

## ENTOMOLOGY

## ENT

**Department of Entomology  
College of Agriculture and  
Natural Resources**

- 110 Applied Entomology for Ornamentals and Turf**  
Fall of odd years. 3(2-2) RB: Interest or experience in ornamentals and turf production systems. R: Open only to students in the Institute of Agricultural Technology. Not open to students with credit in ENT 111.  
Arthropod pests of woody ornamentals and turf grasses. Groups and species of importance to northern Michigan.
- 111 Basics of Applied Entomology**  
Spring. 2(2-2) R: Open to students in the Institute of Agricultural Technology. SA: AT 057 Not open to students with credit in ENT 110.  
Basic insect biology, principles of integrated pest management, and the major pests of field crops, woody ornamentals, other perennials, turf, and commercial greenhouses. Offered first ten weeks of semester.
- 205 Pests, Society and Environment**  
Fall, Spring. 3(3-0) Interdepartmental with Plant Pathology. Administered by Entomology.  
Nature of pests and their impact on society. Principles of integrated pest management in relation to environmental quality and sustainable development.
- 222 New Horizons in Biotechnology**  
Fall. 2(2-0) Interdepartmental with Crop and Soil Sciences. Administered by Crop and Soil Sciences.  
Perspectives on biotechnology for safer food production, environmental quality, and improved human health. Impacts of biotechnology on the national economy. Political and ethical ramifications of applied biotechnology.
- 319 Introduction to Earth System Science**  
Fall. 3(3-0) Interdepartmental with Geological Sciences and Plant Biology and Sociology and Zoology. Administered by Entomology. RB: Completion of one course in biological or physical science.  
Systems approach to Earth as an integration of geochemical, geophysical, biological and social components. Global dynamics at a variety of spatio-temporal scales. Sustainability of the Earth system.
- 364 Turfgrass Entomology**  
Fall. 3(2-2) P: CSS 232 SA: CSS 362  
Life history, identification, and collection of turfgrass insects. Cultural biological and insecticide control. Principles of pest management.
- 401 Directed Studies**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Approval of department.  
Individual field or laboratory research, or review of published literature, on a topic of interest.
- 404 Fundamentals of Entomology**  
Fall. 3(2-4) P: BS 110 or (PLB 105 and PLB 106)  
Insect classification, diversity and evolution. Insect behavior and ecology. Importance of insects to humans and the environment.
- 407 Diseases and Insects of Forest and Shade Trees**  
Spring. 4(3-3) Interdepartmental with Plant Biology and Plant Pathology. Administered by Plant Pathology. P: (PLB 105 or BS 110 or LBS 144 or LBS 148H) and ((PLB 218 or FOR 204 or HRT 211) and completion of Tier I writing requirement) SA: BOT 407  
Diseases, insects, and environmental problems affecting trees in forests, parks, suburbs, and nurseries. Methods of control.
- 410 Apiculture and Pollination**  
Fall. 2(1-2)  
Biology of bees and their relationship to flowers, pollination and crop production.
- 422 Aquatic Entomology**  
Fall of odd years. 3(2-3) Interdepartmental with Fisheries and Wildlife and Zoology. Administered by Entomology. P: BS 110 SA: ENT 420  
Biology, ecology and systematics of aquatic insects in streams, rivers and lakes. Field trips and aquatic insect collection required.
- 469 Biomonitoring of Streams and Rivers**  
Summer of even years. 3(2-3) Interdepartmental with Fisheries and Wildlife. Administered by Entomology. P: BS 110  
Practical field and lab rapid bioassessment methodologies used to sample and assess the biota of streams and rivers. Sampling and identification of fish, macroinvertebrates and other biota.
- 470 General Nematology (W)**  
Spring of odd years. 3(2-3) P: ((BS 110) and completion of Tier I writing requirement) or (BS 111 and BS 111L)  
Biology of nematodes with special reference to the influence of phytoparasitic, entomopathogenic, animal parasitic, microbiontrophic and marine species on human ecology.
- 477 Pest Management I: Pesticides in Management Systems**  
Fall of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences and Fisheries and Wildlife and Horticulture. Administered by Entomology. RB: (CEM 143 or CEM 251) and (PLP 405 and CSS 402) and (ENT 404 or ENT 470) R: Open to juniors or seniors or graduate students.  
Chemistry, modes of action, and environmental fate of pesticides. Product development and regulation. Social aspects of pesticide use.
- 478 Pest Management II: Biological Components of Management Systems (W)**  
Spring of even years. 3(2-3) Interdepartmental with Crop and Soil Sciences and Forestry and Fisheries and Wildlife and Horticulture. Administered by Entomology. P: (ENT 404 or ENT 470 or PLP 405 or CSS 402) and completion of Tier I writing requirement  
Principles of host plant resistance and biological control and their relationship to the design of agroecosystems. Classification of insect biological control agents.
- 479 Organic Pest Management**  
Fall. 3(2-2) R: Open to juniors or seniors in the College of Agriculture and Natural Resources or approval of department.  
Theory, philosophy and application of organic pest management systems.  
Field trip required.
- 485 Tropical Biology**  
Spring. 3(3-0) Interdepartmental with Plant Biology and Zoology. Administered by Zoology. P: ZOL 355 R: Open only to juniors or seniors.  
Tropical biota emphasizing evolutionary and ecological principles compared across tropical ecosystems.
- 812 Graduate Seminar**  
Fall, Spring. 1(1-0) A student may earn a maximum of 10 credits in all enrollments for this course.  
Current research topics. Student presentation required.
- 815 Insect Behavior**  
Fall of odd years. 3(2-3) RB: ENT 404  
Fundamentals of insect behavior with emphasis on mechanisms. Quantitative methods.
- 818 Systematics, Morphology, Biology: Adults**  
Spring of even years. 3(1-7) RB: ENT 404  
Classification, identification, morphology, biology and evolutionary relationships of adult insects. Specimens provided.
- 838 Systematics, Morphology, Biology: Immatures**  
Fall of even years. 3(1-7) RB: ENT 404  
Classification, identification, morphology, biology and evolutionary relationships of immature insects. Emphasis on terrestrial holometabola. Collection required.
- 844 Insect Ecology, Evolution and Conservation**  
Fall of even years. 3(3-0) RB: ENT 404  
Unique characteristics and principles of insect ecology and evolution including trophic relationships, community structure, speciation, coevolution and conservation.
- 848 Biological Control of Insects and Weeds**  
Spring of odd years. 3(2-2) RB: Ecology and introductory entomology  
Principles and practices in the application of natural enemies to control arthropod and weed pests. Identification and biology of beneficial species (parasitoids, predators, pathogens) and the ecological basis for their use in pest management systems.
- 850 Insect Physiology**  
Spring of odd years. 3(2-2) RB: ENT 404  
System by system description of insect form and function. Examples of how physiological systems are coordinated for complex biological functions.
- 851 Molecular Entomology**  
Fall of odd years. 3(3-0) Interdepartmental with Genetics. Administered by Entomology.  
Analysis of molecular processes unique to insects, and their potentials for genetic engineering.
- 870 Nematode Management in Crop Systems**  
Summer of even years. 3(2-3) Interdepartmental with Plant Pathology. Administered by Entomology. RB: PLP 405 SA: BOT 870  
Biology, host parasite relationships and management by farming and cropping systems of selected nematode diseases of economic plants.
- 890 Independent Study**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open to graduate students.  
Individual study on a field or laboratory research topic or review of published literature on a topic of interest.

## Entomology—ENT

### **898 Master's Research**

Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to master's students in the Department of Entomology.

Master's degree Plan B research paper.

### **899 Master's Thesis Research**

Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course. R: Open only to master's students in the Department of Entomology.

Master's thesis research.

### **999 Doctoral Dissertation Research**

Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open to doctoral students.

Doctoral dissertation research.