**ENTOMOLOGY (ENTO)**

**ENTO 2003 Insects and Society (N)**

**Credit hours:** 3  
**Contact hours:** Lecture: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Entomol & Plant Path  
**General Education and other Course Attributes:** Natural Sciences

**ENTO 2143 Global Issues in Agricultural Biosecurity and Forensics**
**Description:** Biosecurity, biosafety, bioterrorism, microbial forensics, emerging organisms, invasive species, quarantine, response, surveillance, detection, diagnostics, and how all system components integrate to science, and to agricultural specialties, economics and defense. Same course as PLP 2143.

**Credit hours:** 3  
**Contact hours:** Lecture: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Entomol & Plant Path  
**General Education and other Course Attributes:** Natural Sciences

**ENTO 2223 Insects in Global Public Health (N)**
**Description:** Biology of diseases carried by arthropods, including their historical and societal impacts focusing on the intersection of arthropod and human biology.

**Credit hours:** 3  
**Contact hours:** Lecture: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Entomol & Plant Path  
**General Education and other Course Attributes:** Natural Sciences

**ENTO 2993 Introduction to Entomology (LN)**
**Description:** Basic biology and classification of insects and closely related animals. Overview of the ecological roles of insects in both natural and managed ecosystems. Previously offered as ENTO 2993 and ENTO 2023.

**Credit hours:** 3  
**Contact hours:** Lecture: 2 Lab: 2  
**Levels:** Undergraduate  
**Schedule types:** Lab, Lecture, Combined lecture and lab  
**Department/School:** Entomol & Plant Path  
**General Education and other Course Attributes:** Scientific Investigation, Natural Sciences

**ENTO 3003 Livestock Entomology**
**Description:** Economic importance, biology and control of pests affecting domestic animals. Biology of diseases carried by arthropods, including their impacts focusing on the intersection of arthropod and animal biology. Previously offered as ENTO 2091.

**Credit hours:** 3  
**Contact hours:** Lecture: 3  
**Levels:** Undergraduate  
**Schedule types:** Lecture  
**Department/School:** Entomol & Plant Path

**ENTO 3021 Postharvest, Structural, and Urban Arthropod Pests**
**Prerequisites:** ENTO 2993.  
**Description:** The biology and management of insect pests of bulk-stored grains, flour, feed, dried fruits and nuts within food processing plants, warehouses, wholesale and retail distribution systems. Common structural and urban arthropod pests found in and around man-made buildings and their identification, biology and standard management practices.

**Credit hours:** 1  
**Contact hours:** Lab: 2  
**Levels:** Undergraduate  
**Schedule types:** Lab  
**Department/School:** Entomol & Plant Path

**ENTO 3044 Insect Morphology and Physiology**
**Prerequisites:** ENTO 2993 Introduction to Entomology.  
**Description:** Morphology and function of insects and their organ systems and use of selected techniques for the study of insect physiology. May not be used for degree credit with ENTO 5044.

**Credit hours:** 4  
**Contact hours:** Lecture: 3 Lab: 3  
**Levels:** Undergraduate  
**Schedule types:** Lab, Lecture, Combined lecture and lab  
**Department/School:** Entomol & Plant Path

**ENTO 3331 Insect Pests of Agronomic Crops**
**Prerequisites:** ENTO 2993 or concurrent enrollment.  
**Description:** A survey of important arthropods or agronomic crops commonly grown in Oklahoma. Coverage includes identification of pests and beneficial insects, recognition of damage symptoms, discussion of sampling strategies and decision-making processes for management, and integrated pest management tactics.

**Credit hours:** 1  
**Contact hours:** Lab: 2  
**Levels:** Undergraduate  
**Schedule types:** Lab  
**Department/School:** Entomol & Plant Path

**ENTO 3421 Horticultural Insects**
**Prerequisites:** ENTO 2993 or concurrent enrollment.  
**Description:** Identification, biology and control of pests attacking horticultural crops. Emphasis on pests injurious to vegetables, fruits, pecans, greenhouse plants, turf and ornamental trees and shrubs.

**Credit hours:** 1  
**Contact hours:** Lab: 2  
**Levels:** Undergraduate  
**Schedule types:** Lab  
**Department/School:** Entomol & Plant Path

**ENTO 3461 Insects in Forest Ecosystems**
**Prerequisites:** ENTO 2993 or concurrent enrollment.  
**Description:** Identification and seasonal life history of insect pests and beneficial insects on shade trees in urban settings, in commercial forests, and in forest products.

**Credit hours:** 1  
**Contact hours:** Lab: 2  
**Levels:** Undergraduate  
**Schedule types:** Lab  
**Department/School:** Entomol & Plant Path
ENTO 3501 Entomology for Educators
Description: Hands-on laboratory course designed to provide high school science teachers, FFA or 4H leaders with all of the resources and background information needed to use insects as a model to teach scientific concepts. Curriculum and resources are provided at the level of 7-12th grade and may be adapted to other levels as needed.
Credit hours: 1
Contact hours: Lab: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Entomol & Plant Path

ENTO 3644 Insect Morphology
Prerequisites: ENTO 2993 or equivalent.
Description: Insect development and comparative morphology. Offered in combination with 5644. No credit for both ENTO 3644 and ENTO 5644.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 3663 Turfgrass Integrated Pest Management
Prerequisites: PLP 3343 or ENTO 2993.
Description: The biology, ecology, and identification of fungal, nematode, and insect turfgrass pests. Contemporary concepts and applications of integrated control practices available for managing turfgrass pests along with decision-making tools for use in turfgrass pest management programs. Same course as PLP 3663.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 4223 Ecological Methodology
Prerequisites: One course in either ecology or general biology.
Description: Use of insects and other invertebrates for describing and evaluating interactions of individuals and populations with their environments. Coverage of behavioral and physiological ecology on consequences to individuals; population and community ecology considered in dynamics of groups of organisms in ecosystems.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2
Levels: Graduate, Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 4400 Special Topics
Prerequisites: Consent of instructor.
Description: Special topics in plant pathology, entomology or related fields. Same course as PLP 4400. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Other: 1
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Entomol & Plant Path

ENTO 4464 Insect Biology and Classification
Prerequisites: ENTO 2993 or equivalent or consent of instructor.
Description: Insect phylogeny, taxonomy, behavior, morphology and physiology in the context of ecosystem function. Major roles of insects in shaping ecosystem diversity, as indicators of environmental integrity, and as vectors of plant and animal pathogens and parasites.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 4484 Aquatic Entomology
Prerequisites: ENTO 2993 or ZOOL 1604 or consent of instructor.
Description: Biology, taxonomy and ecology of insects and other invertebrates, inhabiting freshwater environments. Emphasis is placed on identification and biology of individual taxa. Roles of insects in aquatic ecology as a forage base, and as indicators of biotic integrity of aquatic systems. Linkages between aquatic systems and terrestrial systems are also examined. No credit for students with credit in ENTO 5484 or ZOOL 5484. Same course as ZOOL 4484. Previously offered as ENTO 4483.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 4573 Introduction to Forensic Entomology
Description: The role of arthropods in decomposition, the use of forensic entomology in criminal and civil investigations and the increasing importance of forensic science on society; material includes content that some students may find disturbing. May not be used for degree credit with ENTO 5573.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomol & Plant Path

ENTO 4733 Insect Behavior and Chemical Ecology
Prerequisites: ENTO 2993 and CHEM 3015 or equivalent.
Description: Behavioral biology of insects. Ecological interactions among organisms mediated by naturally produced chemicals. An interface of ecology, behavior, physiology and chemistry with examples from animals, plants and microorganisms. Origin, function, significance and utilization of semiochemicals such as pheromones and allelochemicals. No credit for students with credit in ENTO 5573.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomol & Plant Path
ENTO 4800 Entomology Practicum  
Prerequisites: Consent of practicum coordinator and adviser.  
Description: Supervised research or extension experience with faculty in the Entomology/Plant Pathology Dept. or with approved governmental agencies or private employers. Written report required at close of practicum. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.  
Credit hours: 1-6  
Contact hours: Other: 1  
Levels: Undergraduate  
Schedule types: Independent Study  
Department/School: Entomol & Plant Path  

ENTO 4854 Medical and Veterinary Entomology  
Prerequisites: ENTO 2993 or consent of instructor.  
Description: Biology and control of arthropod vectors of disease and the diseases carried by arthropods. Course includes emphasis on scientific writing skills. No credit for students with credit in ENTO 5854.  
Credit hours: 4  
Contact hours: Lecture: 3 Lab: 4  
Levels: Undergraduate  
Schedule types: Lab, Lecture, Combined lecture and lab  
Department/School: Entomol & Plant Path  

ENTO 4923 Applications of Biotechnology in Pest Management  
Prerequisites: BIOL 1114 and CHEM 1215 or equivalents.  
Description: Applications of biotechnology in managing arthropod pests of plants, animals, plant pathogens, and weeds. Introduction to underlying technology, products being developed and deployed, effectiveness and associated problems or concerns resulting from their use. Same course as PLP 4923 and PLNT 4923. Previously offered as ENTO 4992.  
Credit hours: 3  
Contact hours: Lecture: 3  
Levels: Graduate, Undergraduate  
Schedule types: Lecture  
Department/School: Entomol & Plant Path  

ENTO 5000 Master's Research and Thesis  
Prerequisites: ENTO 2993 or consent of instructor.  
Description: Research in entomology. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.  
Credit hours: 1-6  
Contact hours: Other: 1  
Levels: Graduate  
Schedule types: Independent Study  
Department/School: Entomol & Plant Path  

ENTO 5003 Insect Biochemistry  
Prerequisites: Consent of instructor.  
Description: Biochemical processes in insects and closely related arthropods with emphasis on metabolic pathways unique to this group. Biochemical aspects of arthropod host interactions.  
Credit hours: 3  
Contact hours: Lecture: 3  
Levels: Graduate  
Schedule types: Lecture  
Department/School: Entomol & Plant Path  

ENTO 5020 Special Problems  
Prerequisites: Graduate standing.  
Description: Selected studies in the area of entomology, acarology or araneology. Offered for variable credit, 1-8 credit hours, maximum of 8 credit hours.  
Credit hours: 1-8  
Contact hours: Other: 1  
Levels: Graduate  
Schedule types: Independent Study  
Department/School: Entomol & Plant Path  

ENTO 5044 Insect Morphology and Physiology  
Prerequisites: ENTO 2993 Introduction to Entomology.  
Description: Functions of the organ systems and demonstration of selected techniques for study of insect physiology. Offered in combination with ENTO 3044. May not be used for degree credit with ENTO 3044. Previously offered as ENTO 5043.  
Credit hours: 4  
Contact hours: Lecture: 3 Lab: 3  
Levels: Graduate  
Schedule types: Lab, Lecture, Combined lecture and lab  
Department/School: Entomol & Plant Path  

ENTO 5464 Insect Biology and Classification  
Prerequisites: ENTO 2993 or equivalent or consent of instructor.  
Description: Insect phylogeny, taxonomy, behavior, morphology and physiology in the context of ecosystem function. Major roles of insects in shaping ecosystem diversity, as indicators of environmental integrity, and as vectors of plant and animal pathogens and parasites. No credit for students with credit in ENTO 4464.  
Credit hours: 4  
Contact hours: Lecture: 2 Lab: 4  
Levels: Graduate  
Schedule types: Lab, Lecture, Combined lecture and lab  
Department/School: Entomol & Plant Path  

ENTO 5484 Aquatic Entomology  
Prerequisites: ENTO 2993 or ZOOL 1604 or consent of instructor.  
Description: Biology, taxonomy and ecology of insects and other invertebrates, inhabiting freshwater environments. Emphasis is placed on identification and biology of individual taxa. Roles of insects in aquatic ecology as a forage base, and as indicators of biotic integrity of aquatic systems. Graduate students will have extra collection requirements and biotic integrity analyses. No credit for students with credit in ZOOL 5484, ENTO 4484 or ZOOL 4484. Same course as ZOOL 5484. Previously offered as ENTO 5483.  
Credit hours: 4  
Contact hours: Lecture: 2 Lab: 4  
Levels: Graduate  
Schedule types: Lab, Lecture, Combined lecture and lab  
Department/School: Entomol & Plant Path  

ENTO 5501 Entomology For Educators  
Description: Hands-on laboratory course designed to provide educators (teachers, FFA or 4H leaders, etc.) with all of the resources and background information needed to use insects as a model to teach scientific concepts. No credit given for students who have taken ENTO 3501.  
Credit hours: 1  
Contact hours: Lab: 2  
Levels: Graduate  
Schedule types: Lab  
Department/School: Entomol & Plant Path
ENTO 5513 Biological Control
Prerequisites: ENTO 2993 or equivalent or consent of instructor.
Description: The ecological principles and applied practices of biological control of insects, weeds and plant pathogens. Epidemiology including the scientific basis of biological control; natural enemies and their biology; biological control methods; and biological control in integrated pest management programs. Previously offered as ENTO 5512.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 5524 Integrated Management of Insect Pests and Pathogens
Prerequisites: ENTO 2993 and PLP 3344 or equivalent or consent of instructor.
Description: Modern theory and practices for management of insect pests and pathogens in plant production systems, emphasizing an ecologically-based, integrated approach. Basic concepts of pest management, decision-making, cost/benefit analysis and risk/benefit analysis. Same course as PLP 5524. Previously offered as ENTO 5523.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 5550 Advanced Agronomic Entomology
Prerequisites: ENTO 4523.
Description: Special problems in advanced agronomic entomology. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.
Credit hours: 1-5
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Entomol & Plant Path

ENTO 5573 Introduction to Forensic Entomology
Description: The role of arthropods in decomposition, the use of forensic entomology in criminal and civil investigations and the increasing importance of forensic science on society; material includes content that some students may find disturbing. May not be used for degree credit with ENTO 4573.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Entomol & Plant Path

ENTO 5613 Host Plant Resistance
Prerequisites: ENTO 2993 and PLP 3343 or equivalent and a general genetics course; or consent of instructor.
Description: Interactions of plants and the herbivorous insects and pathogenic micro-organisms that attack them. Development and deployment of multiple-pest resistant cultivars in crop management systems. Same course as PLP 5613. Previously offered as ENTO 5612.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 5623 Advanced Biotechnology Methods
Prerequisites: BIOC 3653, BIOL 3023 or equivalent or consent of instructor.
Description: Overview of current theory and principles of biotechnology and laboratory experience with contemporary techniques and experimental methods used in biotechnology, including genome analysis, gene transfer, identification and isolation of genes and their products and regulation of gene expression in plants and arthropods. Same course as PLP 5623.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 5644 Insect Morphology
Prerequisites: ENTO 2993 or equivalent.
Description: Insect development and comparative morphology. Offered in combination with ENTO 3644. No credit for both ENTO 3644 and ENTO 5644.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTS 5700 Teaching Practicum in Entomology
Prerequisites: Graduate student standing.
Description: Variable credit offering for graduate students who wish to develop skills in teaching, assessment and curriculum development working in conjunction with a primary instructor. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Other: 1
Levels: Graduate
Schedule types: Discussion
Department/School: Entomol & Plant Path

ENTO 5710 Advanced Medical and Veterinary Entomology
Prerequisites: ENTO 4854.
Description: Special problems in methods of disease transmission, animal parasite control and the relationships existing between parasite and host. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.
Credit hours: 1-5
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Entomol & Plant Path

ENTO 5733 Insect Behavior and Chemical Ecology
Prerequisites: ENTO 2993 and CHEM 3015 or equivalent.
Description: Behavioral biology of insects. Ecological interactions among organisms mediated by naturally produced chemicals. An interface of ecology, behavior, physiology and chemistry with examples from animals, plants and microorganisms. Origin, function, significance and utilization of semiochemicals such as pheromones and allelochemicals. No credit for students with credit in ENTO 4733.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Entomol & Plant Path
ENTO 5753 Insecticide Toxicology
Prerequisites: Organic chemistry or 15 credit hours biology.
Description: Properties and mode of action of the major insecticidal materials. Assessment of their impact on the environment.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Entomol & Plant Path

ENTO 5833 Insect Molecular Biology
Prerequisites: ENTO 2993 and BIOL 3024 or equivalent or consent of instructor.
Credit hours: 3
Contact hours: Lecture: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Entomol & Plant Path

ENTO 5850 Epidemiology of Arthropod-Borne Diseases
Prerequisites: ENTO 4854 or equivalent.
Description: The relationships existing between the hosts, arthropod vectors and causal agents of disease and the principles of disease prevention or suppression by the intelligent use of biological principles. Offered for variable credit, 1-4 credit hours, maximum of 4 credit hours.
Credit hours: 1-4
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Entomol & Plant Path

ENTO 5870 Scientific Presentations
Prerequisites: Consent of instructor.
Description: Preparation and delivery of scientific presentations including 50-minute seminars, 10-minute talks, and posters. Same course as PLP 5870 Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.
Credit hours: 1-5
Contact hours: Other: 1
Levels: Graduate
Schedule types: Discussion
Department/School: Entomol & Plant Path

ENTO 5992 Career Skills and Professionalism for Scientists
Prerequisites: Graduate standing.
Description: For graduate students majoring in science-based fields, especially those nearing graduation. Skills needed for effective job application and interviewing, career development and advancement, communication with professional colleagues and the public, and personal professional development. Same course as PLP 5992.
Credit hours: 2
Contact hours: Lecture: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Entomol & Plant Path

ENTO 6000 Doctoral Research and Dissertation
Prerequisites: MS in entomology or consent of major professor.
Description: Independent investigation under the direction and supervision of a major professor. Offered for variable credit, 1-10 credit hours, maximum of 36 credit hours.
Credit hours: 1-10
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Entomol & Plant Path

ENTO 6100 Advanced Insect Physiology
Prerequisites: ENTO 3044 or ENTO 5044 or equivalent.
Description: Special problems in advanced insect physiology. Offered for variable credit, 1-5 credit hours, maximum of 5 credit hours.
Credit hours: 1-5
Contact hours: Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Entomol & Plant Path