Publication (<https://success.grad.ufl.edu/td/>) by assisting with the formatting and submission process for students submitting a master's thesis or doctoral dissertation to the Graduate School

For more information or questions about the Graduate School's organization, visit <https://grad.ufl.edu/about/team/> or use the Graduate School Contact Form found here: <https://grad.ufl.edu/contact-us/>.

Graduate Council

The Graduate Council, chaired by the Dean (p.), is a joint committee (<https://senate.ufl.edu/committees--councils/committees/uf-joint-committees/>) established by the President (p. 945) and the Faculty Senate (<https://senate.ufl.edu/>). The Council establishes general policies and standards of the Graduate School and assists the dean of the Graduate School in the execution of policies related to graduate study and associated research. Graduate School staff (<https://grad.ufl.edu/academics/cp/team/>) provide support to the council by reviewing and editing all proposals submitted by administrative and/or academic units to ensure they comply with Graduate Council policy.

The Graduate Council consists of twelve members of the Graduate Faculty (p.), a graduate student elected by the Graduate Student Council, and the Dean of the Graduate School. Six of the twelve faculty members of the Graduate Council are elected by the Graduate Faculty, and six are appointed by the Provost. All members serve for overlapping three-year terms, aside from the Graduate School Dean (permanent chair) and the graduate student representative (one year).

Nicole L. P. Stedman, Chair
Dean of the Graduate School and Associate Provost

Graduate Council 2025-2026

Members Elected by Graduate Faculty:

- Dr. Jörg Bungert**
UF Department of Biochemistry and Molecular Biology
- Dr. James Jawitz**
UF Department of Soil, Water, and Ecosystem Sciences
- Dr. Abdoulaye Kane**
UF Department of Anthropology and Center for African Studies
- Dr. Michael Martinez**
UF Department of Political Science
- Dr. Connie Mulligan**
UF Department of Anthropology
- Dr. Pilar Useche**
UF Department of Food and Resource Economics and Center for Latin American Studies

Members Appointed by the Provost:

- Dr. Hitomi Greenslet**
UF Department of Mechanical and Aerospace Engineering
- Dr. Chris Janiszewski**
UF Department of Marketing
- Dr. Andrei Kirilenko**
UF Department of Tourism, Hospitality, and Event Management
- Dr. Linjuan Rita Men**
UF Department of Public Relations
- Dr. Joni Williams Splett**
UF School of Special Education, School Psychology, and Early Childhood Studies
- Dr. Weizhou Zhang**
UF Department of Pathology, Immunology, and Laboratory Medicine

Graduate Student Council Representative:

Fatima Akinola
UF Department of Mathematics

Graduate Student Council Representative Alternate:

Ali Mahmoudi
UF Department of Interior Design

History

Graduate study at UF existed while the University was still on its Lake City campus. However, the first graduate degrees, two Master of Arts with a major in English, were awarded on the Gainesville campus in 1906. The first Master of Science was awarded in 1908, with a major in entomology. The first programs leading to the Ph.D. were approved in 1930, and the first degrees were awarded in 1934, one with a major in chemistry and the other with a major in pharmacy. The first Ed.D. was awarded in 1948. Graduate study has grown phenomenally at UF. In 1930, 33 degrees were awarded in 12 fields. In 1940, 66 degrees were awarded in 16 fields. Over the 2023-2024 academic year, UF awarded 6229 graduate degrees in more than 239 fields, including 757 Ph.D. degrees.

UF Graduate School Deans and Years of Service

Years of Service	Graduate Deans
June 2021 to Present	Nicole L. P. Stedman, Dean
May 2007 to May 2021	Henry T. Frierson, Dean
2004-2007	Kenneth J. Gerhardt, Interim Dean
1999-2004	Winfred M. Phillips, Dean
1998-1999	M. Jack Ohanian, Interim Dean
1993-1998	Karen A. Holbrook, Dean
July-September 1993	Gene W. Hemp, Acting Dean
1985-1993	Madelyn M. Lockhart, Dean
1983-1985	Donald R. Price, Acting Dean
September 1982-January 1983	Gene W. Hemp, Acting Dean
1980-1982	Francis G. Stehli, Dean
1979-1980	F. Michael Wahl, Acting Dean
1973-1979	Harry H. Sisler, Dean
1971-1973	Alex G. Smith, Acting Dean
1969-1971	Harold P. Hanson, Dean
1952-1969	L. E. Grinter, Dean
1951-1952	C. F. Byers, Acting Dean
1938-1951	T. M. Simpson, Dean
1930-1938	James N. Anderson, Dean

Governance of the University

Florida State Board of Education

The Department of Education is here to increase the proficiency of all students within one seamless, efficient system by providing them with the opportunity to expand their knowledge and skills through learning opportunities and research valued by students, parents, and communities and to maintain an accountability system that measures student progress.

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The Board of Governors comprises seventeen members, fourteen of whom are appointed by the Florida Governor and confirmed by the Florida Senate for a term of seven years. The remaining members include the Chair of the Advisory Council of Faculty Senates, the Commissioner of Education, and the Chair of the Florida Student Association. The Board oversees the operation and management of the Florida public university system's twelve institutions.

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Contact a member of the Board of Governors

Board of Governors
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The UF Board of Trustees is the public body corporate of the University. It sets policy for the institution and serves as the institution's legal owner and final authority. The UF Board of Trustees holds the institution's resources in trust and is responsible for their efficient and effective use. The UF Board of Trustees consists of six citizen members appointed by the Governor and five citizen members appointed by the Board of Governors. The Chair of the Faculty Senate and the President of the Student Body are also voting members. For more information, visit <https://trustees.ufl.edu>. (<https://trustees.ufl.edu/>)

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The Presidential Cabinet

For the most up-to-date Cabinet information, please visit the page maintained by the Office of the President: <https://president.ufl.edu/cabinet> (<https://president.ufl.edu/cabinet/>).

Kent Fuchs
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 Vice President
 Human Resources

Kurt Dudas (<https://president.ufl.edu/cabinet/#el-cd025e77>)
 Vice President for Strategic Initiatives
 Office of the President

Elias G. Eldayrie (<https://president.ufl.edu/cabinet/#el-d565842e>)
Vice President and CIO
Information Technology

Ryan Fuller (<https://president.ufl.edu/cabinet/>)
Vice President
General Counsel

Nick Kozlov (<https://president.ufl.edu/cabinet/#el-e95e1d7e>)
Chief Financial Officer

Colt Little (<https://president.ufl.edu/cabinet/#el-8fa311ca>)
Vice President
Construction, Facilities, and Real Estate

Maria Martin (<https://president.ufl.edu/cabinet/#el-7f0cc636>)
Vice President
Advancement

Stephen J. Motew (<https://president.ufl.edu/cabinet/#el-5168f2cd>)
President and System CEO
UF Health

David Norton (<https://president.ufl.edu/cabinet/#el-19bc2875>)
Vice President
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Interim Vice President for Strategic Communications

Mary Parker (<https://president.ufl.edu/cabinet/#el-071fe1b6>)

Vice President and Chief Enrollment Strategist
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Director
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Heather White (<https://president.ufl.edu/cabinet/#el-9e1bc25b>)
Vice President
Student Life

University of Florida Deans

College Deans

See <https://president.ufl.edu/deans/> for the most up-to-date list of College Deans.

College of Agricultural Life and Sciences (<https://president.ufl.edu/deans/#el-1b5e7f94>)

College of the Arts (<https://president.ufl.edu/deans/#el-272c3576>)

Warrington College of Business (<https://president.ufl.edu/deans/#el-182758ba>)

College of Dentistry (<https://president.ufl.edu/deans/#el-c936132e>)

College of Design, Construction and Planning (<https://president.ufl.edu/deans/#el-ba4452c2>)

College of Education (<https://president.ufl.edu/deans/#el-da983f6b>)

Herbert Wertheim College of Engineering (<https://president.ufl.edu/deans/#el-003a8ea4>)

College of Health and Human Performance (<https://president.ufl.edu/deans/#el-f7e3a9f6>)

College of Journalism and Communications (<https://president.ufl.edu/deans/#el-e31b5521>)

Levin College of Law (<https://president.ufl.edu/deans/#el-83aafae8>)

College of Liberal Arts and Sciences (<https://president.ufl.edu/deans/#el-df0ab483>)

College of Medicine (<https://president.ufl.edu/deans/#el-c1771d4d>)

College of Nursing (<https://president.ufl.edu/deans/#el-b2c742f9>)

College of Pharmacy (<https://president.ufl.edu/deans/#el-c9d71d69>)

College of Public Health and Health Professions (<https://president.ufl.edu/deans/#el-004d0422>)

College of Veterinary Medicine (<https://president.ufl.edu/deans/#el-b74587f1>)

Other Deans

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Dean for Research, Institute of Food and Agricultural Sciences

Patrick Reakes, M.S.L.S.
Interim Dean, University Libraries

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Dean of the Graduate School and Associate Provost

Christopher Summerlin, Ph.D.
Dean of Students

Marta Wayne, Ph.D.
Dean of the International Center and Associate Provost

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