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.

205  Pests, Society and Environment

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. 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.

362  Management of Turfgrass Pests
Fall. 4(3-2) Interdepartmental with Crop and Soil Sciences and Plant Pathology. Administered by Crop and Soil Sciences. P: CSS 232 Chemical, biological, and cultural methods of managing weeds, diseases, and insect pests of turfgrass. Environmental considerations in 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.

442  Concepts of Biological Information Systems
Spring. 3(3-0) Interdepartmental with Resource Development. Administered by Entomology. R: Open only to seniors or graduate students. Systems approach to managing biological information using computer technology.

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
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, microbivorous 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
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.

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 biology 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.
Entomology—ENT

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 only to graduate students.
Individual study on a field or laboratory research topic or review of published literature on a topic of interest.

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 only to doctoral students in the Department of Entomology.
Doctoral dissertation research.