**ENTOMOLOGY (ENTO)**

**ENTO 800 Insect Biodiversity**

**Prerequisites:** 12 hrs. of biological sciences, graduate standing and ENT 116 or equivalent for entomology majors

**Description:** Classification, taxonomy, and biology of adult insects. Identification of orders and families of insects using keys. Collection required using techniques for collecting, preparing, and curating. One oral/written term paper required.

**Credit Hours:** 4

**Max credits per semester:** 4

**Max credits per degree:** 4

**Grading Option:** Grade Pass/No Pass Option

**ENTO 801 Insect Physiology**

**Crosslisted with:** ENTO 401

**Prerequisites:** CHEM 251 or CHEM 255; 12 hrs entomology or biological sciences (zoology).

**Description:** Functions and other phenomena associated with the major organ systems of insects; the cuticle, nervous, circulatory, digestive, metabolism, nutrition, locomotion, reproduction, respiration, and growth and development.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**ENTO 801L Insect Physiology Lab**

**Prerequisites:** CHEM 251 or CHEM 255; 12 hrs. entomology or biological sciences (zoology)

**Notes:** Must also register for required lecture ENTO 801.

**Description:** Functions and other phenomena associated with the major organ systems of insects; the cuticle, nervous, circulatory, digestive, metabolism, nutrition, locomotion, reproduction, respiration, and growth and development.

**Credit Hours:** 1

**Max credits per semester:** 1

**Max credits per degree:** 1

**Grading Option:** Grade Pass/No Pass Option

**ENTO 802 Aquatic Insects**

**Crosslisted with:** BIOS 485, BIOS 885, ENTO 402, NRES 402, NRES 802

**Prerequisites:** 12 hrs biological sciences.

**Description:** Biology and ecology of aquatic insects.

**Credit Hours:** 2

**Max credits per semester:** 2

**Max credits per degree:** 2

**Grading Option:** Grade Pass/No Pass Option

**Prerequisite for:** BIOS 485L, BIOS 885L, ENTO 402L, ENTO 802L, NRES 402L, NRES 802L

**ENTO 802L Identification of Aquatic Insects**

**Crosslisted with:** BIOS 485L, BIOS 885L, ENTO 402L, NRES 402L, NRES 802L

**Prerequisites:** Parallel ENTO 802, NRES 402/802, BIOS 485/885.

**Description:** Identification of aquatic insects to the family level.

**Credit Hours:** 1

**Max credits per semester:** 1

**Max credits per degree:** 1

**Grading Option:** Grade Pass/No Pass Option

**ENTO 803 Management of Horticultural Crop Insects**

**Crosslisted with:** ENTO 403

**Prerequisites:** Introductory biology course.

**Description:** The biology, ecology and management of insect pests of horticultural crops such as vegetables, fruit trees, trees and shrubs, greenhouse crops, turf and ornamentals. Employing Integrated Pest Management (IPM) strategies to maintain pests below damaging levels while minimizing the use of traditional insecticides.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**ENTO 805 Introduction to Entomology**

**Prerequisites:** Permission

**Notes:** Open only to students that have not taken an entomology course.

**Description:** Introduction to insects (diversity, identification, morphology and physiology, ecology and behavior, and pest management). Beneficial, economic, and medical importance of insects.

**Credit Hours:** 1

**Max credits per semester:** 1

**Max credits per degree:** 1

**Grading Option:** Graded

**Offered:** FALL/SPR

**Prerequisite for:** ENTO 412, ENTO 812; ENTO 800

**ENTO 806 Insect Ecology**

**Crosslisted with:** BIOS 406, BIOS 806, ENTO 406

**Prerequisites:** BIOS/NRES 220 and 222.

**Description:** Biotic and abiotic factors as they influence insect development, behavior, distribution, and abundance.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**ENTO 809 Insect Control by Host-Plant Resistance**

**Crosslisted with:** ENTO 409

**Prerequisites:** 12 hrs agricultural sciences and/or biological sciences including one course in entomology and one course in genetics.

**Description:** Explore resistance of crops to herbivorous arthropods. Investigate how insect behavior and physiology are affected by resistance, critically review current research on plant resistance genes, and the molecular, biochemical and physiological aspects of insect/microbe interactions with host plants.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**ENTO 810 Insects as Educational Tools for the Classroom**

**Prerequisites:** Introductory entomology course

**Description:** Overview of insects. Insect diversity, insect structure and function, insect ecology and behavior, and the beneficial and detrimental roles insects play. Integrating the study of insects into the classroom to enhance science education.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option
ENTO 812 Entomology and Pest Management
Crosslisted with: ENTO 412
Prerequisites: Introductory course in ENTO.
Description: Principles and practices of managing insects pests. Pest management theory, use of sampling, evaluation, tactics, types of insect pests, and current issues.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 813 Biological Control of Pests
Crosslisted with: PLPT 813
Prerequisites: 12 hrs biological sciences and/or agricultural sciences
Description: Principles and practices of using natural enemies and antagonists to manage the abundance of pests and reduce economic losses.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 814 Forensic Entomology
Crosslisted with: ENTO 414, FORS 414, FORS 814
Prerequisites: ENTO 115 or equivalent introductory course.
Description: Application of entomology to legal issues. Criminal investigations, insects of forensic importance, insect succession on carrion, and case studies.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 815 Medical Entomology
Crosslisted with: ENTO 415
Prerequisites: Introductory course in ENTO.
Description: Direct and indirect importance of insects in human medicine. Principles of arthropod-borne disease, medically important arthropod groups, and arthropod-transmitted diseases.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 815A Self-pollinated Crop Breeding
Crosslisted with: AGRO 815A
Prerequisites: AGRO 215
Description: Self-pollinated plant breeding theory and methods. Pedigree, bulk, single seed descent, back-crossing methods and inbreeding theory.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Grade Pass/No Pass Option
Prerequisite for: AGRO 816B, AGRO 816E

ENTO 815B Germplasm and Genes
Crosslisted with: AGRO 815B
Prerequisites: AGRO 215
Description: Obtaining germplasm and genes from cultivated plants, wild relatives of cultivated plants, and the biosphere. Origination of crops, mutation genetics, biotechnology as a source of genes, chromosomal engineering and plant reproduction.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Grade Pass/No Pass Option

ENTO 815D Cross-pollinated Crop Breeding
Crosslisted with: AGRO 815D
Prerequisites: AGRO 215
Description: Cross-pollinated breeding theory and methods. Genes in populations, recurrent selection methods, creating populations, hybrid production practices, and population improvement theory.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Grade Pass/No Pass Option
Prerequisite for: AGRO 816B; AGRO 816E

ENTO 816 Forensic Insect Succession
Crosslisted with: ENTO 416
Description: Forensic insect succession and specific forensically important insects including their life cycle, biology, and association with decomposition. Case studies about how forensic entomology has been used in solving crimes will also be covered.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded
Offered: SPRING

ENTO 817 Pest Management Systems
Prerequisites: 10 hrs entomology and crop production courses
Description: Different philosophies and theories of insect pest management, theory vs. reality of management, interactions of public and private sectors, development and implementation of pest management programs.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 818 Insect Identification and Natural History
Prerequisites: Introductory course in entomology
Notes: Credit toward the degree may not be earned in both ENTO 800 and ENTO 818.
Description: Biology and identification of major insect orders, families, classification, and ecology.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Grade Pass/No Pass Option
Offered: SPRING
ENTO 819 Insect Behavior
Prerequisites: Introductory course in entomology
Description: The process of behavioral study involves investigating the relationship between animals and their surroundings, and their response to their kin and to other organisms. Topics include characterizing how insects find and defend their resources, how they avoid predators, how they find mates, how they mate, and how some exist in highly ordered social settings.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 820 Insecticide Toxicology
Prerequisites: 12 hrs biological sciences; 4 hrs organic chemistry
Description: Principles of toxicology, insecticide classification, mode of action, metabolism and consequences of insecticide use.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 825 Management of Agronomic Crop Insects
Prerequisites: An introductory entomology course
Description: Identification, biology, ecology and management of insect pests of agronomic crops such as corn, soybeans, sorghum, wheat, and alfalfa. Integrated Pest Management (IPM) strategies employed to maintain pests below damaging levels while minimizing the use of traditional insecticides.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 827 Population and Ecological Genetics
Prerequisites: Introductory Genetics, Introductory Algebra
Description: Introduction to key theoretical concepts in population genetics and their application. Mutation, genetic drift, structured populations, natural selection, molecular evolution.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 828 Scientific Illustration
Crosslisted with: AGRI 828, AGRO 828, HORT 828
Prerequisites: 12 hrs agricultural and/or biological sciences.
Description: Prepare scientifically accurate, high quality illustrations and graphics for the teaching, presentation, and publication of scientific information. Drawing techniques, drafting, copyright, and publication and presentation of scientific art work.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 830 Introduction to the Development of Distance Education Courses
Crosslisted with: ALEC 830
Description: Introduction to practical aspects of developing and facilitating distance education courses. Create and facilitate interaction, assessments, course delivery, assignments, course etiquette and ADA compliance. Develop a distance course module grounded in distance education theory and instructional design principles.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 835 Chemical Ecology of Insect-Plant Interactions
Prerequisites: 15 hours of agricultural sciences and/or biological sciences including one course in entomology & one course in biochemistry.
Description: A focus on insect-plant interactions including direct and indirect plant defenses against herbivory, tritrophic interactions among plant, insect herbivores and herbivore natural enemies, biochemical mechanisms of plant defenses, insect herbivore-produced elicitors of plant defenses, semiochemicals based IPM, chemical ecology of insect vectors of plant diseases, and chemical ecology of insect pollination.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: SPRING

ENTO 837 IPM in Sensitive Environments
Description: Concepts of Integrated Pest Management (IPM) and methods used to control insect pests in sensitive environments such as schools, day cares, hospitals, nursing homes, zoos, and prisons.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Grade Pass/No Pass Option
Offered: FALL

ENTO 882 Field Entomology
Crosslisted with: BIOS 482, BIOS 882, ENTO 482
Prerequisites: 12 hrs biological sciences.
Notes: Offered only at Cedar Point Biological Station.
Description: Field course in insect taxonomy and biology emphasizing field collection, specimen preparation, classification, and insect natural history.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Grade Pass/No Pass Option
Offered: SUMMER

ENTO 888 MS Degree Project
Prerequisites: Completion of 24 hrs toward the MS degree
Description: Application of graduate course work for the non-thesis MS degree program.
Credit Hours: 4
Max credits per semester: 4
Max credits per degree: 4
Grading Option: Pass No-Pass
ENTO 896 Independent Study in Entomology
Crosslisted with: ENTO 496
Prerequisites: 12 hrs biological sciences and/or agricultural sciences.
Notes: Independent study contracts must be filed with the department.
Description: Individual or group projects in research, literature review, or extension of course work.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 12
Grading Option: Grade Pass/No Pass Option

ENTO 899 Masters Thesis
Prerequisites: Admission to masters degree program and permission of major adviser
Credit Hours: 1-10
Min credits per semester: 1
Max credits per semester: 10
Max credits per degree: 99
Grading Option: Pass No-Pass

ENTO 905 Seminar in Entomology
Description: Presentation of topics in entomology or related subjects.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 8
Grading Option: Grade Pass/No Pass Option

ENTO 915 Presentation Methods
Prerequisites: Permission
Description: This course prepares entomology graduate students to give scientific and public presentations. It includes instruction in preparing posters and on-screen shows, image editing, finding entomological resources in libraries and on the internet, insect photography, and public speaking. Students develop a portfolio of their work, and they make two 12- and one 30-minute presentations to their classmates.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 920 Xenobiotics in the Environment
Crosslisted with: AGRO 920, EOHT 920, HORT 920, NRES 920
Prerequisites: Recommend one course each in organic chemistry, soil science, biochemistry, plant physiology, microbiology and ecology
Description: Fate and ecotoxicological impacts of biologically foreign compounds in soil-water-plant environments; uptake, mechanisms of toxicity and metabolism in plants and other biota. Herbicides and other pesticides.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 960 Biosystematics and Nomenclature
Crosslisted with: BIOS 960
Description: Methods and principles of systematics and nomenclature.
Credit Hours: 2-3
Min credits per semester: 2
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Grade Pass/No Pass Option

ENTO 991 Advanced Topics in Entomology
Prerequisites: Permission
Description: Advanced study of selected topics not presented in established courses.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 5
Grading Option: Grade Pass/No Pass Option

ENTO 996 Research in Entomology
Credit Hours: 1-12
Min credits per semester: 1
Max credits per semester: 12
Max credits per degree: 12
Grading Option: Grade Pass/No Pass Option

ENTO 999 Doctoral Dissertation
Prerequisites: Admission to doctoral degree program and permission of supervisory committee chair
Description: Research credits required for a doctoral dissertation for completion of degree.
Credit Hours: 1-24
Min credits per semester: 1
Max credits per semester: 24
Max credits per degree: 55
Grading Option: Pass No-Pass

ENTO 999 Doctoral Dissertation
Prerequisites: Admission to doctoral degree program and permission of supervisory committee chair
Description: Research credits required for a doctoral dissertation for completion of degree.
Credit Hours: 1-24
Min credits per semester: 1
Max credits per semester: 24
Max credits per degree: 55
Grading Option: Pass No-Pass