

**986. American Literature and Culture**  
Fall, Winter. 3(3-0)

American Literature in a cultural context, drawing upon popular and fine arts, the history of ideas, the history of social movements.

**999. Research**

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

**ENTOMOLOGY**

**ENT**

**College of Natural Science**

**250. Pesticides and Environmental Quality**

Winter. 3(3-0)

Impact of agricultural pesticides on man and his 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) R S 211 and 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) 301 or concurrently.

Experiments in morphology, physiology, behavior of insects. Populations and classification of major groups.

**337. Forest and Shade Tree Entomology**

Fall. 4(3-2) Three terms of Natural Science.

Provides an understanding of significance and nature of insect injury to forest and shade trees, based upon morphology, physiology, biology and taxonomy of insect and host. Analyzes biological, chemical, cultural and silvicultural approaches to insect control in order to equip student with competence to carry out survey and action program assignments.

**401. Problems**

Fall, Winter, Spring, Summer. 1 to 6 credits. May re-enroll 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.

**404. Field Entomology**

Summer. 6 credits. One year of zoological science or teaching major in general science or approval of department. Given at W. K. Kellogg Biological Station.

Basic field survey in entomology. Emphasis on the biology, collection and identification of insects common to the Gull Lake Biological Station area.

**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.

**411. Seminar**

Fall, Winter. 1(1-0) Majors or approval of department.

Reports by students, faculty, and representatives of the profession, with emphasis on current problems not covered in regular college subjects.

**418. Systematic Entomology**

Winter. 4(1-9) 301, 302.

General taxonomic course to acquaint the student with the various groups of insects.

**420. Aquatic Insects**

Fall. 4(2-4) 301, 302.

Biology, ecology and systematics of aquatic insects.

**421. Stream Ecology**

Summer. 3 credits. 420 or approval of department. Given at W. K. Kellogg Biological Station.

An in-depth examination of stream ecosystems—physical, chemical and biological aspects. Field work will be centered on local streams. Laboratory exercises will involve manipulations necessary for the determination of population energy budgets, with special emphasis on aquatic insects.

**430. Economic Entomology**

Winter. 3(2-3) 301, 302.

Recognition, life histories, behavior, ecology and integrated control of insects of economic importance.

**438. Taxonomy of Immature Insects**

Spring of even-numbered years. 4(1-9)

418.

Identification of immature insects with particular emphasis on the Holometabola.

**440. External Morphology of Insects**

Fall. 4(2-6) 301, 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.

**441. Internal Morphology**

Winter. 4(2-6) 440 or approval of department.

Morphology of the internal structure of insects. Emphasis on the evolutionary development of organs and organ systems of various representative insects.

**450. Insect Physiology**

Winter. 4(3-3) 441; PSL 401; 1 year of chemistry or approval of department.

Comparative physiology of insects with histological and functional aspects of organs and organ systems.

**460. Medical Entomology**

Winter. 4(3-3) 301, 302, or approval of department.

Distribution and biology of important arthropod vectors of diseases to man, disease symptoms, life cycle of the infectious agent, reservoirs, urticating arthropods, anaphylactic reactions, myiasis, and prophylactic measures.

**470. Introductory Nematology**

Winter of odd-numbered years. 3(2-3) Interdepartmental with the Department of Botany and Plant Pathology.

Biology, taxonomy and control of plant parasitic and saprophytic nematodes.

**480. Insects in Relation to Plant Diseases**

(360.) Winter of even-numbered years. 4(2-4) 302. Interdepartmental with the Department of Botany and Plant Pathology.

Relationships of insects, mites and nematodes to important plant diseases incited by bacteria, fungi, viruses and toxins. Mode of transmission and means of control. Transmission techniques and important plant-pathogen-insect relationships.

**490. Topics in Entomology**

(870.) Fall, Winter, Spring, Summer. Variable credit. Majors or approval of department.

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

**808. Advanced Taxonomy**

Fall, Winter, Spring. 4(0-12) May re-enroll for a maximum of 24 credits. 418, 440.

Classification in depth of a single order of insects, including comparative morphology of the group and survey of recent and classical literature.

**811. Ecology of Aquatic Insects**

Summer of every third year; given in 1969. 3 credits. 420 or approval of department. Given at W. K. Kellogg Biological Station.

Aquatic insects, their physiology, distribution, and density. Preparation of energy budgets for natural populations.

**820. Insect Ecology**

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

Insects and various invertebrates in relation to their environment. Factors affecting populations, speciation and distribution. Application of basic ecological principles to integrated control measures.

**821. Advanced Stream Ecology**

Summer. 3 credits. 421 or approval of instructor. Given at W. K. Kellogg Biological Station. Interdepartmental with Fisheries and Wildlife Department.

Stream ecosystem energy budget models with emphasis on individual projects involving both laboratory and field experiments. Particular use will be made of artificial streams and locally abundant species of aquatic insects.

**830. Insect Biochemistry**

Spring of even-numbered years 4(4-0). 450; BCH 401.

Energy metabolism, intermediary metabolism and the biochemistry of development in insects; stresses biochemical differences between insects and higher animals.

**831. Insect Biochemistry Laboratory**

Summer of even-numbered years. 2(0-6) 830 or concurrently.

Laboratory to accompany 830. Experiments designed to elucidate the biochemical mechanisms of importance to insects.

**838. Principles of Taxonomy**

Spring of odd-numbered years. 3(3-0) Twenty credits in zoology and/or entomology, or approval of department.

Methods and principles of systematic zoology and entomology, including a historical survey of the pre-Linnaean and post-Linnaean systems of classification. International rules of zoological nomenclature and their emendations.

**840. Insect Toxicology**

Winter of odd-numbered years. 5(3-6) 301, 302; organic chemistry.

Chemical and physical properties of insecticides, relationship of chemical structure to mode of action, and physiological basis of toxicological action.

**881. Biology of the Arthropoda**

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

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

**899. Research**

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

**940. Analytical Techniques for Biological Compounds I**  
Fall. 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. 4(2-6) 940.

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

**999. Research**

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

## FAMILY AND CHILD SCIENCES\*

FCS

### College of Human Ecology †

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

Fall, Winter, Spring. 4(4-0) Freshmen or Sophomores or approval of department. Students may not receive credit in both 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.

**245. Children, Youth and the Family**  
(261.) Fall, Winter, Spring. 3(3-0) Sophomores, SOC 241.

Focuses on family system. Stages of family development studied include childbearing through launching. Interaction of parent, children and societal forces, particularly in middle childhood and adolescent stages emphasized.

**262A. Child Growth and Development: Conception Through Early Childhood**

(362A.) Fall, Winter, Spring. Summer of odd-numbered years. 3(3-0) A biological science or physiology course and SOC 241; ED 200 or PSY 160 or 170.

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

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

(362., 362B.) Fall, Winter, Spring. Summer of odd-numbered years. 1(0-3) 262A concurrently or approval of department.

Observation of human development in infants and young children.

**364. Interacting with Young Children in Child Development Centers**

Fall, Winter, Spring. 3(2-3) 262A and 262B or PSY 245.

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.

\*Name changed November 1, 1968. Formerly Home Management and Child Development.

†Name changed July 1, 1970. Formerly College of Home Economics.

**365. Human Sexuality and the Family**

Fall, Winter. 3(3-0) Credit may not be earned in both FCS 365 and PSY 290. Juniors.

Contemporary issues about human sexuality. Individual assumptions, standards, behaviors vis-a-vis the family, the peer culture, the larger society. Research findings, guest speakers, small group interaction are included.

**369A. Learning Activities for Early Childhood Programs**

(369.) Fall, Winter, Spring. 3(3-0) Majors: 262A and B and 364; others: ED 312.

Planning learning activities and teaching strategies for children ages 3 to 6 in early childhood education programs.

**369B. Learning Activities for Early Childhood Programs — Laboratory**

(369.) Fall, Winter, Spring. 1(0-3) 369A concurrently and approval of department.

Experience in planning and carrying out learning activities with young children in an early childhood program.

**400H. Honors Work**

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 16 credits. Seniors; approval of department.

**401. Minority Families in America**

Winter. 3(3-0) S S 213 or approval of department.

Historical, structural, functional components of minority family systems in white America. Centers on a particular minority family system each term. Life styles, pressures, adaptations, viability and continuity of minority family subculture.

**444. Interpersonal Relationships in the Family**

Fall, Spring, Summer of even-numbered years. 3(3-0) 145 or 245 or approval of department.

Relationships between and among family members as they are affected by other systems, and by physical, cultural, social-psychological forces within the family eco-system. Contemporary family life issues.

**446. Approaches to the Study of the Family**

Fall, Winter, Summer of odd-numbered years. 4(4-0) 145 or 245, 444.

The family is studied from several approaches. Case studies, films, literary materials, research studies and observations of living situations are included.

**461. Individual Child Study**

Fall, Winter. 3(2-2) Majors: 364; others: 262A, PSY 245 or ED 312.

An in-depth analysis of development and behavior utilizing regular observation of a young child. Applications of theories of child growth and behavior.

**464A. Practicum in a Child Development Center**

Fall, Winter, Spring. Summer of odd-numbered years. 3 to 6 credits. Majors: 364, 369; others: 262A and 262B, or ED 312, approval of department.

A directed practicum in planning, implementing and evaluating the learning environment, in a class of young children during an entire term.

**464B. Problems in Teaching in a Child Development Center**

Fall, Winter, Spring. 2(2-0) 464A concurrently.

Analysis of problems in teaching in an early

childhood program. Application of child guidance techniques and principles.

**467. Administration of Child Development Centers**

Spring. 3(3-0) 464A and 464B or concurrently.

Analysis of the administrator's role in child development centers. Application of philosophical approaches, communication techniques and management skills to operating early childhood education programs. Licensing and other regulations.

**468. Teacher-Parent Interaction**

Fall, Winter. 3 credits. Majors: 464A and 464B, or concurrently; others: 262A or ED 312, approval of department.

Analysis of parent-teacher communication and interaction, parent involvement, and parent education related to early childhood education programs operated by schools, churches, or community agencies. Field experience when feasible.

**469. Physical and Physiological Growth of Children**

(463.) Winter, Spring. 4(3-2) HNF 102; three terms of Natural Science. Interdepartmental with Human Nutrition and Foods.

Physical and physiological growth patterns. Experimental evidence for nutritional requirements. Applications to feeding practices, and physical activity of children.

**470. Current Issues in Family and Child Sciences**

Fall. 3(3-0) 464A, or Seniors, or approval of department.

Analysis of current events, issues; of legislation which has bearing on homes, families and children and children's programs. Implications for professional decisions and actions.

**480. Human Development and Interpersonal Relationships: The Middle and Later Years**

Spring. Summer of odd-numbered years. 4(3-1) Introductory sociology and psychology; 145 or 245 or 444.

Social-psychological-biological development and socialization for roles in middle and later years. Generational relationships; societal influences. Case study approach involving interaction with an adult or family in middle or later years.

**495. Independent Study**

Fall, Winter, Spring, Summer. 4 to 12 credits. May re-enroll for a maximum of 12 credits. Approval of department.

Study of a selected topic under the guidance of a faculty adviser in the area of specialty.

**498. Field Study**

Fall, Winter, Spring, Summer. 4 to 12 credits. May re-enroll for a maximum of 12 credits. Approval of department.

Study in off-campus situations in a variety of ways using involvement in volunteer, governmental or business-sponsored community service agencies to further insights into interaction among the individual, the family and the community.

**801A. Seminar in Family Life**

(800B.) Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 12 credits. Approval of department.

**801B. Seminar in Child Development**

(800B.) Fall, Winter, Spring. 3(3-0) May re-enroll for a maximum of 12 credits. Approval of department.

**810. Workshop**

Summer. Variable credit. Approval of department.

Content varies depending on nature of workshop.