

**Descriptions — Finance and Insurance
of
Courses**

817. Financial Decision Models

Winter. 4(4-0) ACC 839, F I 888.
Interdepartmental with the Department of Accounting.

Development and application of computerized financial models in finance, accounting, and control activities. Use of financial planning software on personal and mainframe computers. Emphasis on models in case analysis.

850. Risk Management and Insurance Concepts

Winter, Summer. 4(4-0)

Analysis of business exposures and risk management techniques. Risk meeting alternatives and their economic, legal, and social implications. The role of insurance and employee benefits in risk management.

855. Market Cost-Revenue Analysis

Winter. 4(4-0) *One course in accounting and one in marketing. Interdepartmental with and administered by the Department of Marketing and Transportation Administration.*

Analytical tools for use in planning and controlling marketing activities. Emphasis on the determination of factors causing marketing cost differences and the assignment of costs to those factors. Application of tools to determination of expenditure-revenue patterns and market potentials.

870. Financial Markets

Fall. 4(4-0) F I 888.

Financial markets, rates, and flows. Major theoretical explanation and empirical evidence concerning financial market behavior.

871. Portfolio Theory and Capital Markets

Fall, Spring. 4(4-0) ACC 839; F I 888.

Theoretical and empirical developments in portfolio analysis, capital markets, capital asset pricing model, arbitrage pricing theory, efficient market hypothesis, and studies of capital markets.

872. Management and Financing of Corporate Assets

Fall, Summer. 4(4-0) F I 871 or concurrently.

Principles of decision analysis in management of current assets, estimation of requirements for short term funds, and valuation of capital budgeting and merger proposals. Analysis of actual business cases is supplemented by selected readings.

873. Long Term Financial Policies

Winter, Summer. 4(4-0) F I 871 or F I 872.

Planning capital structure and the cost of capital. Examines fundamental considerations of raising capital, debt management, dividend policy and problems in public issues. Analysis of actual business cases is supplemented by selected readings.

874. Investment Strategy

Spring. 4(4-0) F I 871 or concurrently.

Analysis of theories and techniques available to achieve superior returns through security selection and/or portfolio management. Review and evaluation of significant literature and empirical results of various investment strategies.

878. Bank Management

Spring. 4(4-0) F I 888.

Provides a comprehensive working knowledge of commercial bank management. Topics include capital adequacy, liquidity, public policy and bank failures, regulation, consumer protection, and other internal and external banking industry issues.

888. Financial Concepts and Analysis

Fall, Winter. 4(4-0) ACC 839.

Basic principles of business finance covering short, intermediate, and long term problems. Principles of capital budgeting. Emphasis on the mathematics of finance and use of numerical examples and problems.

889. Financial Decision Making

Fall, Winter, Spring, Summer. 4(4-0) ACC 840, F I 888 or concurrently.

Financial planning and control using financial theory and management techniques for short, intermediate, and long term problems. Involves case problems.

890. Special Problems

Fall, Winter, Spring, Summer. 1 to 4 credits. *Approval of department.*

Independent study of special topics in finance or insurance.

990. Seminar in Financial Management Theory

Fall. 4(4-0) *Doctoral candidates with approval of department.*

The financial theory of the firm. Theoretical models dealing with capital structure, cost of capital, and dividend policy.

991. Seminar in Capital Markets

Winter. 5(5-0) F I 990.

The mathematical basis of portfolio theory. Development of capital asset pricing models. Empirical tests of capital market theories.

992. Seminar in Selected Finance Topics

Spring. 4(4-0) F I 991.

Study and research in finance topics selected from areas of interest to the instructor and doctoral candidates.

999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. 1 to 5 credits. *May reenroll for a maximum of 36 credits. Approval of department.*

**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.

203. Resource Ecology

Fall, Winter, Spring, Summer. 3(3-0) *Interdepartmental with the departments of Forestry, Geography, Resource Development, and Zoology.*

Basic concepts of ecology which are the unifying basis for resource management, conservation policy and the analysis of environmental quality. Extensive use of guest lecturers.

**207. Great Lakes: Biology and
Management**

Spring. 3(3-0) *Interdepartmental with the Department of Resource Development.*

Living aquatic resources of the Great Lakes: environmental history, biological resources and their management.

**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.

302. Ecosystem Processes

Spring. 3(3-0) CEM 143, PHY 238, B S 212, CSS 210, GLG 201, MTH 109 or MTH 111.

Concepts of ecosystem structure and function developed from basic scientific laws and relationships.

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

Winter. 3(3-0) F W 203 or approval of department. *Not open to majors with Fishery Biology and Limnology or Wildlife Biology and Ecology option.*

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

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

Role of vertebrate animals as agents damaging to human interests; the concepts of damage control; damage control techniques, optional 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.

**402. Environmental Conservation
Education**

Fall. 4(3-2) *Education majors or approval of department.*

Nature, distribution, identification, and interrelationships of Michigan's flora and fauna which influence natural resource use. Includes techniques of teaching about the environment. Field trips required.

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.

410. Upland Wildlife Management

Fall. 3(3-0) F W 302 or FOR 304, FOR 204 or BOT 318.

Wildlife management based on upland ecological processes. Assessment and management of habitat. Mitigation of human impact.

412. Wetland Ecosystem Management

Fall. 3(3-0) F W 302, F W 340.

Ecosystem components and processes applied to wetland management. Mitigation of human impact.

413. Upland and Wetland Ecosystem Laboratory
Fall. 2(0-6) F W 410 or F W 412 or concurrently.

Wildlife habitat analysis and management in upland and wetland ecosystems. Field trips required.

415. Parasitic Diseases of Animals: Ecosystem Approach
Spring of even-numbered years. 4(3-2) F W 301 or ZOL 306 or approval of instructor.

Diseases of fish and wildlife caused by selected viruses, bacteria, helminths, and arthropods. Biology of infectious agents and their interrelationships with animal populations.

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.

434. Wildlife Resource Policy and Management
Winter. 4(3-2) F W 410, F W 412, F W 424.

The impact of public policy on wildlife management. Objectives of and approaches to wildlife management. Planning, implementing, and evaluating wildlife management programs.

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

Concepts and methods of administering wildland 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
Fall. 4(3-2) EC 200 or EC 201. Interdepartmental with Agriculture and Natural Resources and the departments of Forestry, Park and Recreation Resources, and Resource Development. Administered by the Department of Forestry.

Basic economic and institutional principles and techniques that govern the production and consumption of renewable natural resources. Natural resource evaluation, project analysis, and distributional considerations.

471. Ichthyology
Spring. 4(3-3) F W 301 or ZOL 307 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(3-4) F W 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 141B, 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; ENT 301, ENT 302 recommended. Interdepartmental with the Department of Zoology.

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

478. Stream Ecology
Fall. 3(3-0) ENT 420, ZOL 389 or BOT 450 or F W 302 or approval of department. Interdepartmental with the departments of Entomology and Zoology.

Biological, chemical, physical, and geological processes which determine the structure and function of stream ecosystems.

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.

801. Seminar in Fisheries and Wildlife
Fall, Winter, Spring. 1(1-0) May reenroll for a maximum of 7 credits. Approval of department.

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.

810. Human Dimensions of Fish and Wildlife Management
Fall of even-numbered years. 3(3-0) Approval of department.

Methods of surveying, educating, and involving the public to achieve fish and wildlife management goals. Human dimensions research. Case studies of current management issues.

826. Waterfowl Ecology and Management
Winter of even-numbered years. 4(3-3) F W 412, F W 424 or approval of department.

Application of physiological, behavioral, and population characteristics of waterfowl to current issues and management.

828. Conservation and Genetics
Winter of odd-numbered years. 3(3-0) ZOL 441 or CSS 350 or ANS 314 or approval of department.

Application of population genetic principles to ecology and management of fish and wildlife.

830. Environmental Requirements of Fish
Winter of odd-numbered years. 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.

831. Aquatic Toxicology
Spring of odd-numbered years. 3(3-0) F W 830 or approval of department.

Acute and chronic toxicity of compounds and elements on aquatic organisms. Monitoring and predicting structural and functional changes: biochemical, histological, physiological, organismal, behavioral, populational, community, ecosystem.

860. Wildlife Nutrition
Winter of odd-numbered years. 4(3-2) Approval of department.

Application of nutritional concepts to wildlife management. Design of nutritional investigations including methods of sampling and analysis. Improvement of the nutritional status of wildlife habitat.

871. Ecology of Fishes
Summer of even-numbered years. 4 credits. Approval of department. 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.

872. Fish Communities and Aquatic Ecosystems
Winter of even-numbered years. 3(3-0) Approval of department.

Processes by which fish influence the structure and function of aquatic ecosystems.

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.

877. Fish Population Dynamics
Winter of odd-numbered years. 3(3-0) Approval of department.

Quantitative analysis of fish populations; rates of change and their underlying causes.

878. Dynamics of Aquatic Contaminants
Spring of even-numbered years. 4(2-4) F W 476, F W 477 or approval of department.

Movement of contaminants through aquatic ecosystems. Chemical and physical processes controlling decomposition and disposition of contaminants. Relationship of chemical form to bioavailability and toxicity. Statistical and deterministic predictive simulation models.

Descriptions — Fisheries and Wildlife

of

Courses

897. *Ecosystem Ecology*

Fall of even-numbered years. 4(4-0)
ZOL 389 or BOT 450. Interdepartmental with
and administered by the Department of Zool-
ogy.

Concepts of ecosystem structure, energy flow,
and nutrient cycling in representative terrestrial
and aquatic ecosystems.

899. *Master's Thesis Research*

Fall, Winter, Spring, Summer. Varia-
ble credit. Approval of department.

999. *Doctoral Dissertation Research*

Fall, Winter, Spring, Summer. Varia-
ble credit. Approval of department.

328. *Food Plant Sanitation*

(FSC 332.) Winter. 3(3-0) FSC 211,
MPH 200, CEM 141B.

Sanitary aspects of food processing operations,
water quality, equipment design, bactericidal
agents, pest control, personnel hygiene, biolog-
ical hazards, and regulatory agencies. Field trips
required.

328L. *Laboratory in Food Plant Sanitation*

Winter. 1(0-3) FSC 328 or concu-
rently.

Sanitary aspects of food processing operations
water quality, and related hygienic aspects.
Field trips required.

329. *Unit Operation and Food Processing I*

Fall. 4(3-2) PHY 237, MTH 109. Inter-
departmental with and administered by Agri-
cultural Technology and Systems Management.

Engineering concepts related to the unit opera-
tions found in the food industry. Fluid mechan-
ics, heat transfer and rate processes including
psychrometrics and refrigeration.

330. *Food Processing Operations*

(FSC 331.) Winter. 3(3-0) PHY 237,
FSC 211, or approval of department.

Unit operations for food preservation by low
temperature, heat, dehydration, evaporation
and separation processes.

330L. *Laboratory in Food Processing Operations*

Winter. 1(0-2) FSC 330 or concu-
rently.

Demonstrations, workshops, and pilot-scale
processing illustrating selected unit operations in
food manufacture.

333. *Food Chemistry*

Spring. 3(3-0) FSC 211 and CEM 241
or approval of department.

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

333L. *Laboratory in Food Chemistry*

Spring. 1(0-3) FSC 211, CEM 241 and
FSC 333 or concurrently.

Chemical changes in food that affect quality and
stability.

400. *Milk Processing Technology*

Fall. 4(3-3) CEM 241 or approval of
department.

The fluid milk industry. Composition, quality,
sanitation, nutritive value, processing, packag-
ing 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 proce-
dures in utilizing microbial cultures in con-
trolled 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.

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.

430. *Thermal Processes for Foods*

Winter. 3(2-2) ATM 329, FSC 328 or
concurrently.

Process design concepts with emphasis on heat-
ing and cooling of foods in containers. Param-
eters used to describe thermal resistance of
product components. Process time calculations
for thermal processes.

440. *Food Microbiology*

Spring. 3(3-0) MPH 200 or MPH 301 or
approval of department. Interdepartmental
with the Department of Microbiology and Pub-
lic Health.

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

441. *Food Microbiology Laboratory*

Spring. 2(0-4) FSC 440 or concurrently
or approval of department. Interdepartmental
with the Department of Microbiology and Pub-
lic Health.

Laboratory practice with major groups of
microorganisms of importance to the food indus-
try. Concurrent enrollment in FSC 440 recom-
mended.

445. *Meat, Poultry and Fish Processing*

Spring. 4(2-6) FSC 333 or approval of
department.

Muscle food and egg processing technology,
product formulation and quality control. Manu-
facturing of cured meat, sausage and processed
products.

455. *Food Analysis I*

Fall, Spring. 4(2-4) CEM 162, CEM
241 or approval of department.

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

456. *Food Analysis II*

Winter. 4(2-6) CEM 162 and CEM 241
or approval of department.

Use of colorimetry and spectrophotometry,
chromatographic methods and other techniques
for the analysis of food constituents and addi-
tives.

457. *Quality Control in the Food Industry*

Winter of even-numbered years. 3(3-0)
STT 201 or approval of department.

Organization of and tools used for quality con-
trol: control charts, acceptance and auditing
inspections, critical control points, reliability,
safety, recall and liability.

FOOD ENGINEERING

See Agricultural Engineering.

FOOD SCIENCE AND HUMAN NUTRITION

College of Agriculture and Natural
Resources
College of Human Ecology

Food Science

FSC

101. *Food and Society (N)*

Fall, Winter, Spring. 3(3-0) Interde-
partmental with Human Nutrition and Foods.

Analysis of the scientific, social and environmen-
tal aspects of food in determining the quality of
human life. Introduction into the principles of
food preservation and safety.

205. *Food Laws and Regulations*

Spring. 3(3-0) Interdepartmental with
Human Nutrition and Foods.

Food laws and regulations that govern food
processing and food service systems; procedures
involved in adopting and enforcing food laws
and regulations.

211. *Introduction to Food Science*

Winter, Spring. 3(3-0) CEM 141B.

Fundamentals of food composition, food proce-
ssing, preservation and food commodities.

256. *Meats, Poultry and Fishery Products I*

Fall. 3(2-2) Interdepartmental with
the Department of Animal Science.

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 143 or approval of
department.

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