Seminar: American Literature  
Fall, Winter, Spring. 3(3-0)  
Special problems in American literature, beginning to 1900.

Seminar: Twentieth Century Literature  
Fall, Winter, Spring. 3(3-0)  
Special problems in English and American literature, 1900 to the present.

Seminar: Special Studies in Literary Form and Theory  
Fall, Winter, Spring. 3(3-0)  
Forms, genres, and movements.

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

Seminar: Special Topics in Comparative Literature  
Spring. 3(3-0)  
Advanced graduates. Interdepartmental with the departments of Romance and Classical Languages and German and Russian and administered by the Department of Romance and Classical Languages.

Advanced Writing for Doctoral Candidates  
Fall, Winter, Spring, Summer. 3(3-0)  
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.

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

ENTOMOLOGY

College of Agriculture and Natural Resources
College of Natural Science

Pesticides, Their Alternatives and Environmental Quality  
Winter. 3(4-0)  
Impact of agricultural pesticides on man and his environment. Emphasizes the effect of chemicals on food production and combating diseases and ecological imbalance. Prescribes pesticide alternatives for the future.

General Entomology  
Fall, Spring. 3(3-0)  
B S 211 and 212 recommended.  

General Entomology Laboratory  
Fall, Spring. 2(0-6)  
Experiments in morphology, physiology, behavior of insects. Populations and classification of major groups.

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, ecological and silvicultural approaches to insect control in order to equip student with competence to carry out survey and action program assignments.

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.

Field Entomology  
Summer. 6 credits. One year of ecological 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.

Agriculture and Pollination  
Spring. 3(3-2)  
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.

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

Aquatic Insects  
Spring. 4(3-1)  
301, 302.  
Biology, ecology and systematics of aquatic insects. Insect collection required.

Stream Ecology  
Fall, Winter, given at W. K. Kellogg Biological Station. 3(4-0)  
450 or approval of department. Interdepartmental with the Department of Fisheries and Wildlife.  
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. Field trips required.

Economic Entomology  
Fall. 3(3-0)  
301, 302.  
Recognition, life histories, behavior, ecology and integrated control of insects of economic importance.

Taxonomy of Immature Insects  
Spring. 4(1-9)  
Identification of immature insects with particular emphasis on the Holometabola.

External Morphology of Insects  
Fall. (3-6)  
301, 302, or approval of department.  
Morphological study of insect body parts. Emphasis on evolutionary development of structures from the Apterygota through the Pterygota.

Internal Morphology  
Winter. 4(3-6)  
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.

Insect Physiology  
Spring. 4(4-0)  
441: FSL 401; 1 year of chemistry or approval of department.  
Comparative physiology of insects with histological and functional aspects of organs and organ systems.

Medical Entomology  
Spring. 3(3-3)  
301, 302, or approval of department.  
Distribution and biology of important arthropod vectors of diseases to man, diseases symptoms, life cycles of the infectious agent, reservoirs,  
vectorial capacity, anaphylactic reactions, myiasis, and propylactic measures.

Nematode Diseases of Economic Plants  
Winter. 4(5-3)  
B S 812 or BOT 205. Interdepartmental with the Department of Botany and Plant Pathology.  
Major nematode diseases of economically important plants, with emphasis on diagnostic symptoms, nematology and principles of control.

Insects in Relation to Plant Diseases  
Winter of even-numbered years. 4(3-4)  
301.  
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.

Topics in Entomology  
Fall, Winter, Spring, Summer. Variable credit. Majors or approval of department. Advanced work in medical entomology, scarology, advanced forest entomology, soil arthropods, behavior and biological control.

Advanced Taxonomy  
Fall, Winter. 4(9-12)  
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.

Biological Control  
Winter of even-numbered years. 3(3-0)  
Approval of department.  
Properties of entomopathogenic 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.  

A-73
280. Insect Ecology
Fall of even-numbered years. 3(2-3)
Approval of department. Detailed consideration of the dynamics of insect populations. Review of those factors in the insect ecosystem which can be manipulated for the purpose of pest management. Role and use of models in insect ecology.

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

638. 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.

640. 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.

851. Insect Physiology Laboratory
Spring. 2(0-6) 430 or concurrently.
Selected physiological systems in insects.

671. Biology of Nematodes
Spring. 4(2-5) 470 or approval of department. Interdepartmental with and administered by the Department of Zoology. Ontogeny, taxonomy, morphology, pathology and ecology of nematodes, with special reference to plant- parasitic and phytopathogenic species.

881. Biology of the Arthropoda
Winter. 5(3-0) 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.

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

940. Analytical Techniques for Biological Compounds I
Fall, 4(3-6) Organic chemistry, approval of department. Application, extraction, cleanup and purification techniques, employment of analysis of biologically active compounds. Stress use of radioisotopes and column, paper, thin-layer, and molecular sieve chromatography.

941. Analytical Techniques for Biological Compounds II
Winter. 4(3-6) 940.
Analytical techniques used for identification and quantification of biologically active compounds. Emphasis on spectrometry and gas-liquid chromatography.

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

FAMILY AND CHILD SCIENCES

College of Human Ecology

145. The Individual, Marriage and the Family
Fall, Winter, Spring. 4(4-0) Students may not receive credit in both 145 and 256.

245. Children, Youth and the Family
Fall, Winter, Spring. 3(3-0) Sophomore, 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
Fall, Winter, Spring. Summer of odd-numbered years. 3(3-0) A biological science or philosophy course and SOC 241; ED 260 or PSY 160 or 179.
Physical, cognitive, social, and emotional aspects of human growth and development from conception through early childhood.

262B. Child Growth and Development Laboratory
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.

364A. Interacting With Young Children
Fall, Winter, Spring. 3(3-0) 262A, 262B.
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.

364B. Interacting With Young Children — Laboratory
Fall, Winter, Spring. 1(0-3) 262A, 262B, 364A or concurrently.
Experience in interaction with children ages two to six years, individually and in small groups in a child development center.

369A. Learning Activities for Early Childhood Programs
Fall, Winter, Spring. 3(3-0) Majors: 262A and B and 364; others: ED 412.
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
Fall, Winter, Spring. 3(3-0) 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. Variable credit. May re-enroll for a maximum of 16 credits. Senior approval of department.

401. Minority Families in America
Winter. 3(3-0) 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(3-2) Majors: 364; others: 262A, FSY 244 or ED 412.
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 7 credits. Majors: 364, 369A, 369B; others: 262A and 262B, or ED 412, approval of department.
A directed practicum in planning, implementing, and evaluating the learning environment, in a class of young children during an entire term.