ENTOMOLOGY (ENT)

ENT 518: Insect Natural History

2 Credits

Experiential learning in field ecology highlighting insect dynamics, diversity and adaptations in terrestrial and aquatic systems. ENT 518 Insect Natural History (2) This is an experiential learning course in field ecology highlighting insect dynamics, diversity and adaptations in terrestrial and aquatic habitats. On site sessions will introduce ecological processes and natural history from a variety of habitats. Students will gain experience in field sampling and collection techniques, field notebook documentation, GPS use, and specimen databasing. Course is designed for those with limited field experience with insects. The course is intended for new graduate students in Entomology and Ecology. Insect adaptations across multiple habitats are observed in natural, agricultural, and forestry settings and the underlying ecological processes, anthropogenic interactions, and agro/forestry ecosystem management approaches are introduced. A team of faculty and staff from Entomology, and various outside instructors accompany students to various field sites to characterize the attributes, problems, and solutions relative to insect abundance and diversity in each setting. Students learn a wide variety of field sampling and collection methods, sight and key identification to order and major family levels, and standard curation and databasing techniques for arthropods collected for scientific purposes. Methods taught include a variety of light and pheromone trapping, pit traps, sticky traps, malaise traps, sweep netting, and sequential sampling. Curation methods including spreading and pinning, and alcohol and other preservation liquids and drying for immature insects are covered. Community diversity and Shannon Index and advanced statistical characterization of community complexity methods are applied to differing community data that are gathered by teams of students during their chosen mini projects as well as the aquatic community sampling results for Spring Creek vs. Cherry Run. A student collection is required, and at the end of the week each collection is evaluated and graded. Student field notebooks are kept throughout the course and these too are evaluated on the last day and then returned to the students for their continued use.The course is offered over a 5-day period at the end of the insect "active season" with collection and sampling activities requiring natural light or darkness for a variety of the species studied. For example, aquatic insect stream sampling must be done in daylight and collecting for mosquitoes and other insects must be done at dusk or at night with specialized traps. It is essential that this course be completed prior to night temperatures in the 50's and before the first killing frost.

Prerequisite: one of the following courses: ENT 425 , ENT 402W or ENT 410 , BIOL 436 , BIOL 446 , or ECLGY510

ENT 520: Frontiers in Insect Science

4 Credits

This graduate course is designed to provide an overview of the diversity of subjects that fall within the subject of entomology.

ENT 522: Critical Thinking and Professional Development in Entomology

6 Credits

This is a required coruse for Entomology graduate students focusing on developing the professional skills needed for a successful career in basic or applied research. ENT 522 Critical Thinking and Professional Development in Entomology (6) This required course for Entomology graduate students focuses on developing the professional skills needed for a successful career in basic or applied research. Major topics addressed include (i) effective scientific communication, (ii) the mechanisms of research funding and peer review, (iii) critical evaluation of scientific evidence and arguments, (iv) basic principles of study design, and (v) research ethics and effective collaboration. Students engage in a variety of classroom activities - including lectures, discussions, and peer review of written assignments - and interact with instructors possessing expertise in each of the particular subject areas addressed, as well as with guest instructors working on cutting-edge topics in insect science and related fields. The course emphasizes practical application of the material presented to students' own research. Over the course of the semester, each student reviews relevant literature and develops and refines a research proposal based on their own scientific interests.

ENT 530: Seminar in Insect Science

1 Credits/Maximum of 4

Seminar in insect science. Topics range from insect phys & immunology to chemical ecology & epidemiology. ENT 530 Seminar in Insect Science (1 per semester/maximum of 4) This class will examine current issues in insect science. Topics for a semester will range from insect physiology, immunology and disease to population ecology, agroecology, and biodiversity. The intent is to generate useful discussions that will help participants advance their own understanding of the broader debate about various research topics in insect science. Specific topics will change each semester allowing students to choose those topics of the greatest interest. Topics will be proposed by faculty with expertise in specific areas. Seminal articles, peer-reviewed literature, government and industry reports, webpages and government regulatory documents will be selected by the faculty member proposing the topic to broaden and deepen student understanding of the topic area. Class participation is expected during discussions and oral presentations of topic areas will be expected.

Prerequisite: Prerequisite or concurrent: ENT 520

ENT 532: Insect Biodiversity and Evolution

4 Credits

This course is designed to teach students about insect taxonomy, evolutionary history, collection and preservation techniques, morphology, fossils, and natural history. Lab work focuses on adult forms, especially of insects found in Pennsylvania. Students learn how to handle specimens, use diagnostic keys, and identify insects by sight. Collecting techniques will be honed during field trips. Upon completion of this course students will be able to: (1) teach others how to collect, preserve, and transport insect specimens; (2) name and sight-identify all insect orders and several common local families; (3) label a generalized insect diagram with external anatomy terms; (4) draw a phylogenetic tree of relationships between insect orders; (5) demonstrate understanding of how to read a phylogenetic tree, what kinds of data are used to estimate trees, how those data are analyzed, and what it means to be monophyletic; (6) describe key innovations and life history strategies of major insect lineages; (7) solve taxonomic problems and describe how species and other taxa are named and described, i.e., understand the fundamentals of taxonomic practice; (8) name and briefly describe the latest developments in insect biodiversity research; (9) explain how hexapods inform us about biodiversity and influence our conservation decisions.

ENT 535: Statistical Techniques in Entomology

3 Credits

Research methods course covering experimental design and analysis in entomology, ecology, and the agricultural science. ENT 535 Statistical Techniques in Entomology (3) This natural sciences study design, analysis and interpretation course is for graduate students in ecological and agricultural sciences. The goal of this course is to provide students with the tools needed to conduct quantitative studies. The course focuses on study design and methodology by covering topics such as the relationship between study design and data types and data collection, and interpretation of results.

ENT 539: Chemical Ecology of Insects

3 Credits

Interactions of insects with environmental chemicals, including natural and synthetic compounds; host finding and other behavior modifying cues.

ENT 590: Colloquium

1-3 Credits/Maximum of 3

Continuing seminars which consist of a series of individual lectures by faculty, students, or outside speakers.

ENT 596: Individual Studies

1-9 Credits/Maximum of 9

Creative projects, including nonthesis research, which are supervised on an individual basis and which fall outside the scope of formal courses

ENT 597: Special Topics

1-9 Credits/Maximum of 9

Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.

ENT 600: Thesis Research

1-15 Credits/Maximum of 999

No description.

ENT 601: Ph.D. Dissertation Full-Time

0 Credits/Maximum of 999

No description.

ENT 602: Supervised Experience in College Teaching

1-3 Credits/Maximum of 6

Supervised experience in development of instructional materials, organizing and conducting lectures, laboratories, and evaluating students in Entomology courses (1-599).

ENT 603: Foreign Academic Experience

1-12 Credits/Maximum of 12

Foreign study and/or research constituting progress toward the degree at a foreign university.