FOOD SCIENCE FSC

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

211 Principles of Food Science
Fall, Summer. 3(3-0)
Scientific principles, historical perspective, and current status of technology related to food composition, safety, toxicology, processing, preservation, and distribution.

222 Professional Development and Career Planning in Food Science
Fall. 1(1-0) P: FSC 211 or concurrently RB: Introductory course in food science R: Open to students in the Food Science Major. Career opportunities in food science; training in oral, written, and visual communication skills for professional development. Offered second half of semester.

310 Sensory Analysis and Consumer Research
Fall. 3(2-2) P: (FSC 211 or HNF 150) and (STT 200 or STT 201 or STT 315 or STT 421 or STT 464) R: Open to undergraduate students in the Department of Food Science and Human Nutrition. SA: FSC 410
Discriminative, affective and descriptive methods used to evoke, measure, analyze, and interpret sensory reactions to food characteristics and consumer needs.

325 Food Processing: Unit Operations
Spring. 3(3-0) P: FSC 211 or ANS 201 SA: FSC 229, FSC 339
Principles, technologies, and applications in conversion of raw products into high quality foods. Unit operations: thermal processing, irradiation, freezing, membrane fractionation, enzyme technologies, dehydration, and refrigeration. Field trip required.

342 Food Safety and Hazard Analysis Critical Control Program
Fall. 3(3-0) RB: FSC 211 or concurrently) or (HNF 150 or concurrently) or (HNF 260 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 food service.

401 Food Chemistry
Spring. 3(3-0) P: 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
Spring. 1(0-3) P: (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.

420 Quality Assurance
Fall. 2(2-0) P: (STT 200 or STT 201 or STT 231 or STT 315 or STT 351) and ((FSC 211 or concurrently) or (ANS 201 or concurrently) or (HRT 204 or concurrently)) R: Open to juniors or seniors or graduate students in the Department of Food Science and Human Nutrition.
Theory and application of quality assurance programs for food processing industries.

421 Food Laws and Regulations
Spring. Summer. 3(3-0) P: HNF 150 or FSC 211 or ABM 100
Adoption, interpretation, and enforcement of laws and regulations governing food processing and food-service systems. Impact of regulation on food production, availability, marketing, and safety.

422 Advanced Professional Seminar in Food Science
Fall. 1(1-0) P: FSC 222 RB: Advanced course work in food science R: Open to students in the Food Science Major.
Preparation for success in food science careers, marketing tools, business communication skills, and contemporary topics in food science. Offered first half of semester.

429 Fundamentals of Food Engineering
Spring. 3(3-0) Interdepartmental with Biosystems Engineering. Administered by Biosystems Engineering. P: FSC 325 and MTH 124 and PHY 231 R: FSC 211 R: Not open to students in the College of Engineering. SA: BE 329
Definition and measurement of food properties, thermodynamics, fluid mechanics, heat transfer, and mass transfer.

430 Food Processing: Fruits and Vegetables
Fall. 3(2-3) P: FSC 325 R: Not open to freshmen or sophomores. SA: FSC 331
Fruit and vegetable composition and quality indices. Harvest technology, post-harvest physiology, and preparatory systems. Principles and applications of thermal processing, freezing, and specialized techniques.

431 Food Processing: Cereals
Spring. 3(3-0) P: FSC 325 R: Not open to freshmen or sophomores. SA: FSC 331

432 Food Processing: Dairy Foods
Fall. 2(2-3) P: FSC 325 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
Spring. 3(3-0) Interdepartmental with Animal Science. Administered by Food Science. P: FSC 325 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. Product formulation and quality control.

440 Food Microbiology
Spring. 3(3-0) Interdepartmental with Microbiology and Molecular Genetics. Administered by Food Science. P: (MMG 201 or MMG 301) and completion of Tier I writing requirement. R: Not open to freshmen or sophomores.
Major groups of microorganisms of importance to the food industry. Ecological, physiological, and public health aspects.

441 Food Microbiology Laboratory
Spring. 2(0-4) Interdepartmental with Microbiology and Molecular Genetics. Administered by Food Science. P: (FSC 440 or concurrently) and completion of Tier I writing requirement. RB: MMG 302 SA: MPH 441
Methods for studying major groups of microorganisms important to the food industry. Isolation, enumeration, characterization, identification, and use of microorganisms.

442 Hazard Analysis Critical Control Point Training and Certification
Fall. 1(1-0) P: (FSC 325) and (FSC 440 or concurrently) RB: Advanced course work in food science. Design and implementation of Hazard Analysis Critical Control Point (HACCP) programs for the food industry. Offered second half of semester.

455 Food and Nutrition Laboratory
Spring. 3(2-3) P: ((BMB 200 or concurrently) or (BMB 401 or concurrently) or (BMB 461 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
Spring. 3(2-3) P: (FSC 401 and FSC 410) and (FSC 440 or concurrently) RB: FSC 325 R: Open to seniors or graduate students.
Food product development including obtaining, screening, and selecting ideas. Integration of food processing, chemistry, analysis, and microbiology for the design, production, and evaluation of a food product.

477 Food Engineering: Fluids
Fall. 3(2-2) Interdepartmental with Biosystems Engineering. Administered by Biosystems Engineering. P: BE 350 and BE 351 and BE 360 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.

481 Fermented Beverages
Fall. 3(2-2) Fall: Lansing. R: Open to juniors. Approval of department. Origin and history of alcoholic beverages produced by fermentation; types of products and methods of production; relationships among agricultural practices, processing and sensory attributes; responsible consumption of alcoholic beverages.
807 Advanced Food Toxicology
Fall of even years. 3(3-0) R: Approval of department.
Toxicology related to food safety. Metabolism of toxicants as influenced by food constituents, mutagenesis, and chemical carcinogenesis. Risk assessment.

810 International Food Laws and Regulations
Fall, Spring. 3(3-0) RB: Food science, law, food safety, international development or related disciplines. SA: ANR 810 Survey of food laws of various countries and regions.

811 U.S. Food Laws and Regulations
Fall, Spring. 3(3-0) RB: (FSC 810) or food science, law, food safety, international development, veterinary medicine, or related disciplines. SA: ANR 811 Not open to students with credit in FSC 421. Surveys the laws and regulations governing the manufacture, distribution and sale of food products in the United States. Focuses on food and food additives, genetic modification of food, food safety and HACCP, civil and criminal liability for defective products, inspections, labeling, importation, exportation, and current issues of concern.

812 Food Laws and Regulations in the European Union
Fall, Spring. 3(3-0) RB: (FSC 810) or food science, law, food safety, international development, veterinary medicine, or related disciplines. Introduction to the European Union (EU), the role of the Council of Europe, the European Food Safety Authority, food labeling, food additives, food fortification, genetically modified foods, organic foods, imports, food safety, inspections, enforcement and compliance, and the role of science in EU food law.

813 Food Laws and Regulations in Latin America
Fall, Summer. 3(3-0) RB: (FSC 810) or food law background. Not open to students with credit in LAW 810G. Current issues that have shaped Latin American food regulation. Overview of regional characteristics. Basic food laws, agency responsibilities, product registration requirements, basic standards, food labeling, food safety, food additives, and food importation. Trade issues, international organizations, and commercial agreements.

814 Food Laws and Regulations in Canada
Spring. 3(3-0) RB: (FSC 810) or food science, law, food safety, international development or related disciplines. Canadian regulatory framework. Labeling and advertising rules under the Canadian Food and Drug Act and other statutes. Food additives, food supplements and food fortification. Regulation of novel foods and genetically modified foods, organic foods and food irradiation. Inspection and related food safety programs. Food recalls. Compliance and enforcement. Food importation.

815 Food Laws and Regulations in Asia
Summer. 3(3-0) RB: Food science, law, food safety, international development or related disciplines. Current issues that have shaped the regulation of food in Asia, regional characteristics and culture, basic food laws, agency responsibilities, product registration requirements, basic standards, food labeling, food safety, food additives, food import systems. Special emphasis will be given to the food regulations of Japan, China, Korea and Southeast Asia (ASEAN).

816 Codex Alimentarius - The Food Code
Fall, Spring. 3(3-0) RB: (FSC 810) or food science, law, food safety, international development or related disciplines. How Codex Alimentarius formulates and harmonizes food standards for hygiene, contaminants, food additives, veterinary drugs, and pesticide residues, including its role in the World Trade Organization (WTO) Sanitary and Phytosanitary (SPS) and Technical Barriers to Trade (TBT) Agreements.

817 Animal Health, World Trade and Food Safety (OIE): Challenges and Opportunities
Fall. 3(3-0) RB: (FSC 810) or animal science, veterinary medicine, food science, law, food safety, international development, agriculture, or related disciplines. Examines the history, objectives, rules and operations of the World Organization for Animal Health (OIE), regarding global animal health, animal welfare, world trade, and food safety.

818 Global Risk Regulation: Focus on Food Safety
Summer. 3(3-0) RB: Food science, law, food safety, animal science, veterinary medicine, international development, health, environment, or related disciplines. Focuses on societies’ efforts to assess and manage food, health, safety and environmental risks, including selection of the risks deserving regulatory attention, scientific advice and decision-making situations of scientific uncertainty, the role of non-scientific values, calculating costs and benefits of regulation, and distributional and equity effects.

823 Diet and Immune Function
Spring of odd years. 3(3-0) RB: Biochemistry and Microbiology. Influence of diet on the immune system and relationship to infectious and non-infectious diseases, adverse reactions such as food allergy, and substance abuse. Methods to evaluate immune function.

842 Foodborne Diseases
Spring of odd years. 3(3-0) RB: FSC 440 or FSC 840. Epidemiology, isolation, characterization, clinical manifestations, pathogenesis, incidence and control of bacterial, parasitic and viral foodborne pathogens and associated toxins.

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 Food Science major or Human Nutrition major. Topics of current interest and importance in basic and applied areas of food science.
892 Food Science and Animal Science Seminar
Fall, Spring. 1(1-0) A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Animal Science. Administered by Food Science. R: Open to graduate students in the Department of Animal Science or in the Department of Food Science and Human Nutrition. Critical review of literature. Organization and communication of scientific data in food science and animal 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 master's students in the Food Science major. Master's thesis research.

999 Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open to doctoral students in the Food Science major. Doctoral dissertation research.