

**973. Seminar in English Education**  
Fall. 3 to 5 credits. May reenroll for a maximum of 10 credits if different topics are taken. Approval of instructor.  
Seminar in the teaching of English literature, language, and composition.

**975. The Reading Process and the Concept of Literacy**  
Spring. 3(3-0) May reenroll for a maximum of 12 credits. Approval of department.  
The contributions of language and literary studies to our understanding of the reading process and our definitions of literacy.

**980. Studies in English Language**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits.  
The English language from the viewpoint of historical problems, literary analysis and pedagogical implications.

**981. Seminar: Earlier English Literature**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits.  
Special problems in English literature, beginnings to 1660.

**982. Seminar: Later English Literature**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits.  
Special problems in English literature, 1660-1900.

**983. Seminar: American Literature**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits.  
Special problems in American literature, beginnings to 1900.

**984. Seminar: Twentieth Century Literature**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits.  
Special problems in English and American literature, 1900 to the present.

**985. Seminar: Special Studies in Literary Form and Theory**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits.  
Forms, genres, and movements.

**986. Seminar: American Literature and Culture**  
Fall, Winter, Spring. 3(3-0) May reenroll for a maximum of 12 credits.  
American literature in a cultural context, drawing upon popular and fine arts, the history of ideas, the history of social movements.

**998. Advanced Writing for Doctoral Candidates**  
Fall. 3(3-0) May reenroll for a maximum of 12 credits. Admission to a doctoral program or approval of instructor.  
Training for writing dissertations and publishing in the sciences, humanities, and other fields. Includes a detailed analysis of each student's style, methods of organizing, practice in editing, and individual conferences.

**999. Doctoral Dissertation Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**ENTOMOLOGY ENT**  
**College of Agriculture and Natural Resources**  
**College of Natural Science**

**201. Insects and Society (N)**  
Winter. 4(4-0)  
Influence of insects on the human race from a global and historical perspective. Environmental and cultural factors and how they influence and interrelate with the insects.

**250. Pesticides, Their Alternatives and Environmental Quality (N)**  
Fall. 3(4-0)  
Impact of agricultural pesticides on humans and their environment. Emphasizes the effect of chemicals on food production and combating diseases and ecological imbalance. Presents pesticide alternatives for the future.

**301. General Entomology**  
Fall, Spring. 3(3-0) B S 211 and B S 212 recommended.  
Biological relationships of insects. Insect behavior, ecology, and classification. Metamorphosis and development of insects.

**302. General Entomology Laboratory**  
Fall, Spring. 2(0-6) ENT 301 or concurrently.  
Insect diversity with emphasis on morphology, development, classification, identification, bionomics, and evolution. Stresses reproductive strategies and general adaptability as relates to the overall ecological success of insects.

**303. Entomological Techniques**  
Spring. 2(0-6) ENT 301 or approval of department; ENT 302 recommended but not required.  
Field entomology, including collecting and rearing techniques and methods of specimen preparation and preservation. Practical experience in insect identification and bionomics. Collection required.

**337. Forest and Shade Tree Entomology**  
Fall. 4(3-2) Three terms of natural science.  
Ecological relationships of insect/tree interactions. Taxonomy of insects and recognition of insect injury. Biological, chemical, silvicultural and integrated control methods. Insect collection required (see instructor during prior spring term).

**401. Problems**  
Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department.  
Advanced individual work on a field or laboratory research problem or a study of published literature on a selected topic.

**410. Apiculture and Pollination**  
Spring. 3(2-2)  
Biology of the honey bee and some of the wild bees. Relationships between bees and flowering plants. Value of bees in crop pollination. Introduction to management with visits to the University apiary.

**415. Insect Behavior**  
Winter of even-numbered years. 3(3-0) ENT 301, ENT 302; ZOL 313 recommended.  
Mechanisms and adaptive significance of communication, orientation, food and habitat selection and behavioral rhythmicity in insects.

**418. Systematic Entomology**  
Winter. 4(1-9) ENT 301, ENT 302.  
General taxonomic course to acquaint the student with the various groups of insects.

**420. Aquatic Insects**  
Spring. 4(3-3) ENT 301, ENT 302.  
Biology, ecology and systematics of aquatic insects. Insect collection required.

**425. Agricultural Entomology**  
Fall. 4(3-2) One year of biological or agricultural sciences.  
Natural processes of insect populations and associated techniques that are important to agriculture.

**438. Taxonomy of Immature Insects**  
Spring of even-numbered years. 4(1-9) ENT 418.  
Identification of immature insects with particular emphasis on the Holometabola.

**440. External Morphology of Insects**  
Fall. 4(2-6) ENT 301, ENT 302, or approval of department.  
Morphological concepts of external skeletal parts of insects. Emphasis on evolutionary development of structures from the Apterygota through the Pterygota.

**444. Insect Ecology**  
Fall of odd-numbered years. 3(3-0) One course in introductory entomology.  
Unique characteristics and principles of insect ecology. Trophic relationships, populations, climate, co-existence, competition, behavior, communities and distributions.

**450. Insect Physiology**  
Fall of even-numbered years. 5(3-4) ENT 301, ENT 302; 1 biochemistry or physiology course; 1 year of chemistry including 1 term of organic.  
General and comparative physiology of insects, treating molecular, tissue and organ function. Laboratory exercises emphasizing mastery of sound experimental procedures.

**455. Toxicology of Insecticides**  
Winter of odd-numbered years. 4(4-0) 1 term organic chemistry.  
Properties of insecticides. Mode of action, metabolism and movement in animals. Safety and potential hazards to humans and wildlife. Fates of insecticides in the environment.

**460. Medical Entomology**  
Spring. 4(3-3) ENT 301, ENT 302, or approval of department.  
Distribution and biology of important arthropod vectors of diseases to humans, disease symptoms, life cycle of the infectious agent, reservoirs, urticating arthropods, anaphylactic reactions, myiasis, and prophylactic measures.

**470. Nematode Diseases of Economic Plants**  
Spring. 4(3-3) B S 212 or BOT 205. Interdepartmental with the Department of Botany and Plant Pathology.  
Major nematode diseases of economically important plants, with emphasis on diagnostic symptoms, nematode biology and principles of control.

## Descriptions — Entomology

### of Courses

#### 478. Stream Ecology

Fall. 3(3-0) ENT 420, ZOL 389 or BOT 450 or F W 302 or approval of department. Students may not receive credit in both F W 478 and ENT 421. Interdepartmental with the departments of Fisheries and Wildlife and Zoology. Administered by the Department of Fisheries and Wildlife.

Biological, chemical, physical, and geological processes which determine the structure and function of stream ecosystems.

#### 490. Topics in Entomology

Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 12 credits. Majors or approval of department.

Advanced work in medical entomology, acarology, advanced forest entomology, soil arthropods, behavior and biological control.

#### 812. Graduate Seminar Topics

Fall, Winter. 1(1-0) May reenroll if different topic is taken. Graduate students and approval of department.

Graduate level seminars on current research and philosophy. Student participation required.

#### 815. Biological Control

Spring of even-numbered years. 3(2-3) Approval of department.

Properties of entomophagous species; relationships to population ecology and systematics; foreign exploration, colonization, manipulation, and evaluation; interactions with pesticides, analysis of successful programs, and future trends. Collection for taxonomic lab to be made the summer before.

#### 820. Applied Insect Ecology

Winter of odd-numbered years. 3(2-3) Approval of department.

Ecological factors in an insect's ecosystem that can be manipulated for the purpose of pest management. Critical evaluation of current and classical literature presented by students in both oral and written reports.

#### 871. Biology of Nematodes

Spring. 4(2-6) ENT 470 or approval of department. Interdepartmental with the Department of Botany and Plant Pathology.

Ontogeny, taxonomy, morphology, pathology and ecology of nematodes, with special reference to plant-parasitic and phytopathogenic species.

#### 881. Biology of the Arthropoda

Winter. 5(3-6) ZOL 481 or approval of department. Interdepartmental with and administered by the Department of Zoology.

Ecology, life cycles, morphology, taxonomy, and distribution of arthropods other than insects.

#### 890. Problems

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Majors or approval of department.

Advanced individual work in: apiculture, aquatic insects, insect biochemistry, biosystematics, economic insects, insect ecology, forest insects, morphology, nematology, insect physiology, plant disease transmission, insect toxicology, araneida, acarina, medical entomology, chemistry of insecticides, insect biology, extension entomology, systems.

#### 899. Master's Thesis Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

#### 940. Analytical Techniques for Biological Compounds I

Winter of odd-numbered years. 4(2-6) Organic chemistry, approval of department.

Application, extraction, cleanup and purification techniques employed in analysis of biologically active compounds. Stresses use of radioisotopes, and column, paper, thin-layer, and molecular sieve chromatography.

#### 941. Analytical Techniques for Biological Compounds II

Winter of even-numbered years. 4(2-6) ENT 940.

Analytical techniques used for identification and quantification of biologically active compounds. Emphasis on spectroscopy and gas-liquid chromatography.

#### 999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

## FAMILY AND CHILD ECOLOGY

FCE

(Name changed effective July 1, 1980. Formerly the departments of Family and Child Sciences, and Family Ecology.)

### College of Human Ecology

#### 118. Family Resources

(F E 118.) Fall. 3(2-2)

Skill development in identification, description and classification of human and non-human family resources on a historical and cross-cultural basis.

#### 145. The Individual, Marriage and the Family

(FCS 145.) Fall, Winter, Spring. 4(4-0)

Students may not receive credit in both FCE 145 and S W 228.

Individual as young adult. Alternative living patterns. Marriage as social institution. Courtship and marriage patterns. Adjustments in marriage. Attitudes and roles in family living. Crises situations. Family planning.

#### 200. Ecological Approach to Family and Health

(F E 200.) Fall, Winter. 2(2-0) Sophomores. Not open to HEC majors.

Use of the human ecosystem perspective to study people and their various environments with focus on family and health support systems.

#### 221. Human Services in the Community

(UMS 221.) Fall, Spring. 4(3-3)

Analysis of human and community needs: roles of professionals and volunteers in providing community and human services. Participation in community agency required.

#### 238. Personal Finance

(F E 238.) Fall, Winter, Spring. 3(3-0)

Strategies, techniques and resources useful in the management of personal finance.

#### 255. Family and Individual Development: Life Cycle

(FCS 255.) Winter, Spring. 3(3-0)

Three terms of natural science; sophomores.

Overview of family development. Predictable individual developmental changes over the life span. Cognitive, moral, physical, psychological and social aspects. Interface between individual and family development.

#### 262A. Child Growth and Development: Conception through Early Childhood

(FCS 262A.) Fall, Winter, Spring. Summer of odd-numbered years. 3(3-0) Sophomores, PSY 160 or PSY 170 or ED 200; FCE 262B concurrently.

Physical, cognitive, social, and emotional aspects of human growth and development from conception through early childhood.

#### 262B. Child Growth and Development Laboratory

(FCS 262B.) Fall, Winter, Spring. Summer of odd-numbered years. 1(0-3) FCE 262A concurrently or approval of department.

Observation of human development in infants and young children.

#### 263. Children, Youth and the Family

(FCS 263.) Fall, Winter, Spring. 3(3-0) Sophomores; SOC 241 or FCE 145 or FCE 262A; or approval of instructor.

A family systems perspective of middle childhood, adolescence, and youth development is presented, incorporating childhood through launching stages of family development. Interactions of parents, children and socio-cultural factors are analyzed.

#### 331. Management and Decision Making in the Family

(HEC 301.) Fall, Winter, Spring. Summer of even-numbered years. 3(3-0) HEC 201, Juniors.

Integrated nature of management in the family setting from an ecosystem perspective. Values and goals as reflected in decision making about family resources.

#### 332. Application of Principles of Home Management

(F E 332.) Fall, Winter, Spring. 2(0-5) FCE 331 or concurrently; T E 331 or FCE 340.

Principles of effective home management and their application in a living situation.

#### 337. Energy Utilization in the Household

(F E 437, 437.) Fall. Summer of even-numbered years. 3(3-0) FCE 331 or approval of department.

Human and fossil fuel energy use at the household level. Issues and policies regarding work accomplishment in the home.

#### 340. Instruction in Human Ecology for Non-Formal Settings

(F E 340.) Fall, Winter, Spring. 3(2-2) Juniors, HEC 301; Dietetic Majors: HNF 320 or concurrently.

Theory and practice of instruction in Human Ecology with specific application to non-formal environments. For majors in Dietetics and Community Services and other majors in human ecology.

#### 364A. Interacting with Young Children in Child Development Centers

(FCS 364A.) Fall, Winter. 3(3-0) FCE 262A, FCE 262B each with minimum grade of 2.0; FCE 364B concurrently.

Application of principles of human growth and development to personal interaction with children ages three to six individually and in small groups in schools of early childhood.