

## Descriptions - ENGLISH

of

### Courses

987. **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. Administered by the Department of Romance and Classical Languages.

998. **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.

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

250. **Pesticides, Their Alternatives and Environmental Quality (N)**  
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. Presents pesticide alternatives for the future.

301. **General Entomology**  
Fall, Spring. 3(3-0) BS 211 and BS 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.

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, Spring. 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.

415. **Insect Behavior**  
Winter of even-numbered years. 3(3-0) ENT 301, ENT 302; ZOL 413 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.

421. **Stream Ecology**  
Fall, Summer—given at W. K. Kellogg Biological Station. 3(3-0) ENT 420 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.

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.

441. **Internal Morphology**  
Winter. 4(2-6) ENT 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.

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. 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 man 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 man, disease symptoms, life cycle of the infectious agent, reservoirs, urticating arthropods, anaphylactic reactions, myiasis, and prophylactic measures.

470. **Nematode Diseases of Economic Plants**  
Winter. 4(3-3) BS 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.

480. **Insects in Relation to Plant Diseases**  
Fall of even-numbered years. 3(2-2) ENT 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**  
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.

**812. Graduate Seminar Topics**  
Fall, Winter, Spring. 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.

**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.

**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**  
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) 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)

**College of Human Ecology**

**Family and Child Sciences FCS**

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

**255. Family and Individual  
Development: Life Cycle**  
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**  
Fall, Winter, Spring, Summer of odd-  
numbered years. 3(3-0) Sophomores, PSY 160 or  
PSY 170 or ED 200; FCS 262B concurrently.  
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) FCS 262A concurrently  
or approval of department.  
Observation of human development in infants and  
young children.

**263. Children, Youth and the  
Family**  
(245.) Fall, Winter, Spring. 3(3-0)  
Sophomores; SOC 241 or FCS 145 or FCS 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.

**364A. Interacting with Young  
Children in Child Development  
Centers**  
(364.) Fall, Winter, Spring. 3(3-0) FCS  
262A, FCS 262B each with minimum grade of  
2.0; FCS 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.

**364B. Interacting with Young  
Children—Laboratory**  
Fall, Winter, Spring. 1(0-3) FCS 364A  
or concurrently, FCS 262A, FCS 262B each with  
a minimum grade of 2.0.  
Experience in interaction with children ages two  
to six years, individually and in groups in a child  
development center.

**369A. Learning Activities for  
Early Childhood Programs**  
Fall, Winter, Spring. 3(3-0) Majors:  
FCS 262A and FCS 262B, FCS 364A and FCS  
364B each with a minimum grade of 2.0; FCS  
369B concurrently. Others: approval of  
department.  
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. 1(0-3) FCS 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 reenroll for a maximum of  
16 credits. Seniors; approval of department.

**442. Minority Families in  
America**  
(401.) Winter. 3(3-0) Juniors.  
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, Winter, Spring, Summer of even-  
numbered years. 3(3-0) FCS 145 or FCS 263 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.

**445. Human Sexuality in the  
Family**  
(365.) Fall, Winter, Spring. 3(3-0)  
Juniors. Credit may not be earned in both FCS  
445 and PSY 290.  
Personal, interpersonal, societal meanings of  
human sexuality, utilizing outgoing small peer  
group interaction. Nonlecture, value clarification  
approach, integrating reflection on research  
findings, family, peer and cultural influences.