

ENTO - ENTOMOLOGY (ENTO)

ENTO 101 Introduction to Academic Success in Entomology

Credit 1. 1 Lecture Hour. Orientation to academic success within higher education and specifically the Bachelor of Science degree in entomology; awareness of academic and campus support services available for student success; development of goals for academic and career planning, including creation and utilization of degree planner; awareness of personal self-management strategies, including learning styles, time management, goal setting, stress management and development of personal strategies for implementation of personal self-management into practice.

ENTO 102 Continuing Academic Success in Entomology

Credit 1. 1 Lecture Hour. Continued exploration to academic success within higher education and specifically the Bachelor of Science degree in Entomology; increase awareness of academic and campus support services available for student success; development of goals for academic and career planning, including creation and utilization of degree planner; awareness of personal self-management strategies, including learning styles, time management, goal setting, stress management, and development of personal strategies for implementation of personal self-management into practice. Must be taken on a satisfactory/unsatisfactory basis. **Prerequisite:** ENTO 101.

ENTO 201 General Entomology

Credits 3. 2 Lecture Hours. 2 Lab Hours. Survey of the major classes of arthropods with special emphasis on species of economic or biological importance; general insect anatomy, physiology, metamorphosis and classification; survey of the biologies of insect orders and major families using common injurious and beneficial species to relate material to production agriculture and the urban environment.

ENTO 208 Veterinary Entomology

Credits 2. 2 Lecture Hours. Insects and their relatives causation of economic loss, impacts to well-being and transmission of disease pathogens to domestic and companion animals and wildlife as well as health and well-being of humans through occupational or recreational exposure; insect biology, economic importance and principles and methods of prevention and control. **Prerequisite:** Co-enrollment in ENTO 209.

ENTO 209 Veterinary Entomology Laboratory

Credit 1. 2 Lab Hours. Insects and their relatives causation of economic loss, impacts to well-being and transmission of disease pathogens to domestic and companion animals and wildlife, as well as health and well-being of humans through occupational or recreational exposure; laboratory emphasizes identification of major arthropod pests, use of microscopy and dissection equipment. **Prerequisite:** Concurrent enrollment with ENTO 208.

ENTO 210 Global Public Health Entomology

Credits 3. 3 Lecture Hours. Impacts of insects and insect-borne diseases on public health and well-being around the globe; insect biology, bloodfeeding, and transmission of human diseases; role of insect borne diseases on human history, socio-economic development, and public health infrastructure. **Prerequisite:** Freshman or sophomore classification or approval of instructor.

ENTO 285 Directed Studies

Credits 0 to 4. 0 to 4 Other Hours. Directed individual study in entomology. **Prerequisites:** Freshman or sophomore classification; approval of instructor and department head.

ENTO 289 Special Topics in...

Credits 1 to 4. 1 to 4 Lecture Hours. Selected topics in an identified area of entomology. May be repeated for credit. **Prerequisite:** Approval of instructor.

ENTO 291 Research

Credits 0 to 4. 0 to 4 Other Hours. Research conducted under the direction of faculty member in entomology. May be repeated for credit. **Prerequisites:** Freshman or sophomore classification and approval of instructor.

ENTO 300/ECCB 300 Field Studies

Credits 3. 3 Other Hours. Integration of principles of animal and plant ecology with environmental factors to characterize wildlife populations; intensive analysis of specific areas will emphasize either the development of a wildlife management plan or a general vertebrate natural history survey. **Prerequisite:** Prior approval of instructor and concurrent enrollment in ECCB 450/ENTO 450 and ECCB 451/ENTO 451. **Cross Listing:** ECCB 300/ENTO 300.

ENTO 301 Biodiversity and Biology of Insects

Credits 4. 3 Lecture Hours. 3 Lab Hours. Introduction to orders and most important families of insects; order-level morphology and family-level natural history; collection of insects identified to family level provides introduction to collection methods and specimen preparation. **Prerequisites:** ENTO 201, or ENTO 208 and ENTO 209; BIOL 111 and BIOL 112; junior or senior classification or approval of instructor.

ENTO 305 Evolution of Insect Structure

Credits 3. 2 Lecture Hours. 3 Lab Hours. External morphology of insects; evolution of form and function. **Prerequisite:** ENTO 201, or ENTO 208 and ENTO 209; BIOL 111.

ENTO 306 Insect Structure and Function

Credits 4. 3 Lecture Hours. 3 Lab Hours. Physiology and morphology of insects; structure and function of internal organ systems and their role in insect success. **Prerequisite:** ENTO 201, or ENTO 208 and ENTO 209; BIOL 111 and BIOL 112; CHEM 101, CHEM 111, CHEM 102 and CHEM 112, or CHEM 119 and CHEM 120.

ENTO 320 Honey Bee Biology

Credits 3. 3 Lecture Hours. Introduction of honey bee biology and beekeeping practices to science and non-science majors; honey bees as the model insect to introduce general principles of biology and entomology. **Prerequisite:** Junior or senior classification or approval of instructor.

ENTO 321 Beekeeping

Credit 1. 3 Lab Hours. Basic Knowledge and techniques used in apiculture; tools and knowledge needed to keep bees responsibly and productively. **Prerequisites:** ENTO 320 or concurrent enrollment, junior or senior classification or approval of instructor.

ENTO 322 Insects and Human Society

Credits 3. 3 Lecture Hours. Emphasis on the role insects have played in the development of human cultures; aspects include health, food production and storage, art, music and architecture; overview of historic, present day, and future roles insects will have on environmental movements (green societies), and in underdeveloped, developing and developed societies. **Prerequisite:** Junior or senior classification.

ENTO 401 Principles of Integrated Pest Management

Credits 3. 2 Lecture Hours. 3 Lab Hours. Integrated pest management (IPM) concepts, principles, development and application; IPM constitutes a series of pest control tactics and strategies toward more sustainable agriculture, natural resources, and urban and rural health and well-being. **Prerequisite:** ENTO 201, or ENTO 208 and ENTO 209.

ENTO 402 Insects In Agriculture

Credits 3. 2 Lecture Hours. 3 Lab Hours. Examination of the biology and ecology of insect agricultural pests and the science underlying their management; exploration of the biology, taxonomy and management of insects as both pests and beneficial species in a range of agricultural systems. **Prerequisites:** Grade of C or better in ENTO 201 or approval of instructor.

ENTO 403 Urban Entomology

Credits 3. 2 Lecture Hours. 3 Lab Hours. Biology, economic importance and control strategies for arthropod pests commonly invading households and commercial structures in urban environments; laboratory consists of urban pest identification and special presentations and demonstrations covering topics related to urban pest problems and their control. Offered in 2011-2012 academic year and alternating years thereafter. **Prerequisites:** ENTO 201, or ENTO 208 and ENTO 209, or approval of instructor.

ENTO 423 Medical Entomology

Credits 2. 2 Lecture Hours. Biologies, disease relationships, and control of insects and other arthropods parasitic on or in humans; aspect of the fields of clinical and preventative medicine. **Prerequisites:** BIOL 111; ENTO 427 or concurrent enrollment; junior or senior classification.

ENTO 424 Insect Ecology

Credits 3. 2 Lecture Hours. 3 Lab Hours. Provides basic ecological background with an applied interpretation, emphasizing influences of insect populations and communities on ecosystem processes that influence landscape structure, function and change. **Prerequisites:** ENTO 201, or ENTO 208 and ENTO 209; BIOL 111; junior or senior classification or approval of instructor.

ENTO 425 Disease Ecology

Credits 3. 3 Lecture Hours. Ecological interactions that influence the distribution and abundance of pathogens, vectors, and hosts ultimately determine the spread of disease; impacts of urbanization, climate change, and other human influenced environmental changes on disease dynamics; integration of disease ecology into pathogen and vector monitoring and comprehensive strategies to reduce disease occurrence. **Prerequisite:** ENTO 208, ENTO 209 and ENTO 423; junior or senior classification, or approval of instructor.

ENTO 426/VIBS 426 Methods in Vector-Borne Disease Ecology

Credits 3. 1 Lecture Hour. 5 Lab Hours. Methodological understanding of how vector-borne diseases are studied in the field and laboratory; hands-on exploration of the ecology disease systems in a one health framework; concepts of design, execution and presentation of research projects; outdoor field work and bio-safety level 2 laboratory. **Prerequisites:** Junior or senior classification and approval of instructor. **Cross Listing:** VIBS 426/ENTO 426.

ENTO 427 Medical Entomology Laboratory

Credit 1. 2 Lab Hours. Morphological features of adults and immature stages of parasitic arthropods of medical importance; molecular techniques to determine infectious status of arthropod vectors. **Prerequisites:** BIOL 111; ENTO 423 or concurrent enrollment; junior or senior classification.

ENTO 428 Insect Biotechnology

Credits 3. 3 Lecture Hours. Applications of genetic engineering and biotechnology; specific problems dealing with insects and control of insect pests. **Prerequisites:** ENTO 429 or concurrent enrollment; GENE 301, GENE 315, GENE 320/BIMS 320, or FIVS 308; junior or senior classification or approval of instructor.

ENTO 429 Insect Biotechnology Laboratory

Credit 1. 3 Lab Hours. Basic technical experience in insect molecular biology and biotechnology, including genomic DNA isolation, PCR, cloning, sequencing and gene manipulation techniques; focus on insect applications for improvement of human health and agriculture. **Prerequisites:** ENTO 428 or concurrent enrollment; junior or senior classification or approval of instructor.

ENTO 431/FIVS 431 The Science of Forensic Entomology

Credits 3. 3 Lecture Hours. Explores the science, methodology and technology employed to gather, preserve and present information about insects and other arthropods in such a manner that this information can be used in courts of law as evidence and testimony to help resolve issues of a criminal or civil nature. **Prerequisite:** Junior or senior classification or approval of instructor. **Cross Listing:** FIVS 431/ENTO 431.

ENTO 432/FIVS 432 Applied Forensic Entomology

Credit 1. 3 Lab Hours. Laboratory-based offering practical experience using scientific information, methodology, technology, and legal procedures inherent to the field of forensic entomology; emphasis on collecting, preserving, and identifying information as evidence and expert witness testimony in courts of law. **Prerequisites:** Junior or senior classification or approval of instructor. **Cross Listing:** FIVS 432/ENTO 432.

ENTO 435 Case Studies in Problem Solving

Credits 3. 3 Lecture Hours. Development of reasoning strategies by examining a variety of case studies, science and scientific methods; solving real-world problems as part of an investigative team. **Prerequisite:** ENTO 201, or ENTO 208 and ENTO 209; ENTO 482; senior classification or approval of instructor.

ENTO 441 Engineering Vector Populations

Credits 3. 3 Lecture Hours. Genetic strategies developed and deployed to control vector-borne diseases; vector population replacement, reduction or elimination; CRISPR and Cas9, gene drive and sterile insect technique; social, regulatory, political and ecological factors concerning genetic technologies.

ENTO 442 Mosquito - A History of Humankind's Struggle for Survival with the Deadliest Animal on the Planet

Credits 3. 3 Lecture Hours. Mosquito-borne pathogens, human diseases; transmission cycles alternating replication susceptible vertebrate host, blood-feeding vector mosquito; biology of mosquitoes, historical approaches controlling mosquito-borne diseases, elimination of vectors; new approaches to disease control. **Prerequisites:** Grade of C or better in BIOL 111 and BIOL 112; junior or senior classification.

ENTO 450/ECCB 450 Caribbean Conservation

Credits 2. 6 Lab Hours. Provide experience in and appreciation for diverse tropical habitats and the problems associated with conserving these habitats; design and conduct individual research projects on topics of their choice with approval from the instructors on project design and feasibility. **Prerequisites:** Concurrent enrollment in ENTO 300/ECCB 300 and ENTO 451/ECCB 451; junior or senior classification. **Cross Listing:** ECCB 450/ENTO 450.

ENTO 451/ECCB 451 Caribbean Research Seminar

Credit 1. 1 Other Hour. Document research activities; keep a journal of activities and research methods during study abroad trips. **Prerequisites:** Concurrent enrollment in ENTO 300/ECCB 300 and ENTO 450/ECCB 450; junior or senior classification. **Cross Listing:** ECCB 451/ENTO 451.

ENTO 455 Field Entomology in the Tropics

Credits 3. 9 Other Hours. Intensive hands-on, field-based experiences in Costa Rica at the Texas A&M Soltis Center for Research and Education; study of insect diversity, behavior and natural history and insight into the challenges in conserving biodiversity; two-week course designed to provide authentic research experiences in a tropical rainforest; involvement in physically demanding fieldwork, extensive collecting and sampling, specimen sorting and preparation, as well as field observation of insect natural history and behavioral experiments; learn how to keep field notes, work in teams to solve research questions and communicate research through various media. **Prerequisites:** Grade of C or better in BIOL 111 and BIOL 112; or approval of instructor; any course in entomology recommended.

ENTO 481 Seminar

Credit 1. 1 Lecture Hour. Report of original investigations, current literature and special features of entomology. **Prerequisites:** ENTO 201, or ENTO 208 and ENTO 209; junior or senior classification.

ENTO 482 Occupational and Professional Development

Credits 2. 2 Lecture Hours. Organized instruction in written and oral communication; acquaint students with private and public-sector companies and agencies as well as leading professionals from these firms to reinforce academic instruction and prepare students for the transition to employment, graduate and professional schools. **Prerequisite:** ENTO 201, or ENTO 208 and ENTO 209; or approval of instructor.

ENTO 484 Professional Internship

Credits 0 to 4. 0 to 4 Other Hours. Independent study and supervised field experience related to a professional area of interest in entomology. May be taken two times for credit. **Prerequisite:** ENTO 201, or ENTO 208 and ENTO 209; junior or senior classification or approval of instructor.

ENTO 485 Directed Studies

Credits 0 to 4. 0 to 4 Other Hours. Individual problems. **Prerequisites:** Approval of instructor and department head.

ENTO 489 Special Topics in...

Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours. Selected topics in an identified area of entomology. May be repeated for credit. **Prerequisite:** Approval of instructor.

ENTO 491 Research

Credits 0 to 4. 0 to 4 Other Hours. Research conducted under the direction of faculty member in entomology. May be repeated for credit. **Prerequisites:** Junior or senior classification or approval of instructor.