992D. Seminar in Later English Literature
Fall. 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 English. Approval of department.
British literature 1660-1900. Culture and society, periodization and genres.

992E. Seminar in 20th Century English Literature
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 English.
Literature of Great Britain, Ireland, and other Anglophone countries, exclusive of the United States.

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 English. 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 English. 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 English. 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 36 credits in all enrollments for this course.
R: Open only to doctoral students in English.

ENTOMOLOGY ENT

Department of Entomology
College of Agriculture and Natural Resources
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.

362. Management of Turfgrass Pests
Fall. 4(3-2) Interdepartmental with Crop and Soil Sciences, and Botany 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. Insects: Success in Biodiversity
Fall. 4(3-4) Summer of even-numbered years. 4 credits. Given only at W.K. Kellogg Biological Station.
P: BS 110 or BOT 105, 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 Botany and Plant Pathology.
P: BOT 105 and BOT 106, or BS 110 and BS 111; BOT 218 or FOR 204, or HRT 210 and HRT 211. R: 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.

420. Stream and Aquatic Insect Ecology
Fall. 4(3-3) Interdepartmental with Fisheries and Wildlife, and Zoology. Administered by Fisheries and Wildlife.
P: BS 110, CEM 141.
Biological and environmental factors determining structure and function of stream and aquatic insect communities. Aquatic insect systematics.

442. Concepts of Biological Information Systems
Spring. 3(3-0)
R: Open only to seniors and graduate students.
Systems approach to managing biological information using computer technology.

460. Medical and Veterinary Entomology
Spring of even-numbered years. 3(2-3)
P: BS 110. R: not open to freshmen and sophomores
Insects and other organisms related to human and animal health. Ectoparasites, ecology of vector-borne diseases, epidemiology, and management of arthropod vectors.

470. General Nematology (W)
Spring of even-numbered years. 3(2-3)
P: BS 110 or BS 111. R: 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 Horticulture, and Crop and Soil Sciences, and Fisheries and Wildlife.
P: CEM 143; BOT 405 or CSS 402, 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. 3(2-3) Interdepartmental with Horticulture, Crop and Soil Sciences, Fisheries and Wildlife, and Forestry.
P: ENT 404 or ENT 470 or BOT 405 or CSS 402 or FW 328. R: 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, and Botany and Plant Pathology. Administered by Zoology.
P: ZOL 250. R: Open only to juniors and seniors.
Tropical biota emphasizing evolutionary and ecological principles compared across tropical ecosystems.

485L. Field Tropical Biology
Spring, Summer. 2 credits. Interdepartmental with Zoology, and Botany and Plant Pathology. Administered by Zoology.
P: ZOL 485 or concurrently. R: Open only to juniors and seniors. Approval of department.
Intensive field experience to study tropical ecosystems. Individual project required. Given at various sites in Costa Rica by the Organization for Tropical Studies.

805. Integrated Pest Management Systems
Fall. 3(2-2)
Biological, ecological and sociological factors which can be exploited for integrated pest management. Design and management of environmental systems for pest prevention and non-chemical control.

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-numbered years. 3(2-3)
P: ENT 404.
Fundamentals of insect behavior with emphasis on mechanisms. Quantitative methods.

818. Systematics, Morphology, Biology: Adults
Spring of even-numbered years. 3(1-7)
P: ENT 404.
Classification, identification, morphology, biology and evolutionary relationships of adult insects. Specimens provided.

838. Systematics, Morphology, Biology: Immatures
Fall of even-numbered years. 3(1-7)
P: ENT 404.
Classification, identification, morphology, biology and evolutionary relationships of immature insects. Emphasis on terrestrial holometabola. Collection required.

844. Insect Ecology and Evolution
Spring of odd-numbered years. 3(3-0)
P: ENT 404.
Unique characteristics and principles of insect ecology and evolution including trophic relationships, community structure, speciation and coevolution.

845. Ecology and Evolution: the Interface
Fall. 3(3-0) Interdepartmental with Zoology, and Botany and Plant Pathology. Administered by Zoology.
Conceptual and methodological issues common to both ecology and evolutionary biology.

850. Insect Physiology
Spring of odd-numbered years. 4(3-2)
P: 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-numbered years. 3(3-0) Interdepartmental with Genetics.
Analysis of molecular processes unique to insects, and their potentials for genetic engineering.

870. Plant Nematology
Spring of odd-numbered years. 3(2-3) Interdepartmental with Botany and Plant Pathology.
P: BOT 405.
Biology, host parasite relationships and management 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.

940. Analytical Techniques for Bioactive Compounds: Separation
Spring of odd-numbered years. 4(2-6)
Extraction and chromatigraphic separations of compounds from environmental matrices.

941. Analytical Techniques for Bioactive Compounds: Confirmation
Spring of even-numbered 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.

ENVIRONMENTAL ENGINEERING ENE

Department of Civil and Environmental Engineering
College of Engineering

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: ENE 801.
Physical and chemical principles of air and water pollution control and environmental contaminants in water, air and soils.

803. Physicochemical Process Laboratory
Spring. 1(0-3)
P: ENE 801. C: ENE 802.
Experiments involving physicochemical processes such as air stripping coagulation and flocculation, activated carbon and chemical oxidation.

804. Biological Processes in Environmental Engineering
Fall. 3(3-0)
P: ENE 801 or concurrently.
Engineering of microbial processes used in wastewater treatment, in-situ bioreclamation, and solid waste stabilization.

805. Biological Processes Laboratory
Spring. 1(0-4)
P: ENE 804.
Principles of biological processes applied to wastewater treatment.

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: 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.

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.

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.

FAMILY AND CHILD ECOLOGY FCE

Department of Family and Child Ecology
College of Human Ecology

145. The Individual, Marriage and the Family
Fall, Spring. 3(3-0)
R: Open only to freshmen and sophomores.
Development of the young adult in the human ecological context. Issues of sexuality, gener, parenting, work and family interface, communication and resource use. Diversity in relationships and families.

211. Child Growth and Development: Conception Through Early Childhood
Fall, Spring. 3(3-0)
R: Not open to freshmen.
Physical, cognitive, social, emotional and ecological aspects of human growth and development from conception through early childhood.

211L. Child Growth and Development Laboratory
Fall, Spring. 1(0-3)
C: FCE 211. R: Not open to freshmen.
Observation and recording the behavior and development of young children.

212. Children, Youth and Family
Fall, Spring. 3(3-0)
P: FCE 145, SOC 100 or FCE 211. R: Not open to freshmen.
An ecosystems perspective on development during childhood and adolescence emphasizing family and community contexts.

225. Ecology of Family and Human Development
Fall, Spring. 3(3-0)
R: Not open to seniors except seniors in the College of Human Ecology.
Human development across the lifespan with an ecological perspective. Relationships between human resource professionals and family systems.

238. Personal Finance
Fall, Spring, Summer. 3(3-0)
Strategies, techniques and resources useful in the management of personal finance.

270. Human Services in the Community
Fall, Spring. 4(3-2)
R: Not open to freshmen. Open only to students in the Department of Family and Child Ecology.
Human services from an ecological perspective. Human service needs, resources and methods of service delivery. Participation in community agency required.

320. Interaction Processes with Children in Groups
Fall, Spring. 3(3-0)
P: FCE 211. R: Open only to juniors and seniors in the Department of Family and Child Ecology.
Principles of verbal and non-verbal interaction in relation to children's behavior in groups. Focus on young children in early childhood programs.

320L. Interaction with Children-Laboratory
Fall, Spring. 1(0-3)
P: FCE 211; FCE 320 or concurrently. R: Open only to juniors and seniors in the Department of Family and Child Ecology.
Practice applying principles of interaction to individuals and small groups in early childhood programs.

321. Curriculum for Early Childhood Programs
Fall, Spring. 3(3-0)
P: FCE 320, FCE 320L. R: Open only to juniors and seniors in the Department of Family and Child Ecology. Completion of Tier I writing requirement.
Child development principles and accreditation standards for designing curricula for early childhood programs. Planning and evaluating learning activities and programs.

321L. Curriculum for Early Childhood Programs: Laboratory
Fall, Spring. 1(0-3)
P: FCE 320, FCE 320L, FCE 321 or concurrently. R: Open only to juniors and seniors in the Department of Family and Child Ecology.
Supervised practice in providing learning activities for individual children and small groups. Planning, implementing and evaluating activities.

350. Management and Decision Making in the Family
Fall. 3(3-0)
R: Not open to freshmen and sophomores. Completion of Tier I writing requirement.
Management for the realization of values and goals through decision making about resources in the family.