

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.

- 440 Food Microbiology**
Spring. 3(3-0) Interdepartmental with Microbiology and Molecular Genetics. P:M: (MIC 205 or MIC 301) and completion of Tier I writing requirement. R: Not open to freshmen or sophomores. SA: MPH 440
Major groups of microorganisms of importance to the food industry. Emphasis on ecological, physiological, and public health aspects.
- 441 Food Microbiology Laboratory**
Spring. 2(0-4) Interdepartmental with Microbiology and Molecular Genetics. P:M: (FSC 440 or concurrently) and completion of Tier I writing requirement. P:NM: (MIC 206 or MIC 302) SA: MPH 441
Methods for studying major groups of microorganisms important to the food industry. Isolation, enumeration, characterization, identification, and use of microorganisms.
- 455 Food Analysis**
Fall. 3(2-3) P:M: (BMB 200) or (BMB 401 or concurrently) and completion of Tier I writing requirement.
Principles and application of analytical techniques. Analysis for fats, proteins, carbohydrates, minerals, vitamins, and additives. Techniques include spectroscopy, fluorimetry, chromatography, electrophoresis, and proximate composition.
- 470 Integrated Approaches to Food Product Development**
Fall, Spring. 2(0-6) P:M: (FSC 402 or concurrently or FSC 441 or concurrently or FSC 455 or concurrently) and completion of Tier I writing requirement. P:NM: (FSC 339) R: Open only to seniors or graduate students.
Food product development including obtaining, screening, and selection of ideas. Integration of food processing, chemistry, analysis, and microbiology for the design, production, and evaluation of a food product.
- 477 Food Engineering**
Fall. 3(2-2) Interdepartmental with Biosystems Engineering. Administered by Department of Agricultural Engineering. P:M: (BE 350 and BE 351 and CE 321) SA: FE 465
Unit operations, process engineering, equipment, and industrial practices of the food industry. Manufactured dairy products: thermal processing, pipeline design, heat exchange, evaporation, dehydration, aseptic processing, membrane separation, cleaning, and sanitation.
- 490 Special Problems in Food Science**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Not open to freshmen or sophomores. Approval of department; application required.
Individual study of selected topics in food science. Supervised independent study.
- 801 Chemistry of Food Lipids**
Fall of odd years. 3(3-0) P:NM: (FSC 401 and BMB 461)
Composition and structure of lipids: physical and chemical properties in relation to their function in foods.
- 802 Food Proteins**
Spring of even years. 3(3-0) P:NM: (BMB 461 and FSC 401)
Use of proteins and enzymes in the food industry. Functional properties of proteins and enzymes in food systems.
- 807 Advanced Food Toxicology**
Fall of even years. 3(3-0) Interdepartmental with Animal Science; Human Nutrition and Foods. R: Approval of department.
Toxicology related to food safety. Metabolism of toxicants as influenced by food constituents, mutagenesis, and chemical carcinogenesis. Risk assessment.
- 831 Advanced Cereal Science**
Fall of even years. 3(3-0) P:NM: (BMB 401 and FSC 331 and FSC 401) or approval of department.
Physico-chemical properties of major constituents in cereal grains. Relationship of constituent structures to functionality in the processing of cereal grains into food products, with emphasis on wheat.
- 837 Food Rheology**
Fall. 3 credits. Interdepartmental with Biosystems Engineering. Administered by Department of Agricultural Engineering.
Definition, analysis, and measurement of rheological properties to describe the steady shear, dynamic, viscoelastic, extensional, and solid behavior of biological materials. Industrial applications of rheological methods with emphasis on fluid and semi-solid foods.
- 840 Advanced Food Microbiology**
Spring of odd years. 3(3-0) P:NM: (FSC 440)
Detection, characterization, identification, and enumeration of food-associated pathogens. Applications and regulation of food biotechnology.
- 842 Foodborne Diseases**
Spring of odd years. 3(3-0) P:NM: (FSC 440 or FSC 840)
Epidemiology, isolation, characterization, clinical manifestations, pathogenicity, incidence and control of bacterial, parasitic and viral foodborne pathogens and associated toxins.
- 850 Analytical Techniques in Food Science**
Summer of odd years. 2(1-2) R: Open only to graduate students in Food Science or Human Nutrition.
Theory and application of dynamic rheological testing, nucleic acid and protein analysis, and immunological techniques. Other new technologies related to food science.
- 860 Research in Food Processing Technology**
Summer of even years. 2(1-2) R: Open only to graduate students in Food Science, Human Nutrition, Animal Science, and Horticulture.
Theory, application, and evaluation of food processing technology: ultrafiltration, food irradiation, and critical point extraction.
- 890 Special Problems in Food Science**
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 in Food Science. Approval of department; application required.
Individual investigation of an area of food science.
- 891 Selected Topics in Food Science**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in Foods or Food Science or Human Nutrition.
Topics of current interest and importance in basic and applied areas of food science.
- 892 Food Science Seminar**
Fall, Spring. 1(1-0) A student may earn a maximum of 4 credits in all enrollments for this course. R: Open only to graduate students in Food Science.
Critical review of literature. Organization and communication of scientific data in food science.
- 898 Master's Research**
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 5 credits in all enrollments for this course. R: Open only to master's students in Food Science. Approval of department.
Directed research in support of Plan B master's degree requirements.
- 899 Master's Thesis Research**
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 99 credits in all enrollments for this course. R: Open only to M.S. students in Food Science.
Master's thesis research.
- 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 Ph.D. students in Food Science.
Doctoral dissertation research.

FOOD SYSTEMS ECONOMICS AND MANAGEMENT FSM

Department of Agricultural Economics College of Agriculture and Natural Resources

- 335 Food Marketing Management**
Spring. 3(3-0) Interdepartmental with Marketing and Supply Chain Management. Administered by Department of Marketing and Supply Chain Management. P:M: (FSM 200 or MSC 300) R: Open only to juniors or seniors. SA: ML 335, MTA 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.
- 439 Food Business Analysis and Strategic Planning**
Fall. 3(3-0) Interdepartmental with Marketing and Supply Chain Management. Administered by Department of Marketing and Supply Chain Management. P:M: (MSC 335 or FSM 335) and (STT 201 or STT 200 or STT 315) R: Open only to juniors or seniors. SA: ML 439, MTA 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.