

ENTOMOLOGY AND NEMATOTOLOGY

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 Management 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 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.

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. Emphasising 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.