

992F Seminar in American Literature to 1900
Fall, Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to doctoral students in the College of Arts and Letters or approval of department.

Issues in American literature of critical and current interest.

992G Seminar in 20th Century American Literature
Fall, Spring. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to doctoral students in the College of Arts and Letters or approval of department.

A particular problem, topic, theme, genre, issue, or period in twentieth century American literature.

992I Seminar in Literary Form and Theory
Fall, Spring. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to doctoral students in the College of Arts and Letters or approval of department.

Theories of periodization, genre, form, signification, and cultural production which influence the study of literature and language.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to doctoral students in the English major.

Doctoral dissertation research.

362 Management of Turfgrass Pests
Fall. 4(3-2) Interdepartmental with Crop and Soil Sciences; Botany and Plant Pathology. Administered by Department of Crop and Soil Sciences. P:M: (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 Insects: Success in Biodiversity
Fall. 4(3-4) P:M: (BS 110) or (BOT 105 and BOT 106)

Biological adaptations of insects to the environment. Evolution, behavior, ecology, metamorphosis, classification, importance to humans, and pest management.

407 Diseases and Insects of Forest and Shade Trees

Spring. 4(3-3) Interdepartmental with Botany and Plant Pathology. Administered by Department of Botany and Plant Pathology. P:M: (BOT 105 or BS 110 or LBS 144 or LBS 148H) and (BOT 218 or FOR 204 or HRT 211) and completion of Tier I writing requirement. Not open to students with credit in BOT 405.

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.

419 Advanced Earth System Science
Spring. 3(2-2) Interdepartmental with Botany and Plant Pathology; Geological Sciences; Zoology; Sociology. P:M: (ENT 319)

Systems science theory applied to analysis of the biological, geological, physical, and social causes and consequences of global changes. Issues of sustaining the Earth system.

422 Aquatic Entomology
Fall of odd years. 3(2-3) Interdepartmental with Fisheries and Wildlife; Zoology. P:M: (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. R: Open only to seniors or graduate students.

Systems approach to managing biological information using computer technology.

460 Medical and Veterinary Entomology
Spring of even years. 3(2-3) P:M: (BS 110) R: Not open to freshmen or sophomores.

Insects and other organisms related to human and animal health. Ectoparasites, ecology of vector-borne diseases, epidemiology, and management of arthropod vectors.

469 Biomonitoring of Streams and Rivers
Summer of even years. 3(2-3) Given only at W.K. Kellogg Biological Station. Interdepartmental with Fisheries and Wildlife. P:M: (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 will be emphasized.

470 General Nematology (W)
Spring of odd years. 3(2-3) P:M: (BS 110) or (BS 111 and BS 111L) and completion of Tier I writing requirement.

Biology of nematodes with special reference to the influence of phytoparasitic, entomopathogenic, animal parasitic, microbiotrophic and marine species on human ecology.

477 Pest Management I: Pesticides in Management Systems

Fall. 3(3-0) Interdepartmental with Crop and Soil Sciences; Fisheries and Wildlife; Horticulture. P:NM: (CEM 143 or CEM 251) and (BOT 405 and CSS 402) and (ENT 404 or ENT 470 or FW 328)

Chemistry, efficient use, and environmental fate of pesticides. Legal and 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; Forestry; Fisheries and Wildlife; Horticulture. P:M: (ENT 404 or ENT 470 or BOT 405 or CSS 402 or FW 328) 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 Zoology; Botany and Plant Pathology. Administered by Department of Zoology. P:M: (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) P:NM: (ENT 404)

Fundamentals of insect behavior with emphasis on mechanisms. Quantitative methods.

818 Systematics, Morphology, Biology: Adults
Spring of even years. 3(1-7) P:NM: (ENT 404)

Classification, identification, morphology, biology and evolutionary relationships of adult insects. Specimens provided.

ENTOMOLOGY

ENT

Department of Entomology College of Natural Science

205 Pests, Society and Environment
Fall, Spring. 3(3-0) Interdepartmental with Botany and Plant Pathology.

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 Department of 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 Botany and Plant Pathology; Geological Sciences; Zoology; Sociology. 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.

Entomology—ENT

- 838 Systematics, Morphology, Biology: Immatures**
Fall of even years. 3(1-7) P:NM: (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) P:NM: (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) P:NM: (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.
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 Botany and Plant Pathology. P:NM: (BOT 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.
- 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 masters students in Entomology.
Master's thesis research.
- 940 Analytical Techniques for Bioactive Compounds: Separation**
Spring of odd years. 4(2-6)
Extraction and chromatographic separations of compounds from environmental matrices.
- 941 Analytical Techniques for Bioactive Compounds: Confirmation**
Spring of even years. 4(2-6)
Instrumental confirmation of compounds from environmental matrices.

- 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 Ph.D. students in Entomology.
Doctoral dissertation research.

ENVIRONMENTAL ENGINEERING ENE

Department of Civil and Environmental Engineering College of Engineering

- 427 Environmental Toxicology and Society**
Spring of odd years. 3(3-0) Interdepartmental with Animal Science; Sociology. Administered by Department of Animal Science. P:NM: (ISB 200 or ISB 202 or ISB 204 or ISB 206H or BMB 200 or BS 111 or BS 110)
Impact of environmental chemicals on health and modern society. Cellular and organ functions and their interface with the environment. Limitations of scientific investigation and environmental regulations.
- 800 Environmental Engineering Seminar**
Fall, Spring. 1(1-0) R: Open only to Environmental Engineering majors.
Current research in environmental engineering.
- 801 Dynamics of Environmental Systems**
Spring. 3(3-0)
Principles of mass balance, reaction kinetics, mass transfer, reactor theory in environmental engineering.
- 802 Physicochemical Processes in Environmental Engineering**
Fall. 3(3-0) P:NM: (ENE 801)
Physical and chemical principles of air and water pollution control and environmental contaminants in water, air and soils.
- 804 Biological Processes in Environmental Engineering**
Fall. 3(3-0) P:NM: (ENE 801 or concurrently)
Engineering of microbial processes used in wastewater treatment, in-situ bioreclamation, and solid waste stabilization.
- 806 Laboratory Feasibility Studies for Environmental Remediation**
Spring. 3(2-4) P:NM: (ENE 802 and ENE 804) R: Open only to graduate students in Environmental Engineering, Environmental Engineering-Environmental Toxicology, and Environmental Engineering-Urban Studies. Not open to students with credit in ENE 803 or ENE 805.
Analysis and characterization of contaminants in soil or water. Conceptual and preliminary design of treatment systems. Use of treatability studies to evaluate treatment options. Oral presentations and preparation of consulting reports with design recommendations.
- 807 Environmental Analytical Chemistry**
Fall. 3(3-0) R: Open only to Environmental Engineering majors.
Techniques for measurement and analysis in environmental engineering. Sample preparation. Quality assurance.
- 808 Environmental Analytical Chemistry Laboratory**
Spring. 1(0-3) P:NM: (ENE 807) R: Open only to Environmental Engineering majors.
Laboratory work in environmental analytical chemistry.
- 880 Independent Study in Environmental Engineering**
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to Environmental Engineering majors.
Solution of environmental engineering problems not related to student's thesis.
- 890 Selected Topics in Environmental Engineering**
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course. R: Open only to Environmental Engineering majors.
Selected topics in new or developing areas of environmental engineering.
- 892 Master's Research Project**
Fall, Spring, Summer. 3 to 5 credits. R: Open only to master's students in the Environmental Engineering major. Approval of department.
Master's degree Plan B individual student research project. Original research, research replication, or survey and reporting on a research topic.
- 893 Master's Design Project**
Fall, Spring, Summer. 1 to 3 credits. R: Open only to master's students in the Environmental Engineering major. Approval of department.
Master's degree Plan B individual student environmental engineering design project.
- 899 Master's Thesis Research**
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 24 credits in all enrollments for this course.
Master's thesis research.
- 999 Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 72 credits in all enrollments for this course.
Doctoral dissertation research.

EPIDEMIOLOGY EPI

Department of Epidemiology College of Human Medicine

- 390 Disease in Society: An Introduction to Epidemiology and Public Health**
Spring. 3(3-0) Interdepartmental with Social Science.
Human epidemiology and population health issues facing contemporary society, in both developed and less developed settings. Health-related information in the mass media and scholarly publications.