

884 Outreach in Fisheries, Wildlife and Natural Resources Management
Spring of odd years. 3(3-0) Interdepartmental with ANR Education and Communication Systems. RB: Previous course in communications recommended.

Theory, research, practice and current issues in using outreach in fisheries, wildlife and natural resource management.

891 Advanced Topics
Fall, Spring, Summer. 2 to 4 credits. A student may earn a maximum of 10 credits in all enrollments for this course.

In depth study of advanced topics in fisheries and wildlife.

892 Biodiversity
Spring. 2(2-0) A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Zoology. Administered by Department of Zoology. P:NM: (ZOL 250)

Status of world biota and factors in the decline and extinction of major groups of plants and animals. Theory and design of natural reserves. Assessment and ecological meaning of diversity. Management for global and local diversity.

893 Seminar in Fisheries and Wildlife
Fall, Spring. 1(1-0) A student may earn a maximum of 7 credits in all enrollments for this course.

Study and research in advanced problems and current development in fisheries and wildlife.

897 Ecosystem Ecology
Spring. 4(4-0) Interdepartmental with Zoology; Botany and Plant Pathology. Administered by Department of Zoology.

Structure and function of natural ecosystems. Succession, food web analysis, energy flow, nutrient cycling, and effects of human activities on ecosystems. Global environmental change. Ecosystem management and restoration.

898 Master's Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to graduate students in the Fisheries and Wildlife major.

Master's degree Plan B research paper.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to graduate students in the Fisheries and Wildlife major.

Master's thesis research.

976 Multivariate Methods in Agriculture and Natural Resources
Spring. 4(4-0) Interdepartmental with Forestry; Animal Science. Administered by Department of Forestry. P:NM: (STT 422 and MTH 314) R: Open only to graduate students in the College of Agriculture and Natural Resources and in the Interdepartmental Graduate Specializations in Ecology and Evolutionary Biology.

Application of multivariate methods to research problems. Hotelling's T-test, profile analysis, discriminant analysis, canonical correlation, principal components, principal coordinates, correspondence analysis, and cluster analysis.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to Doctoral level graduate students in Fisheries and Wildlife.

Doctoral dissertation research.

FOOD INDUSTRY MANAGEMENT FIM

Department of Agricultural Economics College of Agriculture and Natural Resources

100 Decision-making in the Agri-Food System
Fall, Spring. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. SA: FSM 200

Organization and operation of the agri-food system. Economic analysis of agri-food firms and consumers. Management functions and decision-making of agri-food firms.

210 Professional Seminar in Food Industry Management
Spring. 1(1-0) P:M: (ABM 100 or concurrently or ABM 130 or concurrently) R: Open only to Food Industry Management majors.

Industry trends in food industry management. Verbal, written, and visual communication techniques applied to professional situations, including professional development and career planning.

220 Food Product Marketing
Fall. 3(3-0) P:M: (ABM 100 or concurrently)
Structure of the food marketing system including food processors, manufacturers, retailers and food service. Impact of consumer behavior and buying patterns. International food product marketing. Strategic planning in food marketing.

222 Agribusiness and Food Industry Sales (W)
Fall, Spring. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. P:M: (ABM 100 or ABM 130 or EC 201 or EC 202) and completion of Tier I writing requirement. R: Open only to sophomores or juniors or seniors. SA: FSM 320

Selling processes and activities within agribusiness and food firms. Principles and techniques of sales. Operation of sales organizations.

335 Food Marketing Management
Spring. 3(3-0) Interdepartmental with Marketing and Supply Chain Management. P:M: (FIM 220 or MSC 300) SA: ML 335, MTA 335, FSM 335

Management decision-making in food industry organizations (processors, wholesalers, retailers). Marketing and sales in response to customer and consumer needs. Distribution and merchandising systems in domestic and international contexts.

337 Labor and Personnel Management in the Agri-Food System
Fall. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. P:M: (ABM 100 or ABM 130) R: Open only to juniors or seniors. SA: FSM 325

Human resource management principles for farms, agribusinesses and food firms: planning, recruiting, training, scheduling, motivating, supervising and evaluating. Labor regulations, compensation and records.

400 Public Policy Issues in the Agri-Food System
Spring. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. P:M: (ABM 100 or EC 201 or EC 202) R: Open only to juniors or seniors. SA: FSM 421

Objectives, alternatives and consequences of public policy in the agri-food system. Analysis of economic implications for food and agribusiness firms, farmers, consumers and society.

410 Advanced Professional Seminar in Food Industry Management
Fall. 1(1-0) P:M: (ABM 210 or FIM 210) R: Open only to Food Industry Management juniors or seniors.

Advanced professional problems and reestablishment of career planning in the agri-food system. Industry trends, career alternatives, and job search strategies. Enhanced verbal, written and visual communication techniques.

422 Vertical Coordination in the Agri-Food System
Fall. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. P:M: (ABM 100 and EC 201) R: Open only to juniors or seniors. SA: FSM 443

Analysis of vertical coordination in the industrialized agri-food system. Agricultural cooperatives, contracts, marketing orders, and trade associations. Analysis of imperfect competition and methods of conducting business. Interaction with legal systems and government.

427 Global Agri-Food Industries and Markets
Fall. 3(3-0) Interdepartmental with Agribusiness Management. Administered by Department of Agricultural Economics. P:M: (FIM 220 or ABM 225)

Strategic understanding of the international agri-food system. Analysis of global production, marketing, and consumption. Knowledge of changing conditions in international industries and markets. Global trends and opportunities.

439 Food Business Analysis and Strategic Planning(W)
Fall. 3(4-0) Interdepartmental with Marketing and Supply Chain Management. P:M: (FIM 220) R: Open only to juniors or seniors SA: ML 439, MTA 439, MSC 439

Principles and techniques of business analysis and strategic planning applied to food firms. Food trend forecasts, market potential, competition and cost analyses, business and strategic planning.

Food Industry Management–FIM

490 Independent Study in Food Industry Management
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (ABM 100) R: Open only to sophomores or juniors or seniors in the Food Industry Management major. Approval of department: Application required. Students are limited to a combined total of 6 credits in ABM 490 and FIM 490. SA: FSM 490
Independent supervised study in topics in food industry management.

493 Professional Internship in Food Industry Management
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. P:M: (ABM 100) R: Open only to juniors or seniors in the Food Industry Management major. Approval of department; application required. A student may earn a maximum of 6 credits in all enrollments for any or all of these courses: ABM 493, AEE 493, ANR 493, ANS 493, CSS 493, FIM 493, FW 493, HRT 493, PKG 493, PRM 493, PRR 493, and RD 493.
Supervised professional experience in the food industry.

FOOD SCIENCE FSC

Department of Food Science and Human Nutrition College of Agriculture and Natural Resources College of Human Ecology

120 What's for Dinner: Science on Your Plate
Fall, Spring. 1(2-0) Not open to students with credit in FSC 211 or FSC 229.
Relationship between science and food. Current issues and future challenges in food science, technology, government, consumers and the media.

150 Introduction to Human Nutrition
Fall, Spring, Summer. 3(3-0) Interdepartmental with Human Nutrition and Foods. Administered by Department of Food Science and Human Nutrition.
Nutrition needs in life stages from a human ecological perspective. Domestic and international factors affecting the availability of a safe, nutritious food supply. Relationships of food choices to health and disease.

211 Principles of Food Science
Fall. 3(3-0) Not open to students with credit in FSC 229.
Scientific principles, historical perspective, and current status of technology related to food composition, safety, toxicology, processing, preservation, and distribution.

229 Unit Operations in Food Processing
Fall. 3(3-0)
Principles, technologies, and applications involved in conversion of raw products into high quality foods. Processing principles such as thermal processing, irradiation, freezing, membrane concentration, enzyme technologies, dehydration, and refrigeration.

275 Seafood Systems Management
Spring. 3 credits. Interdepartmental with Fisheries and Wildlife; Animal Science. Administered by Department of Fisheries and Wildlife.
Domestic and international perspectives on major aquatic foods. Cultural and nutritional value; wild harvest; aquaculture; processing technology; food handling and food safety.

320 Muscle Foods
Spring. 3(2-3) Interdepartmental with Animal Science. Administered by Department of Animal Science. P:M: (ANS 210 or FSC 211 or HNF 150)
Structure of muscle. Meat technology and merchandising concepts.

329 Fundamentals of Food Engineering
Spring. 3(3-0) Interdepartmental with Biosystems Engineering. Administered by Department of Agricultural Engineering. P:M: (FSC 229) and (MTH 126 or LBS 118) and (PHY 231 or LBS 164) P:NM: (FSC 211) SA: FE 329
Unit operations in food industry: fluid mechanics, heat transfer, rate processes, refrigeration, freezing, and dehydration. Thermal process calculations.

339 Food Processing and Engineering Laboratory
Spring. 2(0-6) P:M: (FSC 329 or concurrently) and completion of Tier I writing requirement. P:NM: (FSC 229)
Application of principles of material and energy balance, fluid flow, heat transfer, and water activity to the batch and continuous processing of raw product into high quality food.

342 Food Safety and Hazard Analysis Critical Control Point Program
Fall. 3(3-0) P:NM: (FSC 211 or concurrently or FSC 229 or concurrently or HNF 150 or concurrently or HNF 311 or concurrently) or a prior or concurrent basic course in microbiology, chemistry or biological sciences. SA: FSC 442
Sources of microbiological, chemical and physical hazards; minimizing microbial growth and survival; good manufacturing, cleaning and sanitation practices; Hazard Analysis Critical Control Point Programs in food processing and foodservice.

401 Food Chemistry
Fall. 3(3-0) P:M: (BMB 200 or CEM 352) or (BMB 401 or concurrently) R: Not open to freshmen or sophomores.
Organic and biological reactions of food constituents. Chemical changes in foods during processing and storage affecting texture, color, flavor, stability, and nutritive qualities.

402 Food Chemistry Laboratory
Fall. 1(0-3) P:M: (FSC 401 or concurrently) and completion of Tier I writing requirement.
Chemical changes in food constituents which affect stability of food products and properties such as color, flavor and texture.

407 Food and Animal Toxicology
Fall. 3(3-0) Interdepartmental with Animal Science. Administered by Department of Animal Science. P:M: (BMB 200 and BMB 401 and PSL 250) R: Not open to freshmen or sophomores.
Fate and effects of chemicals in the food chain. Impact on animal production. Residues in food products. Food safety assessment. Control methods.

407L Toxicology Methods Laboratory
Fall. 2(0-4) Interdepartmental with Animal Science. Administered by Department of Animal Science. P:NM: (ANS 407 or concurrently) R: Not open to freshmen or sophomores.
Laboratory techniques for evaluating potential toxicity of chemicals to living systems. Field trip to industrial toxicology laboratory required.

417 Topics in Toxicology
Spring. 1(1-0) Interdepartmental with Animal Science. Administered by Department of Animal Science. P:NM: (ANS 407) R: Not open to freshmen or sophomores.
Selected topics including regulatory toxicology, risk assessment, environmental toxicology, food safety, and safe handling of toxic substances.

420 Quality Assurance
Fall. 2(2-0) P:M: (STT 200 or STT 201 or STT 231 or STT 315 or STT 351) and (FSC 229 or concurrently or ANS 210 or concurrently or HRT 203 or concurrently or FSC 211 or concurrently) R: Open only to juniors or seniors or graduate students in the Department of Food Science and Human Nutrition or in the Food Processing and Technology Specialization.
Theory and application of quality assurance programs for food processing industries.

421 Food Laws and Regulations
Spring. 3(3-0) P:M: (HNF 150 or HNF 311 or FSC 211 or FSC 229 or FSM 200)
Adoption, interpretation, and enforcement of laws and regulations governing food processing and foodservice systems. Impact of regulation on food production, availability, marketing, and safety.

430 Food Processing: Fruits and Vegetables
Fall. 3(2-3) P:M: (FSC 211 or FSC 229) R: Not open to freshmen or sophomores. SA: FSC 330
Fruit and vegetable composition and quality indices. Harvest technology, postharvest physiology, and preparatory systems. Principles and applications of thermal processing, freezing, and specialized techniques.

431 Food Processing: Cereals
Spring. 3(2-3) P:M: (FSC 211 or FSC 229) R: Not open to freshmen or sophomores. SA: FSC 331
Classification and composition of cereals. Milling processes. Cereal product manufacture.

432 Food Processing: Dairy Foods
Spring. 3(2-3) P:M: (FSC 211 or FSC 229 or ANS 210) R: Not open to freshmen or sophomores. SA: FSC 332
Principles for production and processing of safe and wholesome dairy foods. Practical experience in safety and quality assurance systems and in the processing of fluid milk, cultured products, cheese, and frozen desserts.

433 Food Processing: Muscle Foods
Fall. 3(2-3) P:M: (FSC 211 or FSC 229 or ANS 210) R: Not open to freshmen or sophomores. SA: FSC 333
Manufacturing practices and principles of fresh, frozen, and cured meats and fish. Processed products from muscle foods. Egg characteristics. Product formulation and quality control.