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 (http://gradcatalog.ufl.edu/graduate/degrees/) 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 (http://gradcatalog.ufl.edu/graduate/degrees/) 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 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 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	Trainee Seminar Series	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 6139	Personal Genomics and Your Health	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.