

ENT

Entomology

Courses offered

ENT 110 INSECT BIOLOGY. (3)*

Overview of the biology of insects. Emphasizes how this enormously abundant and important group of animals has resolved the basic challenges of survival and reproduction. Principles of physiology, behavior, ecology, and evolution are introduced using insects as examples. The roles of both beneficial and detrimental insects will be discussed. [Offered in fall, spring and summer.]

ENT 209 BEES AND PEOPLE. (3)

Bees are a charismatic group of insects with important roles in human society. They are critical crop and wild flower pollinators, and have been cultivated for pollination, honey, and wax production for thousands of years. Some bee species live in social groups, including the honey bee, which lives in one of the most complex societies in the animal kingdom. This course will focus on bee biology, diversity, behavior, and basic beekeeping to teach students about scientific approaches in diverse areas of biology. We will also address the ways in which scientific consensus is reached around controversial issues, particularly those that threaten bee populations.

ENT 220 PLAGUE, PESTS, AND PESTILENCE: HISTORY AND GLOBAL PERSPECTIVE. (3)

Vectors are living organisms that can transmit infectious diseases between humans or from animals to humans. Vector-borne diseases have impacted human lives and society through history. This introductory course examines the major vector-borne diseases affecting humans through multiple perspectives (biomedical, cultural, political, and social) on a global scale. Special attention will be paid to arthropod-borne diseases with the greatest impact on history such as mosquitoes, ticks, and lice. Lectures will be supplemented with readings and videos. The reasons why new pathogens emerge, and the risk of bio-terrorism and future outbreaks will also be addressed.

ENT 300 GENERAL ENTOMOLOGY. (3)

Fundamentals of insect biology and relationships among insects, plants, and other organisms; identification of commonly encountered insects. Beneficial and detrimental effects of insects are discussed. Lecture, two hours; laboratory, two hours per week. Prereq: One course in introductory biology. (Same as BIO 300.) [Offered in fall only.]

ENT 310 INSECT PESTS OF FIELD CROPS. (3)

Identification, life histories and control of insects attacking field crops, especially those of importance in Kentucky. The damage that these insects cause, the reasons for their abundance, and alternatives in control practices will also be emphasized. Lecture, two hours per week; laboratory, two hours per week. [Offered in fall only.]

ENT

Entomology

ENT 320 HORTICULTURAL ENTOMOLOGY. (3)

A detailed coverage of the insects and mites attacking turf, ornamentals, greenhouse plantings, vegetables and fruits, with emphasis on field recognition of the pests and their damage. Lecture, two hours per week; laboratory, two hours per week. [Offered in fall only.]

ENT 340 LIVESTOCK ENTOMOLOGY. (2)

Biology and behavior of insects and other pests attacking livestock, poultry, pets and wildlife. Current control methods are discussed. For students interested in livestock production, farm management, equine management, dairy science, poultry science, and preveterinary medicine, as well as general agriculture. Prereq: One course in introductory biology. [Offered in spring only.]

ENT 360 GENETICS. (3)

The basic principles of heredity as currently understood from evidence accumulated in classical, cytogenetic, molecular, and quantitative genetic experiments. Emphasis is placed on a thorough understanding of genetic principles and the relationship of genetics to all biological disciplines. Prereq: BIO 148, BIO 152 and CHE 105 or consent of instructor. (Same as ABT 360.) [Offered in fall only.]

ENT 395 INDEPENDENT WORK. (1-3)

Special problems for individual students who are capable of pursuing independent investigations in the various areas of entomology. May be repeated to a maximum of six credits. Prereq: ENT 300. [Offered in fall, spring and summer.]

ENT 399 FIELD BASED/COMMUNITY BASED EDUCATION. (1-6)

Field-based or community-based experience in entomology under supervision of a faculty member. Pass/Fail only. Prereq: Permission of faculty member and department chairperson and completion of a departmental learning agreement before registration. [Offered in fall, spring and summer.]

ENT 460 INTRODUCTION TO MOLECULAR GENETICS. (3)

Molecular genetics is the study of the biochemical basis of heredity and focuses on the structure and expression of DNA at the molecular and cellular level. The course will provide a detailed understanding of the biochemical events involved in genome replication, prokaryotic and eukaryotic transcription, and translation of DNA, as well as RNA processing, recombination and the theoretical underpinnings of genetic engineering. Prereq: ABT/ENT 360 or BIO 304 or consent of instructor. (Same as ABT 460.) [Offered in spring only.]

ENT

Entomology

ENT 461G INTRODUCTION TO POPULATION GENETICS. (3)

This survey course examines the population dynamics and equilibria of genes in nuclei, chloroplasts and mitochondria. Emphasis will be on biological relevance (in plants, animals, and micro-organisms), but some theoretical derivations will also be introduced. Prereq: ABT 360 (or equivalent) and one course in probability/statistics. (Same as ABT/BIO/FOR 461G.) [Offered in spring only.]

ENT 502 FOREST ENTOMOLOGY. (3)

Insects play an integral role in forest health and forest sustainability, both from the ecosystem benefits they provide and from their status as pests. This course provides an overview of the many benefits insects provide before focusing on their role as herbivores affecting forest productivity and sustainability. Lectures primarily address principles and concepts. Laboratories use a hands-on approach to demonstrate insect collecting and identification techniques, ecological concepts and management approaches, and use of reference materials. Prereq: A minimum of 3 credits of basic biology (BIO 103 or BIO 148 or equivalent) or consent of instructor. (Same as FOR 502.) [Offered in fall only.]

ENT 505 EVOLUTION IN AGRICULTURE, MEDICINE AND CONSERVATION BIOLOGY. (3)

An introduction to modern evolutionary theory with emphasis on its application to current problems in agriculture, the biomedical sciences, and conservation biology. Prereq: Genetics (ABT 360, BIO 304 or equivalent introductory genetics course). (Same as ABT 505.)

ENT 509 BRAINS AND BUDS: NEUROSCIENCE OF POLLINATION. (3)

Pollinators have tremendous agricultural and societal value, and to a neuroscientist, they showcase principles of cognition in the real world. Pollinator species present exquisite examples of co-evolution, physiological and dietary specialization, navigation in complex landscapes, collective decision-making processes, and the behavioral consequences of environmental toxins and disease. In this course, we will use pollinator species (honey bees and other insects, as well as vertebrate pollinators) to explore how critical features of pollination intersect at the level of brain function, covering important neuroscience topics including sensory ecology and evolution, neural energetics, mechanisms of addiction and reward, molecular neuroscience, cognition, and learning and memory. Prereq: Students must have at least Junior standing in a life sciences discipline, or permission from instructor. (Same as BIO 509.)

ENT 520 DIGITAL IDENTIFICATION: INSECTS & THEIR RELATIVES. (3)

A study of arthropod identification using digital tools instead of physical curation methods. Phylogenetic relationships and key characteristics are emphasized, along with the translation of Family-level identification to practical interpretation, including pest management and natural-resource education related to North American arthropods. Prereq: Current student in STO (Science Translation and Outreach) graduate program, BIO 148, or consent of instructor.

ENT

Entomology

ENT 530 INTEGRATED PEST MANAGEMENT. (3)

Principles of insect damage, populations and distributions. Various types of natural and applied control, including problems of insecticide toxicity, resistance and residues. Prereq: ENT 300 or ENT 310 or ENT 320 or equivalent course, or consent of instructor.

ENT 561 INSECTS AFFECTING HUMAN AND ANIMAL HEALTH. (3)

We all have been bitten at some point by a mosquito, tick, or some other arthropod. They spread life-threatening diseases while taking a blood-meal (hence referred to as vectors). Nearly ~17% of all infectious diseases are vector borne (VB) that result in over 700k deaths globally. In the US alone, VB disease cases tripled from 2004 to 2016. This course broadly introduces and examines vectors, VB diseases, and their epidemiology. Guest lectures from the faculty of UK Medical College, College of Public Health and KY department of Health personnel are included in the course. Prereq: 3 credits of basic biology (BIO 103 or BIO 148 or equivalent) or permission of instructor. (Same as BIO/CPH 561.) Offered in fall every year.

ENT 563 PARASITOLOGY. (4)*

Protozoan, helminth and arthropod parasites of man and domestic animals, emphasis on etiology, epidemiology, methods of diagnosis, control measures, and life histories. Techniques for host examination and preparation of material for study. Prereq: BIO 148, BIO 152, BIO 155 or BIO 198, or consent of instructor. (Same as BIO 563.)

ENT 564 INSECT TAXONOMY. (4)

A study of insect taxonomy including the collection, preparation, and identification of adult insect specimens. Prereq: Consent of instructor. (Same as BIO 564.) [Offered in fall – even years.]

ENT 568 INSECT BEHAVIOR. (3)

The principles of animal behavior will be stressed using insects as examples. Physiology, mechanisms, behavioral ecology and evolution of insect behavior will be covered. Prereq: One year of biology or permission of instructor. (Same as BIO 568.)

ENT 595 ENTOMOLOGICAL SPECIAL TOPICS (Subtitle required). (1-4)

Special topics or experimental courses in Entomology for undergraduate and graduate students. Special title is required and must be approved by the chairperson of the Department of Entomology. A particular title may be offered twice at most under ENT 595. Students may not repeat under the same subtitle. Prereq: Will be set by instructor. (Offered in fall and spring.)

ENT

Entomology

ENT 606 CONCEPTUAL METHODS IN ECOLOGY AND EVOLUTION. (3)*

This course provides students with hands-on experience in a diverse array of conceptual research techniques used by ecologists and evolutionary biologists. The focus will be on optimization methods used for predicting animal and plant behaviors and life histories, and on methods for assessing population trends and dynamics. Mathematical techniques used will include graphical analyses, matrix algebra, calculus, and computer simulations. The latter part of the course will consist of collaborative modeling projects, in which small groups of students will work with the instructor to address an important contemporary research problem and will report their results in a public talk and a project writeup. Prereq: One year of calculus and BIO 325 or FOR 340 or ENT 665, or consent of instructor. (Same as BIO/FOR 606.)

ENT 607 ADVANCED EVOLUTION. (2)*

This course covers advanced topics in evolution, concentrating on questions central to the understanding of general evolutionary processes. Phenomena occurring both within populations (e.g., selection, inheritance, population subdivision) and between populations (e.g., gene flow, competition) will be addressed. Special attention will be given to modern research approaches and techniques including quantitative genetics, measurement of selection, phylogenetic analyses of comparative data and molecular systematics. Prereq: One year of calculus, genetics (BIO 304 or BIO 461) and BIO 508 or consent of instructor. (Same as BIO/FOR 607.) [Offered in fall only.]

ENT 608 BEHAVIORAL ECOLOGY AND LIFE HISTORIES. (2)

This course uses an evolutionary approach to examine behavior and life histories. Topics addressed include: the optimality approach, constraints on optimality, kin and group selection, predator and prey behaviors, social and mating behaviors, and life history evolution. Prereq: BIO 325 and one semester of calculus; or consent of instructor. (Same as BIO/FOR 608.)

ENT 609 POPULATION AND COMMUNITY ECOLOGY. (3)*

This course discusses the processes that determine population distributions and dynamics and community structure for both plants and animals. Topics addressed include: population regulation and population stability, community diversity and stability, ecological succession, population interactions (competition, predation, mutualism), coevolution, and the effects of spatial and temporal heterogeneity on population and community patterns. Prereq: BIO 325 or FOR 340 or consent of instructor. (Same as BIO/FOR 609.) [Offered in fall only.]

ENT

Entomology

ENT 625 INSECT-PLANT RELATIONSHIPS. (3)

This course examines the natural history, ecology, and evolution of insect/plant relationships. Topics include mechanisms and theory of plant defense, behavioral and physiological adaptations of herbivorous insects, pollination biology, multitrophic-level interactions, causes of insect outbreaks, and applications to managed ecosystems. Critical reading and discussion of current literature is emphasized. Prereq: Two years of college-level biology. (Same as BIO 625.) [Offered in spring – odd years.]

ENT 635 INSECT PHYSIOLOGY. (4)

Study of insect physiological processes including development, digestion, reproduction, respiration, excretion, hormones and immunity. Opportunity to learn techniques used in insect physiology and molecular biology. Prereq: Consent of instructor. [Offered in spring – even years.]

ENT 636 INSECT MOLECULAR BIOLOGY. (4)

Principles of insect molecular biology. Analysis of insect development, reproduction, behavior, immunity, transgenic insects and insecticide resistance at the molecular level. Hands-on experience with molecular biology techniques. Prereq: ENT/BIO 635 or consent of instructor. [Offered in spring – odd years.]

ENT 660 IMMATURE INSECTS. (3)

Bionomics, structure and classification of immature stages of insects; practice in their identification. Lecture, one hour; laboratory, six hours. Prereq: BIO 570 or ENT 564, or consent of instructor.

ENT 665 INSECT ECOLOGY. (3)

The biotic and physical factors influencing the distribution and abundance of insects and insect populations. Prereq: Consent of instructor. [Offered in fall – even years.]

ENT 667 INVASIVE SPECIES BIOLOGY. (3)

This course examines the circumstances that allow introduced organisms to become invasive, how invasive species threaten our resources, examine specific introductions (past and present) threatening our resources, and investigates approaches to minimizing the incidence and impact of invasions. Our purpose is to develop insights into the biology and ecology of biological invasions so as to gain an understanding of how they're threatening resource sustainability, and means of minimizing their impacts. Prereq: Graduate standing or consent of instructor. (Same as BIO/FOR 667.) [Offered in fall – odd years.]

ENT

Entomology

ENT 670 SCIENTIFIC PUBLISHING: PROCESS AND ETHICS. (2)

An introduction to scientific publishing, including types of scientific journals, choosing where to publish, the structure of scientific papers, the peer review process, data management and archiving, post-publication promotion of research, metrics of scientific impact such as impact factors and altmetrics, and publication ethics. Prereq: Graduate student in a science discipline OR permission of instructor.

ENT 680 BIOLOGICAL CONTROL. (3)

Principles related to the use of arthropods to suppress populations of arthropod pests and weeds. Includes historical perspective, ecological relationships, and contemporary issues related to the conservation and manipulation of arthropod predators, parasitoids, and herbivores. Prereq: ENT 300 or equivalent OR permission of instructor. [Offered in spring – even years.]

ENT 684 PHYLOGENETIC SYSTEMATICS. (3)

Theory and methods of phylogenetic analysis and cladistics will be explained. Applications of phylogenetic analysis, such as historical biogeography, biological classification, and testing of ecological hypotheses will be explored. (Same as BIO 684.)

ENT 695 SPECIAL TOPICS IN ENTOMOLOGY (Subtitle required). (1-4)

Special topical or experimental courses in entomology for graduate students. Special title required and must be approved by the chairperson of the Department of Entomology. A particular title may be offered twice at most under ENT 695. Students may not repeat under the same subtitle. Prereq: Will be set by instructor. [Offered in fall and spring.]

ENT 748 MASTER'S THESIS RESEARCH. (0)

Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed. [Offered in fall and spring.]

ENT 770 ENTOMOLOGICAL SEMINAR. (0-1)

Discussion of current research problems in entomology. May be repeated to a maximum of six hours. [Offered in fall and spring.]

ENT 780 SPECIAL PROBLEMS IN ENTOMOLOGY AND ACAROLOGY. (2-3)

Investigations of chosen insect problems, including original work. Discussion and assignment of current insect subjects. May be repeated to a maximum of six credits. Prereq: Consent of the instructor (Director of Online Plan B MS in Entomology). [Offered in fall and spring.]

ENT 790 RESEARCH IN ENTOMOLOGY AND ACAROLOGY. (1-6)

Independent research in entomology or acarology. May be repeated to a maximum of 12 hours. Prereq: Consent of instructor. [Offered in fall and spring.]