

**805. Integrated Pest Management Systems**  
Fall. 3(2-12)  
Biological, ecological and sociological factors which can be exploited for integrated pest management. Design and management of environmental systems for pest prevention and non-chemical control.

**812. Graduate Seminar**  
Fall, Spring. 1(1-0) A student may earn a maximum of 10 credits in all enrollments for this course.  
Current research topics. Student presentation required.

**815. Insect Behavior**  
Fall of odd-numbered years. 3(2-13)  
P: ENT 404.  
Fundamentals of insect behavior with emphasis on mechanisms. Quantitative methods.  
QP: ENT 301, ENT 302 QA: ENT 415

**818. Systematics, Morphology, Biology: Adults**  
Spring of odd-numbered years. 3(1-17)  
P: ENT 404.  
Classification, identification, morphology, biology and evolutionary relationships of adult insects. Specimens provided.  
QP: ENT 301, ENT 302 QA: ENT 418

**838. Systematics, Morphology, Biology: Immatures**  
Fall of even-numbered years. 3(1-17)  
P: ENT 404.  
Classification, identification, morphology, biology and evolutionary relationships of immature insects. Emphasis on terrestrial holometabola. Collection required.  
QP: ENT 418 QA: ENT 438

**844. Insect Ecology and Evolution**  
Spring of even-numbered years. 3(3-0)  
P: ENT 404.  
Unique characteristics and principles of insect ecology and evolution including trophic relationships, community structure, speciation and coevolution.  
QP: ENT 301 or ENT 302 or ENT 425 QA: ENT 444

**850. Insect Physiology**  
Spring of even-numbered years. 4(3-12)  
P: ENT 404.  
System by system description of insect form and function. Examples of how physiological systems are coordinated for complex biological functions.  
QP: ENT 301, ENT 302 QA: ENT 450

**851. Molecular Entomology**  
Fall of odd-numbered years. 3(3-0) Interdepartmental with Genetics.  
Analysis of molecular processes unique to insects, and their potentials for genetic engineering.  
QA: ENT 851

**870. Plant Nematology**  
Spring of odd-numbered years. 3(2-13)  
Interdepartmental with Botany and Plant Pathology.  
P: BOT 405.  
Biology, host parasite relationships and management of selected nematode diseases of economic plants.  
QP: BOT 405 QA: ENT 871

**890. Independent Study**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 8 credits in all enrollments for this course.  
R: Open only to graduate students.  
Individual study on a field or laboratory research topic or review of published literature on a topic of interest.

**899. Master's Thesis Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
R: Open only to masters students in Entomology.  
QA: ENT 899

**940. Analytical Techniques for Bioactive Compounds: Separation**  
Spring of even-numbered years. 4(2-16)  
Extraction and chromatographic separations of compounds from environmental matrices.  
QA: ENT 940

**941. Analytical Techniques for Bioactive Compounds: Confirmation**  
Spring of odd-numbered years. 4(2-16)  
Instrumental confirmation of compounds from environmental matrices.  
QA: ENT 941

**999. Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 99 credits in all enrollments for this course.  
R: Open only to Ph.D. students in Entomology.  
QA: ENT 999

## ENVIRONMENTAL ENGINEERING ENE

Department of Civil and  
Environmental Engineering  
College of Engineering

**800. Environmental Engineering Seminar**  
Fall, Spring. 1(1-0)  
R: Open only to Environmental Engineering majors.  
Current research in environmental engineering.  
QA: ENE 800

**801. Dynamics of Environmental Systems**  
Spring. 3(3-0)  
Principles of mass balance, reaction kinetics, mass transfer, reactor theory in environmental engineering.  
QP: CE 481 QA: ENE 801

**802. Physicochemical Processes in Environmental Engineering**  
Fall. 3(3-0)  
P: ENE 801.  
Physical and chemical principles of air and water pollution control and environmental contaminants in water, air and soils.  
QP: CE 483 QA: ENE 802

**803. Physicochemical Process Laboratory**  
Spring. 1(0-3)  
P: ENE 801. C: ENE 802  
Experiments involving physicochemical processes such as air stripping coagulation and flocculation, activated carbon and chemical oxidation.  
QP: ENE 801 QA: ENE 802

**804. Biological Processes in Environmental Engineering**  
Fall. 3(3-0)  
P: ENE 801 or concurrently.  
Engineering of microbial processes used in wastewater treatment, in-situ bioreclamation, and solid waste stabilization.  
QP: ENE 801 QA: ENE 804

**805. Biological Processes Laboratory**  
Spring. 1(0-4)  
P: ENE 804.  
Principles of biological processes applied to wastewater treatment.  
QP: ENE 804 QA: ENE 805

**807. Environmental Analytical Chemistry**  
Fall. 3(3-0)  
R: Open only to Environmental Engineering majors.  
Techniques for measurement and analysis in environmental engineering. Sample preparation. Quality assurance.  
QP: CE 481

**808. Environmental Analytical Chemistry Laboratory**  
Spring. 1(0-3)  
P: ENE 807. R: Open only to Environmental Engineering majors.  
Laboratory work in environmental analytical chemistry.  
QP: CE 481

**880. Independent Study in Environmental Engineering**  
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course.  
R: Open only to Environmental Engineering majors.  
Solution of environmental engineering problems not related to student's thesis.

**890. Selected Topics in Environmental Engineering**  
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 9 credits in all enrollments for this course.  
R: Open only to Environmental Engineering majors.  
Selected topics in new or developing areas of environmental engineering.  
QA: CE 890

**899. Master's Thesis Research**  
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 24 credits in all enrollments for this course.  
QA: ENE 899

**999. Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 72 credits in all enrollments for this course.  
QA: ENE 899

## FAMILY AND CHILD ECOLOGY FCE

Department of Family and  
Child Ecology  
College of Human Ecology

**145. The Individual, Marriage and the Family**  
Fall, Spring. 3(3-0)  
R: Open only to freshmen and sophomores.  
Development of the young adult in the human ecological context. Issues of sexuality, gener, parenting, work and family interface, communication and resource use. Diversity in relationships and families.  
QA: FCE 145

**211. Child Growth and Development: Conception Through Early Childhood**  
Fall, Spring. 4(3-2)  
R: Not open to freshmen.  
Physical, cognitive, social, emotional and ecological aspects of human growth and development from conception through early childhood.  
QP: PSY 160 or PSY 170 QA: FCE 262A

**212. Children, Youth and Family**  
Fall, Spring. 3(3-0)  
P: FCE 145, SOC 100 or FCE 211. R: Not open to freshmen.  
An ecosystems perspective on development during childhood and adolescence emphasizing family and community contexts.  
QP: FCE 145 or FCE 262A QA: FCE 263

**225. Ecology of Family and Human Development**  
Fall, Spring. 3(3-0)  
R: Not open to seniors except seniors in the College of Human Ecology.  
Human development across the lifespan with an ecological perspective. Relationships between human resource professionals and family systems.

**238. Personal Finance**  
Fall, Spring, Summer. 3(3-0)  
Strategies, techniques and resources useful in the management of personal finance.  
QA: FCE 238

**Descriptions—Family and Child Ecology  
of  
Courses**

- 270. Human Services in the Community**  
Fall, Spring, 3(2-3)  
R: Not open to freshmen. Open only to students in the Department of Family and Child Ecology. Human services from an ecological perspective. Human service needs, resources and methods of service delivery. Participation in community agency required. QA: FCE 221
- 320. Interaction Processes with Children in Groups**  
Fall, Spring, 3(3-0)  
P: FCE 211. R: Not open to freshmen and sophomores. Principles of verbal and non-verbal interaction in relation to children's behavior in groups. Focus on young children in early childhood programs. QP: FCE 262A, FCE 262B or FCE 221 QA: FCE 364A
- 320L. Interaction with Children-Laboratory**  
Fall, Spring, 1(0-3)  
P: FCE 211, FCE 320 or concurrently. R: Not open to freshmen and sophomores. Practice applying principles of interaction to individuals and small groups in early childhood programs. QP: FCE 262A, FCE 262B, FCE 364A QA: FCE 364B
- 321. Curriculum for Early Childhood Programs**  
Fall, Spring, 3(3-0)  
P: FCE 320, FCE 320L. R: Not open to freshmen and sophomores. Child development principles and accreditation standards for designing curricula for pre-primary age children. Plan and evaluation of unit activities and programs. QP: FCE 364A, FCE 364B QA: FCE 369A
- 321L. Curriculum for Early Childhood Programs: Laboratory**  
Fall, Spring, 1(0-3)  
P: FCE 320, FCE 320L, FCE 321 or concurrently. R: Not open to freshmen and sophomores. Supervised practice in providing learning activities for individual children and small groups. Planning, implementing and evaluating activities. QP: FCE 364A, FCE 364B QA: FCE 369B
- 350. Management and Decision Making in the Family**  
Fall, 3(3-0)  
Not open to freshmen and sophomores. Management for the realization of values and goals through decision making about resources in the family. QA: FCE 331, FCE 332
- 370. Educational Systems in Human Ecology**  
Fall, Spring, 3(3-0)  
P: FCE 270. R: Not open to freshmen. The human ecologist as educator in formal, nonformal, and informal educational systems. Instructional methods appropriate for those environments. QP: FCE 221 QA: FCE 340
- 405. Work and Family**  
Spring, 3(3-0)  
R: Not open to freshmen and sophomores. Historical perspectives on work and family. Effects of work on family members across life cycle, and employer and public policy response. QA: FCE 405
- 411. Developmental Study of a Child**  
Fall, Spring, 2(1-13)  
P: FCE 211 or PSY 244. R: Not open to freshmen and sophomores. Ecological analysis of developmental behavior. Application of research findings to observations of a child. QP: FCE 262, PSY 244 QA: FCE 461
- 413. Adult Development and the Family: Middle and Later Years**  
Spring, Summer, 4(3-13)  
P: One course in psychology or sociology. R: Not open to freshmen and sophomores. Social, psychological and biological development within the family. Field study approach. QP: PSY/SOC QA: FCE 480, FCE 479
- 414. Parenting**  
Fall of odd-numbered years, 3(3-0)  
R: Not open to freshmen and sophomores. Childrearing in modern society. Adult parenting roles in various family structures. Support roles of families and communities.
- 424. Student Teaching in an Early Childhood Program**  
Fall, Spring, Summer, 6 to 8 credits.  
P: FCE 321, FCE 321L. R: Open only to seniors or graduate students in Child Development, Child Development and Teaching, Community Services or Family and Child Ecology. Approval of department. A supervised teaching practicum. Planning, implementing, and evaluating an ecological, educational program for children and their families. QP: FCE 369A, FCE 369B QA: FCE 464, FCE 464A, FCE 464C, FCE 468
- 441. Home Economics Education Programs**  
Fall, 2(2-0)  
R: Not open to freshmen and sophomores. Types, functions, and purposes of various home economics education programs, and operational issues. QA: TE 442, TE 331
- 442. Ethnic Minority Families in America**  
Fall, Spring, 3(3-0)  
R: Not open to freshmen and sophomores. Historical, structural, and functional components of selected ethnic minority family systems in America. Life styles, pressures, adaptations, viability, and continuity. QA: FCE 442
- 444. Interpersonal Relationships in the Family**  
Fall, Spring, 3(3-0)  
R: Not open to freshmen and sophomores. Personal awareness and interpersonal relationships within the family system. Small group discussions. QA: FCE 444
- 445. Human Sexuality**  
Fall, Spring, 3(3-0)  
R: Not open to freshmen and sophomores. Family and psychosocial factors affecting the development of a person's sexuality across the life cycle. Reciprocal impact on society and the legal system. QA: FCE 445
- 452. Consumer Issues**  
Spring, 3(3-0)  
P: FCE 238 or approval of department. R: Not open to freshmen and sophomores. Issues in contemporary consumer ecosystems. QP: EC 201, EC 202 QA: FCE 436
- 454. Family Financial Management**  
Spring, 3(3-0)  
P: FCE 238 or approval of department. R: Not open to freshmen and sophomores. Financial management strategies of families during the life cycle. Income support programs. QP: FCE 238, EC 202 QA: FCE 438
- 458. Family Financial Advising**  
Fall of odd-numbered years, 2(2-0)  
P: FCE 454 or concurrently. R: Not open to freshmen and sophomores. Advising strategies for working with families with financial concerns. QP: FCE 438 QA: FCE 494
- 470. Current Issues in Family and Child Ecology**  
Spring, 3 to 9 credits in increments of 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Not open to freshmen and sophomores. Legislation, current events, and issues affecting families and children. Implications for professional decisions and actions. QA: FCE 470
- 472. Evaluation of Human Service Programs**  
Spring, 3(3-0)  
P: FCE 370. R: Not open to freshmen and sophomores. Models of program evaluation for human service-related programs. QP: FCE 340 QA: FCE 491
- 473. Administration of Child and Family Programs**  
Spring, 3(3-0)  
P: FCE 370 or FCE 424. R: Open only to juniors, seniors, or graduate students in the Department of Family and Child Ecology. Administrative and ecological principles. Program linkages with agencies and their regulations. QA: FCE 467
- 490. Independent Study**  
Fall, Spring, Summer, 1 to 5 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Not open to freshmen and sophomores. Approval of instructor; application required. Individual study of selected topics under faculty guidance. QA: FCE 495
- 490H. Honors Independent Study**  
Fall, Spring, Summer, 1 to 5 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Not open to freshmen and sophomores. Open only to honors students. Approval of instructor; application required. Honors individual study of selected topics with faculty guidance. QA: FCE 495
- 492. Internship Seminar**  
Fall, Spring, 2(2-0)  
P: FCE 370. R: Open only to juniors or seniors in the Department of Family and Child Ecology. Approval of department. Preparation for professional internship. QP: FCE 340 QA: FCE 497
- 493. Internship**  
Fall, Spring, Summer, 3 to 9 credits in increments of 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course. P: FCE 492. R: Open only to seniors in the Department of Family and Child Ecology. Approval of department. Professional experience in a community organization. QP: FCE 221, FCE 340, FCE 492 QA: FCE 498
- 801. Family Ecosystems**  
Fall, Spring, 3(3-0)  
Family viewed from ecosystems perspective. Assessment tools used to analyze family systems. QA: FCE 835
- 810. Theories of Human Development**  
Fall, 3(3-0)  
Major theories of development; research findings and the validity of theoretical positions. QA: FCE 819
- 811. Child Development: Ecological Perspectives**  
Fall of even-numbered years, 3(3-0)  
Ecological factors that influence family functioning and child outcomes. QP: FCE 819, FCE 891
- 812. Adolescence in the Family: Ecological Perspectives**  
Spring of odd-numbered years, 3(3-0)  
Ecological factors that influence family functioning and adolescent outcomes. QA: FCE 857
- 813. Adulthood and Aging in the Family: Ecological Perspectives**  
Fall of odd-numbered years, 3(3-0)  
Adult development and aging in the contexts of family and community. Family relationships in adulthood and aging. QP: FCE 479, FCE 480 QA: FCE 850
- 814. Parenthood and Parent Education**  
Spring of even-numbered years, 3(3-0)  
Influence of parents on children/youth and factors that influence parenting; approaches to providing education and support for parents. QP: FCE 891, FCE 819, FCE 857 QA: FCE 845, FCE 846

- 821. Early Childhood Education: Curricular Approaches**  
*Spring, 3(3-0)*  
P: FCE 810.  
Theoretical background, content, and evaluation of early childhood curricula and programs. Influence of research and public policy.  
QP: FCE 819 QA: FCE 841
- 822. Assessment of the Young Child**  
*Fall of even-numbered years. 3(3-0)*  
Assessment instruments and procedures for children from birth to age seven. Techniques for assessing physical, social, emotional, and cognitive development of young children.  
QA: FCE 842
- 823. Infant Programs and Practices**  
*Spring of even-numbered years. 3(2-3)*  
P: FCE 810 or PSY 845.  
Concepts of early childhood education applied to children from birth to age three. Evaluation of research, learning materials, and activities for infants at home and in small group settings. Field work required.  
QP: FCE 819 or APR DEPT QA: FCE 848, FCE 849
- 830. Survey of Marriage and Family Therapy Theories**  
*Fall, 3(3-0)*  
Contemporary ecosystem theories of marriage and family therapy.  
QA: FCE 859
- 831. Treatment Processes in Marriage and Family Therapy**  
*Spring, 3(2-3)*  
P: FCE 830. R: Open only to Marriage and Family Therapy majors.  
Case management and treatment processes for problems affecting system change and family functioning.  
QP: FCE 822
- 832. Ethics, Law, and Professional Development**  
*Spring of even-numbered years. 3(3-0)*  
Ethics and laws affecting family life professionals. Developing a professional identity. Management of private practice and consulting services.  
QA: FCE 858
- 845. Foundations of Family Study**  
*Fall, 3(3-0)*  
Historical and cultural perspectives of the family; conceptual approaches to family study; sensitivity to family diversity; key issues related to the life cycle. Field observations required.
- 847. Theories of the Family**  
*Spring, 3(3-0)*  
P: FCE 845.  
Perspectives on the family. Relationships of theory, research, and practice.  
QA: FCE 854
- 848. Divorce and Remarriage Interventions**  
*Fall of even-numbered years. 3(3-0)*  
Impact of changing marital status on the individual, family and society. Current research, laws, educational programming for clinical treatment strategies.  
QA: FCE 856
- 850. Theories of Management and Decision Making in the Family**  
*Fall, 3(3-0)*  
Theories of decision making in the context of family management. Application to human resource development in the family. Integrated ecological approach.  
QA: FCE 804, FCE 832
- 851. Family Economics**  
*Fall of odd-numbered years. 3(3-0)*  
P: One course in economics.  
The household as an economic unit in consumer and producer roles. Economic functions and processes.  
QA: FCE 837, FCE 838
- 871. Methods of Teaching Adults**  
*Fall of odd-numbered years. 3(3-0)*  
Uses of human and family ecological perspectives in teaching adult audiences.  
QA: FCE 825
- 872. Program Design and Development**  
*Fall of even-numbered years. 3(3-0)*  
Processes involved in program design and development for human service organizations and agencies.
- 873. Administration and Management of Human Services Programs**  
*Spring of odd-numbered years. 3(3-0)*  
P: FCE 872.  
Processes and procedures related to the management and administration of human services programs.
- 874. Volunteer Development and Management**  
*Fall of odd-numbered years. 3(3-0)*  
Recruitment, development, and guidance of volunteers for human service programs. Administration of programs involving volunteers.
- 875. Curriculum and Evaluation in Home Economics Education**  
*Spring of odd-numbered years. 3(3-0)*  
Relationships between curriculum and evaluation. Processes used in developing curriculum and evaluation models.  
QA: FCE 823, FCE 827
- 880. Research Methods in Family and Child Ecology**  
*Fall, Spring, 3(3-0)*  
Methods applied to problem definition, research design, and analysis.  
QA: FCE 891
- 890. Independent Study**  
*Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 9 credits in all enrollments for this course.*  
Individual study of selected topics with faculty guidance.  
QA: FCE 897
- 891. Topics in Family and Child Ecology (MTC)**  
*Fall, Spring, 2 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course.*  
Family science, early childhood development, problems in programs, or services for families.  
QA: FCE 840
- 892. Seminar in Family and Child Ecology**  
*Fall, Spring, 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course.*  
Selected content in family relationships, family economics, human development in the family, community services, or programs for children and families.  
QA: FCE 801, FCE 802
- 894. Laboratory and Field Experience**  
*Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.*  
R: Open only to graduate students in the Department of Family and Child Ecology.  
Supervised observation, practica, or internships.  
QA: FCE 898
- 899. Master's Thesis Research**  
*Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.*  
R: Open only to graduate students in the Department of Family and Child Ecology.  
QA: FCE 899
- 902. Advanced Marriage and Family Therapy Theories**  
*Spring of odd-numbered years. 3(3-0) A student may earn a maximum of 12 credits in all enrollments for this course.*  
P: FCE 830.  
Selected theoretical perspectives in marriage and family therapy and related therapy techniques.  
QP: FCE 859
- 904. Family Ecology Theory Construction**  
*Fall of odd-numbered years. 3(3-0)*  
P: FCE 801; FCE 810; FCE 830 or FCE 847 or FCE 850. R: Open only to doctoral students.  
Integration and application of concepts in constructing family ecology theory. Theory development strategies.  
QP: FCE 835, FCE 819 or FCE 854 or FCE 859  
QA: FCE 935
- 980. Advanced Research Methods (MTC)**  
*Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 9 credits in all enrollments for this course.*  
P: FCE 801, FCE 880. R: Open only to doctoral students.  
Research design, measurement and implementation.  
QP: FCE 891 QA: FCE 894
- 991. Topics in Family and Child Ecology (MTC)**  
*Fall, Spring, 2 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course.*  
R: Open only to doctoral students.  
Topics and problems in programs and services for families.
- 993. Internship**  
*Fall, Spring, Summer. 1 to 9 credits. A student may earn a maximum of 12 credits in all enrollments for this course.*  
R: Open only to Family and Child Ecology graduate students. Approval of department.  
Supervised practicum, or internship.  
QA: FCE 901
- 999. Doctoral Dissertation Research**  
*Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 50 credits in all enrollments for this course.*  
R: Open only to majors in Family Ecology.  
QA: FCE 999

FAMILY MEDICINE FM

Department of Family Medicine  
College of Osteopathic Medicine

- 590. Special Problems in Family Medicine**  
*Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 48 credits in all enrollments for this course.*  
R: Open only to graduate-professional students in the colleges of Osteopathic and Human Medicine. Approval of department.  
Each student works under faculty direction on an experimental, theoretical, or applied problem.  
QA: FM 590
- 601. Clinical Practicum in Family Medicine**  
*Fall, Spring, Summer. 1 to 9 credits. A student may earn a maximum of 9 credits in all enrollments for this course.*  
R: Open only to graduate-professional students in the College of Osteopathic Medicine upon completion of Units I and II.  
Direct involvement in a family practice emphasizing patient, office, and personnel management.  
QA: FM 600
- 620. Directed Studies**  
*Fall, Spring, Summer. 1 to 30 credits. A student may earn a maximum of 30 credits in all enrollments for this course.*  
R: Open only to graduate-professional students in the colleges of Osteopathic Medicine and Human Medicine upon completion of Units I and II.  
Individual or group projects on special problems related to family medicine.  
QA: FM 620
- 640. Principles of Family Medicine I**  
*Fall, 1(0-4)*  
R: Open only to graduate-professional students in the College of Osteopathic Medicine. Unit I. Systems Biology course or concurrently.  
Preceptorship experience in family medicine taught by faculty and clinical preceptors at multiple sites.  
QP: PHM 520 QA: FM 652, FM 662