

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.

810 Introduction to Descriptive and Analytical Epidemiology
Fall. 3(3-0) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 810

Study of disease from a population perspective as the interaction of host, agent, and environment. Fundamental concepts include case definition, measuring frequency of disease, mortality and morbidity data, and major study designs.

812 Causal Inference in Epidemiology
Fall. 3(3-0) P:NM: (EPI 810 and LCS 829) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 812

Causal models, criteria, and causality related to study design and analysis in epidemiology. Application of theoretical concepts to the design, analysis, and assessment of epidemiologic research.

813 Investigation of Disease Outbreaks
Fall, Spring, Summer. 3 credits. P:NM: (EPI 810 or concurrently) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 813

Principles of and practice in investigating disease outbreaks. Field trips required.

814 Nutritional Epidemiology
Fall of odd years. 3(3-0) P:NM: (EPI 810 or concurrently) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 814

Methodologies used in epidemiologic studies of diet and health in the context of U.S. and international dietary patterns. Relationship between diet and specific diseases.

815 Epidemiology of Cardiovascular Disease
Spring of even years. 3(3-0) P:NM: (EPI 810) R: Open only to master's students in the Epidemiology major or approval of department.

Survey of methodologies used in epidemiologic studies of cardiovascular diseases. Review of evidence of genetic, environmental, and behavioral causes of cardiovascular disease.

816 Reproductive and Perinatal Epidemiology
Summer of odd years. 3(3-0) P:NM: (EPI 810 or concurrently) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 816

Epidemiology of adverse health states in pregnancy and the puerperium. Impact of these health states on subsequent child development.

817 Epidemiology of Communicable Diseases
Fall of even years. 3(3-0) P:NM: (EPI 810) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 817

Application of principles of epidemiology to research in communicable diseases relevant to public health in the U.S. and other countries.

818 The Epidemiology of Zoonotic Diseases
Spring of odd years. 3(3-0) Interdepartmental with Veterinary Medicine. P:NM: (EPI 810) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 818

Human susceptibility to diseases of animals. Modes of transmission, surveillance, and strategies for prevention of specific zoonotic diseases.

819 Spatial Epidemiology and Medical Geography
Summer of even years. 3(3-0) Interdepartmental with Geography. P:NM: (EPI 810) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 819

Concepts, techniques, and utilization of spatio-epidemiologic analyses for human health.

820 Evidence-Based Medicine
Fall. 3(3-0) Interdepartmental with Medicine. P:M: (EPI 810 or concurrently and STT 421 or concurrently)

Methodology of clinical epidemiology and health services outcomes research. Linkage of epidemiology with daily clinical problems.

821 Epidemiology of the Health and Cognitive Status of the Elderly
Fall of odd years. 3(3-0) Interdepartmental with Family Practice. P:NM: (EPI 810 or concurrently) R: Open only to master's students in the Epidemiology major or approval of department. SA: FMP 821, HM 821

Interpretation of research on the health and cognitive status of elderly. Interpretation of statistical tests of hypotheses. Conclusions based on data.

822 Environmental Epidemiology
Fall of odd years. 3(3-0) P:M: (EPI 810 or concurrently and STT 421 or concurrently) RB: Basic science in biology, physiology, immunology R: Open only to graduate students in the Department of Epidemiology or approval of department.

Epidemiology of health effects and risk communication.

823 Cancer Epidemiology
Fall of even years. 3(3-0) P:M: (EPI 810 and STT 421) R: Open only to master's students in the Epidemiology major or approval of department. SA: HM 823

Basic principles of carcinogenesis. Major etiologic factors, types of malignancies, and biomarkers for susceptibility and exposure. Prevention and early detection of cancer.

824 Reproductive Epidemiology
Fall of even years. 3(3-0) P:M: (EPI 810 or concurrently and STT 421 or concurrently) RB: Social science or biological science R: Open only to graduate students in the Department of Epidemiology or approval of department.

Epidemiology of reproductive events.

825 Epidemiologic Modeling
Spring of odd years. 3(3-0) Interdepartmental with Physics. P:NM: (EPI 810 and STT 422) R: Approval of department. SA: HM 825

Mathematical modeling of epidemics. Stochastic and chaotic systems approaches. Applications through personal computer software.

826 Research Methods in Epidemiology
Fall. 3(3-0) P:M: (STT 422) R: Open only to master's students in the Epidemiology major. SA: HM 826

Analyses of epidemiologic and clinical data applying statistical methods, based on logistic and survival models, using standard software.

827 The Nature and Practice of Scientific Integrity
Spring. 3(3-0) P:M: (EPI 810)

Historical development of where and how science is practiced in the United States. Scientific culture, sociology, and ethical standards. Principles, standards, and practices which define scientific integrity and responsible research conduct.

829 Design and Conduct of Epidemiological Studies and Clinical Trials
Spring. 3(2-2) Interdepartmental with Large Animal Clinical Sciences. Administered by Department of Large Animal Clinical Sciences. P:NM: (VM 533) or approval of department. R: Open only to graduate students in the colleges of Human Medicine, Osteopathic Medicine, or Veterinary Medicine.

Applied analytical methods in experimental design. Assessment of health and disease status of animal and human populations. Risk assessment and interpretation of clinical trials.

890 Independent Study in Epidemiology
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course. P:NM: (EPI 810) R: Open only to master's students in the Epidemiology major. Approval of department. SA: HM 890

Independent study in areas relevant to epidemiology such as population genetics.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open only to master's students in the Epidemiology major. Approval of department. SA: HM 899

Master's thesis research.

EXECUTIVE MBA PROGRAM EMB

The Eli Broad College of Business and The Eli Broad Graduate School of Management

801 Business as an Institution
Fall. 2(2-0) R: Open only to students in the Executive M.B.A. Program. SA: MGT 808
Institutional goals and control of the business enterprise. Positioning of the firm in the marketplace. Ethical foundations of business.

802 Accounting and Financial Concepts
Fall. 2(2-0) R: Open only to students in the Executive M.B.A. Program. SA: ACC 802 C: EMB 812 concurrently.
Financial statement relationships and analysis. Cash flow and working capital measurement and analysis. Contemporary financial reporting issues.