

**337. Forest and Shade Tree  
Entomology**

Fall. 4(3-2) N S 193.

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**

Spring. 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**

(860.) 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**

Fall of even-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.

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 quantitation of biologically active compounds. Emphasis on spectroscopy and gas-liquid chromatography.

**999. Research**

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

**EXTENSION PERSONNEL  
DEVELOPMENT EPD**

**College of Agriculture and  
Natural Resources**

**801. Seminar in Cooperative  
Extension Service**

Fall, Winter, Spring, Summer. 1 to 3 credits. Approval of department.

**880. Special Problems**

Fall, Winter, Spring, Summer. Variable credit. May re-enroll for a maximum of 6 credits.

Supervised readings and independent study of selected topics varying from term to term: application of social research to extension, marketing and 4-H programs, and special problem papers.

**899. Research**

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

**FAMILY AND CHILD  
SCIENCES\***

FCS

**College of Human Ecology†**

**145. Relationships in the Modern Family**

Fall, Winter, Spring. 3(3-0) Freshmen or Sophomores or approval of department. Students may not receive credit in both 145 and S W 228.

Family relationships throughout the life cycle. Changing nature of families in contemporary society; appraisal of attitudes and roles in family living; development of realistic patterns for courtship and marriage in an increasingly complex world.

**261. Human Development in the Family**

Fall, Winter, Spring. Summer of odd-numbered years. 3(3-0) Sophomores.

Influences of values in a society upon the pattern of family life; normal growth and development of family members, changing roles of family members—conflict in roles; family structure around the world; family authority patterns; value orientation.

**362A. Child Study**

(362.) Fall, Winter, Spring. Summer of odd-numbered years. 3(3-0) N S 192; S S 233, PSY 160 or 170 or ED 200. Human Ecology students; 261.

Development of child from prenatal through adolescent period. Observations of children of various ages.

**362B. Child Study—Laboratory**

(362.) Fall, Winter, Spring. 1(0-3) 362A concurrently and approval of department.

**364. Guidance of Young Children**

Fall, Spring. 3(2-2) 362 or PSY 345 or approval of department.

Examination of philosophies of child guidance and their relation to knowledge of child development and behavior. Supervised practice in guiding young children in a nursery school setting.

**365. Human Sexuality in the Family**

Winter. 3(3-0) Credit may not be earned in both FCS 365 and PSY 290. Juniors. Emphasizes a life process approach of human sexuality—biologically, psychologically, socially—as it develops from prenatal life through old age within the family.

**369A. Learning Resources in the Nursery School**

(369.) Winter, Spring. 3(3-0) Majors, 362; others, ED 312.

Selection and use of play materials and equip-

ment for group work with young children and function of these materials in development of child.

**369B. Learning Resources in the Nursery School—Laboratory**

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

**400H. Honors Work**

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

**444. Interpersonal Relations Within the Home**

Fall, Spring. Summer of even-numbered years. 3(3-0) 261 or approval of department.

Develops an understanding of the dynamics of the various relationships within families. Planned to meet personal needs as well as preparation for those entering professions related to the family-life field. Current family-life literature.

**446. Approaches to Studying the Family**

Fall, Winter. Summer of odd-numbered years. 3(3-0) 145; S S 233. PSY 160 or 170 or ED 200, or approval of department.

Course to increase understanding of human relations in families and other small groups, and of one's self in a group. Readings, case studies, literary materials, films, and observations of living situations are included.

**461. Growth and Behavior of the Individual Child**

Fall, Winter. 3(2-2) Majors: 364; others: 362 or PSY 345 or ED 312.

Child's progress as he interacts with his environment followed through observations in nursery school and at home and through use of nursery school records. Various measuring and summarizing devices.

**463. Physical Development of Children**

Winter. 4(3-2) 362 or ED 312; HNF 102.

Growth patterns and factors influencing them. Experimental evidence of nutritional requirements.

**464A. Participation in the Nursery School I**

Fall, Winter, Spring. Summer of odd-numbered years. 3 to 6 credits. Majors: 364, 369; others: 362 or ED 312 and approval of department; 463 concurrently.

**467. Nursery School Administration**

Spring. 3(2-3) 464A or concurrently.

Housing and equipment, costs, staff, program, health protection, and community relations. School planning and organization.

**468. Nursery School and Parent Education**

Fall, Winter, Spring. Summer of odd-numbered years. 3 credits. Majors: 364, 369; others: 362 or ED 312 and approval of department; 464A concurrently.

Recognizing and planning for learning experiences for children in nursery school program and methods of working with parents.

**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.

**813B. Special Studies in Family Life and Child Development**

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

**820. Human Development in the Family: Physiological Development**

Fall. 4(4-0) Six credits in child development or approval of department.

Selected aspects of family members' physiological potential, development, status explored. Family's contributions to members' physiological potential for growth and development and to realization of human potential are seen as fundamental.

**821. Human Development in the Family: Personality**

Winter. 4(4-0) Six credits in child development or approval of department.

Influence of child-rearing practices and parent-child relationships on developing human personality. Application of research findings and theoretical approaches to psychological development in the family and family-related situations.

**822. Human Development in the Family: Socialization**

Spring. 4(4-0) Basic course in sociology; 6 credits in child development or family life or approval of department.

Influence of family structure and interaction upon socialization from infancy to adulthood. Relationship of family to processes in larger social environment, and influence of these on human social development.

**830. Individual Readings**

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

**862. Advanced Child Study**

Spring. Summer of odd-numbered years. 3(3-0) 362 or ED 312 or approval of department.

Current trends in field of child development based on research and on significant new books. Careful observations of children in a variety of informal situations will be made within the limits of available resources.

**899. Research**

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

**999. Research**

Fall, Winter, Spring, Summer. Variable credit.

Research in home management and economics of the family.

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

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