

- 901. Internship**
Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 9 credits. Approval of department.
Supervised advanced graduate practicums, observation, internships, and externships in the various areas of emphasis.
- 902. Independent Study in Family Ecology**
Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 9 credits. Approval of department.
Study on an individual basis.
- 903. Seminars in Family Ecology**
Spring, Summer. 2 or 3 credits. May reenroll for a maximum of 9 credits. Approval of department.
Seminars in selected topics.
- 932. History and Philosophy of Human Ecology**
Fall. Summer of even-numbered years.
3(2-0)
History and development of human ecology as an interdisciplinary field of study. Values underlying the field. Current emphasis.
- 999. Research**
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

FAMILY MEDICINE F M

College of Osteopathic Medicine

- 530. Physical Examination Skills**
Fall. 2(1-2) Admission to medical school and approval of department.
Introductory course in physical examination skills used in the family physician's office. The lecture relates principles of physical examination to the laboratory where skills are taught.
- 590. Special Problems in Family Medicine**
Fall, Winter, Spring, Summer. 1 to 8 credits. May reenroll for a maximum of 32 credits. Approval of department.
Each student will work under direction of a faculty member on an experimental, theoretical or applied problem.
- 600. Clinical Practicum in Family Medicine**
Fall, Winter, Spring, Summer. 2 to 12 credits. May reenroll for a maximum of 24 credits. Grade P in all courses offered in terms 1 through 8 or approval of department.
Opportunity for direct involvement and experience in functioning family practice. Emphasizes patient, office, and personnel management. Provides understanding and consideration of responsibilities encountered in the practice of family medicine.
- 620. Directed Studies**
Fall, Winter, Spring, Summer. 2 to 24 credits. May reenroll for a maximum of 48 credits. Admission to a college of medicine or approval of department.
Individual or group projects on special problems related to family medicine.

- 632. Principles of Family Practice I**
Winter. 1(0-3) Admission to a college of medicine.
Cognitive material and development of the psychomotor skills necessary to prepare the student physician for assignment to a family practice clinical setting.
- 642. Principles of Family Practice II**
Spring. 1(0-4) F M 632.
Continuation of F M 632.
- 652. Principles of Family Practice III**
Summer. 1(0-4) F M 632 or approval of department.
Continuation of F M 642.
- 662. Principles of Family Practice IV**
Fall. 1(0-4) F M 632 or approval of department.
Continuation of F M 652.
- 672. Principles of Family Practice V**
Winter. 1(0-4) F M 632 or approval of department.
Continuation of F M 662.
- 682. Principles of Family Practice VI**
Spring. 1(0-4) F M 632 or approval of department.
- 692. Principles of Family Practice VII**
Fall, Winter, Spring, Summer. 1(0-4) F M 632 or approval of department.
Continuation of F M 682.
- 695. Principles of Family Medicine VI**
Summer. 4(4-0) Admission to medical school and approval of department.

FAMILY PRACTICE FMP

(Established July 1, 1974.)

College of Human Medicine

- 500. Preceptorship Training**
Fall, Winter, Spring, Summer. 1 to 3 credits. One year of medical school. Interdepartmental with and administered by the Department of Human Medicine.
Field experience in primary care taught by primary care physicians throughout the state to medical students from Michigan State University, University of Michigan and Wayne State University.
- 540. Families in Crisis: A Clinical View**
Winter, Spring. 1 to 4 credits. May reenroll for a maximum of 4 credits. Student in medicine, nursing, or graduate student in psychology, counseling, social work or related field. Interdepartmental with the Department of Psychiatry.
Dynamics of family crises as might be experienced in health care settings. Videotapes, readings and small group discussions to illustrate family dynamics.

- 580. Special Topics in Family Practice**
Fall, Winter, Spring, Summer. 3 to 6 credits. May reenroll for a maximum of 18 credits. Approval of department.
A course designed to provide students the opportunity to explore and study special aspects and modes of family-oriented health care delivery.
- 603. Comprehensive Patient Care Clerkship**
Fall, Winter, Spring, Summer. 16 credits. May reenroll for a maximum of 64 credits. Satisfactory completion of CHM Phases I and II, H M 602; approval of instructor.
A 48-week clerkship designed to be ambulatory based with integrated hospital experience. Students are to meet the objectives of the required Phase III Clerkships. Approved through Summer Term 1979.
- 610. Family Practice Clerkship**
(H M 610.) Fall, Winter, Spring, Summer. 8 to 17 credits. May reenroll for a maximum of 34 credits. H M 602.
A clerkship in a model family practice unit with graded responsibility and supervision in the care of families and their medical problems with emphasis on primary, continuing and comprehensive care.

FISHERIES AND WILDLIFE F W

College of Agriculture and Natural Resources

- 100. Introduction to Fisheries and Wildlife**
Fall. 1(1-0) Freshmen Fisheries and Wildlife Majors.
Fisheries and wildlife as a profession. Academic and nonacademic needs to meet professional objectives, using current management problems as a focus for discussion.
- IDC. Resource Ecology and Man**
For course description, see Interdisciplinary Courses.
- 202. Soils and Man's Environment**
Winter. 3(3-0) Interdepartmental with the departments of Resource Development and Crop and Soil Sciences and Natural Resources. Administered by the Department of Crop and Soil Sciences.
Use of soil-water resources in a technological society as it relates to environmental quality. Nature of pollution problems and their possible solutions. Food production and world population.
- 301. Fish and Wildlife of North America**
Winter. 5(3-4) B S 212 or approval of department.
Comparative study of fish and wildlife groups in North America, their significant life history stages, morphology, migrations, habitats and populations. Common species are identified in the laboratory.

**Descriptions – Fisheries and Wildlife
of
Courses**

**305. Principles of Fisheries and
Wildlife Management**

Spring. 3(3-0) IDC 200 or approval of department. Not open to majors in fisheries-limnology or wildlife-ecology options.

Ecological concepts in management. Effects of regulations, refuges, stocking, species introduction, habitat manipulation, artificial feeding, genetic improvement, land use and control of predators, diseases and competitors on the production of fish and game.

328. Vertebrate Pest Control

Fall. 3(3-0) B S 212 or approval of department.

Role of wild vertebrate animals as agents damaging to man's interests; the concepts of damage and control; damage control techniques. Field trip.

340. Wildlife Biometry

Winter. 4(3-2) MTH 111, six credits in fisheries and wildlife.

Survey of statistical formulas, methods and applications of statistics to problems in fisheries and wildlife.

374. Biological Oceanography

Winter. 3(3-0) B S 212 or approval of department.

Biology of marine animals, with emphasis on physical, chemical and biological factors affecting their abundance and distribution.

376. Introductory Limnology

Winter. 3(3-0) B S 212; students may not receive credit for both F W 376 and F W 476.

Lake and stream ecology including effects of natural and man-induced perturbations on freshwater ecosystems.

**402. Environmental Conservation
Education**

Fall, Winter, Spring, Summer. 4(3-2) Education majors or approval of department.

Nature, distribution and interrelationships of natural resources dictating the quality of man's environment. Principles of resource use, study of natural objects and techniques of teaching in and about the environment.

404. Fisheries and Wildlife Problems

Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 12 credits. B S 212; 6 credits of fisheries and wildlife; approval of department.

To give undergraduate majors an opportunity to study special topics in fisheries and wildlife.

420. Ecology of Animal Parasites

Summer. 6 credits. B S 212 or approval of department. Given at W. K. Kellogg Biological Station. Interdepartmental with the departments of Microbiology and Public Health and Zoology and administered by the Department of Microbiology and Public Health.

Parasitism of animals by protozoa, helminths and arthropods with emphasis on the interrelationships of host-parasite associations with the natural environments.

421. Stream Ecology

Full. Summer—given at W. K. Kellogg Biological Station. 3(3-0) ENT 240 or approval of department. Interdepartmental with and administered by the Department of Entomology.

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.

424. Wildlife Population Analyses

Spring. 4(3-2) BOT 450 or ZOL 389, or concurrently.

Population mensuration; reproductive and survival rates, sex and age determination; handling and marking methods. Field trips.

425. Wildlife Habitat Analyses

Fall. 4(2-4) BOT 450 or ZOL 389 or FOR 220.

Evaluation of environmental factors affecting wildlife species; food and cover measurements. Determination of limiting factors.

426. Ecology of Migratory Birds

Fall. 4(2-4) ZOL 461 or approval of department.

Ecological, behavioral, and physiological characteristics affecting population parameters of migratory birds and applications of these relationships to the management of migratory wildlife resources.

**427. Wildlife Biology and
Management**

Winter. 4(2-4) F W 424; ZOL 389 or BOT 450.

Ecology and management of resident wildlife on farm, forest and range lands.

450. Natural Resource Administration

Fall, Spring. 4(4-0) Seniors. Interdepartmental with the departments of Forestry, Park and Recreation Resources and Resource Development and Natural Resources. Administered by the Department of Forestry.

Concepts and methods of administering wild-land properties. The legal, economic and social environment. Benefit-cost analysis of management changes. Unit organization, personnel management and accounting. Presents a systems view of administration.

455. Natural Resource Economics

Winter. 4(4-0) FOR 450 or approval of department. Interdepartmental with the departments of Forestry, Park and Recreation Resources, Resource Development, and Natural Resources. Administered by the Department of Forestry.

Basic economic and political principles and techniques that govern the production and consumption of forest land products, including basic forest valuation procedures.

471. Ichthyology

Spring. 3(2-3) F W 301 or ZOL 320 or ZOL 428. Interdepartmental with the Department of Zoology.

Classification and natural history of fishes. Emphasis on food, game, and forage fishes.

**473. Fishery Biology and
Management**

Fall. 5(3-3) ZOL 471.

Biology of fishes with special reference to distribution and natural history, and application of this knowledge to problems of obtaining maximum return from fishery resources.

475. Fish Culture

Spring. 3(3-0) F W 473.

Artificial propagation of freshwater fish including hatchery management, nutritional and environmental requirements, disease and parasite control and intensive fishery management. Utilization of hatchery stock in fisheries management.

476. Limnology

Winter. 3(3-0) CEM 131 and CEM 161; BOT 450 or ZOL 389. Students may not receive credit for both F W 376 and F W 476. Interdepartmental with the Department of Zoology.

Ecology of lakes and streams with special reference to physical, chemical and biological factors affecting their productivity.

477. Limnological Methods

Winter. 3(0-9) F W 476 concurrently; ZOL 481; ENT 301, ENT 302 recommended. Interdepartmental with the Department of Zoology.

Methods and instruments of limnological field investigation on lakes and streams.

**484. Outdoor Environmental
Education**

Fall. 4(3-2) Juniors or approval of department.

Using the outdoors as a teaching laboratory for ecological studies of plant and animal communities. Designed primarily for secondary teachers.

**485. Environmental Conservation
Program Design**

Winter. 3(3-0) Seniors or approval of department.

Materials and methods for integrating environmental conservation into educational programs in schools, nature centers, youth groups and communities.

**801. Seminar in Fisheries and
Wildlife**

Fall, Winter, Spring. 1(1-0)

Graduate problems and current developments of importance.

802. Advanced Topics

Fall, Winter, Spring Summer. 1 to 6 credits. May reenroll for a maximum of 15 credits. Approval of department.

Study of selected advanced topics in detail and depth.

821. Advanced Stream Ecology

Summer. 3 credits. ENT 421 or approval of instructor. Given at W. K. Kellogg Biological Station. Interdepartmental with and administered by the Department of Entomology.

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. Environmental Requirements of
Fish**

Winter. 3(3-0) Approval of department.

Adaptations and responses of fish to environmental changes; research methods for evaluating environmental limitations and effects of pollutants on fish growth, reproduction and survival. Applications for developing water quality criteria.

871. Ecology of Fishes

Summer. 3(1-6) Approval of instructor or ZOL 389 or F W 473. Given at the W. K. Kellogg Biological Station. Interdepartmental with and administered by the Department of Zoology.

Exploration of ecological problems with particular emphasis on growth, food and habitat selection, population biology and niche relations. Field and experimental investigations of fish communities.

873. Ecology and Management of Stream Fish
Winter. 3(4-0) F W 376, ZOL 389 or BOT 450; or F W 476 or concurrently.

Flowing water habitat as it affects fish, with influences of climate, vegetation, land use, water withdrawal; damming, channel alteration and fishery management.

874. Advanced Biological Limnology
Fall of odd-numbered years. 3(4-0) F W 477, or approval of department.

Historical and current contributions to concepts of community structure, energy flow and materials cycling in aquatic eco-systems.

875. Chemical Limnology
Winter. 4(3-3) F W 476, F W 477 or approval of department.

Application of analytical chemistry concepts and technologies to fundamental chemical mechanisms in natural and polluted water systems. Special consideration given to selected heterogeneous equilibria.

876. Applied Limnology
Spring. 3(3-0) F W 874 or F W 875 or approval of department.

Aquatic ecology: quantitative relationship between physical, chemical and biological parameters in polluted and unpolluted lakes and streams.

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

940. Quantitative Wildlife Ecology
Fall. 3(3-0) Approval of department.

Fundamentals of population demographics. Rates of increase, dynamic and static life tables, logistic theory, the Leslie matrix model, age specific and time specific parameters. Current hypotheses on mechanisms promoting population stability.

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

FOOD SCIENCE AND HUMAN NUTRITION

College of Agriculture and Natural Resources

College of Human Ecology

Food Science	FSC
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101. Food and Society
Fall, Winter. 3(3-0) Interdepartmental with Human Nutrition and Foods.

Analysis of the scientific, social and environmental aspects of food in determining the quality of man's life. Introduction into the principles of food preservation and safety.

211. Introduction to Food Science
Spring. 3(3-0)

Modern food processing, world food problems, and the basic characteristics of processed foods.

215. World Food Issues
Spring. 3(3-0) Interdepartmental with and administered by the Department of Geography.

Food resources as related to world distributions of population, soil, water, fuel and minerals. Special attention to urbanization, irrigation, and future food needs and global constraints.

223. Commercial Food Processing Systems
Fall. 3(3-0) Interdepartmental with and administered by Physical Systems in Agriculture and Natural Resources.

Processes and systems used in handling, processing and distribution of food; the need for processing systems and their influence on food quality.

242. Meats, Poultry and Fishery Products I
Fall. 3(2-2) Interdepartmental with the Department of Animal Husbandry.

Principles of evaluation and nutritive value. Identification of grades and cuts of beef, pork, lamb and poultry products.

300. Dairy Products
Spring. 3(2-2) CEM 132 or approval of department.

Chemical and physical properties of milk and milk products. Survey of dairy products and the technologies involved in their manufacture.

311. Food Processing and Preservation
Winter, Summer. 4(4-0) CEM 132 or HRI 245 or approval of department; not open to majors in Food Science.

Effects of processing, packaging and preservation on the quality of foods. Demonstrations of use of ingredients, evaluation of products and results of various processing methods.

331. Physical Principles of Food Processing
Fall, Winter. 4(3-2) FSC 211, MTH 109; PHY 239 or approval of department.

Food preservation by heat, low temperature, dehydration and radiation.

332. Biological Principles of Food Processing
Winter. 4(3-3) MPH 200 or approval of department.

Biological problems related to food processing including waste disposal, sanitizing and bactericidal compounds, pesticides and residues, plant and animal growth regulators, radioactive elements, preservatives and toxicology of additives.

333. Chemical Principles of Food Processing
Spring. 4(3-3) FSC 211 and CEM 241 or approval of department.

Chemical changes in foods that affect the texture, color, flavor, odor, stability, and nutritive quality during processing and storage.

400. Milk Processing Technology
Fall. 4(3-3) CEM 132 or approval of department.

The fluid milk industry. Composition, quality, sanitation, nutritive value, processing, packaging and distribution of milk and milk products.

401. Industrial Food Fermentations
Fall. 3(3-0) FSC 440 and organic chemistry or approval of department.

Physical, microbiological and chemical procedures in utilizing microbial cultures in controlled fermentations of foods and food constituents.

402. Chemistry and Technology of Lipids
Winter. 3(3-0) One term organic chemistry.

Chemical and physical properties of edible fats and oils. Refining and processing of lipids into margarine, butter, shortening and salad oils. Chemical methods for analysis of lipids.

404. Dehydrated Foods
Spring. 3(2-3) FSC 331; FSC 333 concurrently or approval of department.

Concentration and dehydration of foods by roller, spray, and freeze drying and foam, puff and tunnel drying. Stability and nutritional aspects of dehydrated foods.

405. Technology of Manufactured Dairy Products
Winter. 4(3-3) FSC 400 or approval of department.

Manufacturing technology of fermented dairy foods, frozen dairy desserts, and imitation dairy products.

421. Food Plant Management
Spring. 3(3-0) Seniors or approval of department.

Business and technical management concepts associated with food plants. Efficiency factors, regulatory obligations, and administrative aspects.

440. Food Microbiology
Fall, Dietetics majors only. Spring. 5(3-4) MPH 200 or MPH 301 or approval of department. Interdepartmental with the Department of Microbiology and Public Health.

Major groups of microorganisms of importance to the food industry are studied with emphasis on ecological, physiological, and public health aspects.

445. Meat, Poultry and Fishery Products III
Spring. 3(1-6) FSC 333 or approval of department.

Processing, formulation and quality control.

448. Fruit, Vegetable and Cereal Products I
Fall. 4(3-3) FSC 331 or approval of department.

Quality factors involved in canning, sugar and salt preservation and milling.

449. Fruit, Vegetable and Cereal Products II
Winter. 4(3-3) FSC 331 or approval of department.

Quality factors involved in cooling, freezing and other preservation procedures.

455. Food Analysis I
Fall. 4(2-4) CEM 132 and CEM 162 or approval of department.

Modern methods of analysis for fat, protein, moisture and other macroconstituents of food. Application of spectrophotometry in determination of microconstituents; use of dye-binding, complexometric and iodimetric techniques in food analysis.