998. 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

College of Natural Science

250. Pesticides and Environmental Quality
Winter. 3(3-0)
Impact of 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) B S 211 and 212 recommended

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 tree, based upon morphology, physiology, biology and taxonomy of insect and host. Analyzes ecological, 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. Must 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(2-3)
Biological 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) Major 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(4-4) 301, 302.
Biology, ecology and systematics of aquatic insects.

421. Stream Ecology
Summer. 3 credits. 430 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)
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; FSL 401; 1 year of chemistry or approval of department.
Comparative physiological and functional aspects of organs and organ systems.

460. Medical Entomology
Winter. 4(3-3) 301, 302, or approval of department.
Diet and distribution of important arthropod vectors of diseases to man, disease symptoms, life cycle of the infectious agent, reservoirs, urticating arthropods, anaaphlyctic 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
Fall, Winter of even-numbered years. 4(3-4) 302, 303.
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
Fall, Winter, Spring, Summer. Variable credit. Major or approval of department.
Advanced work in medical entomology, acarology, advanced forest entomology, soil arthropods, behavior and biological control.

508. Advanced Taxonomy
Fall, Winter, Spring. 4(0-12) May re-enroll for a maximum of 24 credits. 419, 440.
Classification in depth of a single order of insects, including comparative morphology of the group and survey of recent and classical literature.

511. Ecology of Aquatic Insects
Summer of even 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.

520. Insect Biochemistry
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.

521. 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.

530. Insect Biochemistry Laboratory
Summer of even-numbered years. 2(0-6) 430 or concurrently.
Laboratory to accompany 530. Experiments designed to elucidate the biochemical mechanisms of importance to insects.

538. Principles of Taxonomy
Spring of odd-numbered years. 3(2-3)
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.

540. Insect Taxonomy
Winter of odd-numbered years. 5(3-6)
301, 302; organic chemistry.
Chemical and physical properties of insects, relationship of chemical structure to mode of action, and physiological basis of toxicological action.

581. Biology of the Arthropoda
Winter. 5(3-6) ZOL 451 or approval of department. Interdepartmental with and administered by the Zoology Department.
Ecoology, life cycles, morphology, taxonomy, and distribution of arthropods other than insects.

599. 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 of active compounds.  
Stresses use of radioisotopes, and columns, 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 W 228.  

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  
(363A) Fall, Winter, Spring. Summer of odd-numbered years. 3(3-0) A biological science or physiology course and SOC 241; ED 200 or FST 100 or 170.  
Physical, cognitive, social, and emotional aspects of human growth and development from conception through early childhood.

262B. Child Growth and Development Laboratory  
(363B, 362B) Fall, Winter, Spring. Summer of odd-numbered years. 1(0-0) 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(2-2) 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, 1985. Formerly Family 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 296. 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 included.

393A. 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.

393B. Learning Activities for Early Childhood Programs — Laboratory (369B) Fall, Winter, Spring. 1(0-3)  
393A 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 sub-culture.

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, literature materials, research studies and observations of living situations are included.

481. Individual Child Study  
Fall, Winter. 3(3-0) Majors: 364; others: 262A, PSY 245 or ED 313.  
An in-depth analysis of development and behavior utilizing regular observation of a young child. Applications of theories of child growth and behavior.

484A. 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.

485. Problems in Teaching in a Child Development Center  
Fall, Winter, Spring. 3(2-0) 464A concurrently.  
Analysis of problems in teaching in an early childhood program. Application of child guidance techniques and principles.

457. 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 Psychological Growth of Children  
(W 360) Winter, Spring. 4(2-2) 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  
Fall, Winter, 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. General 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 advisor 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.

501A. Seminar in Family Life  
(360B) Fall, Winter, Spring. 3(3-0)  
May re-enroll for a maximum of 12 credits. Approval of department.

501B. Seminar in Child Development  
(360B) 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.