

# FOOD SCIENCE AND TECHNOLOGY (FDST)

---

## **FDST 801 Teaching Applications of Food Science**

**Crosslisted with:** FDST 401

**Prerequisites:** BIOS 101 and CHEM 109A and 109L

**Notes:** Will not count toward a FDST major or minor.

**Description:** Overview of the science of food and how food can be used in the classroom to enhance science education.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

## **FDST 803 Food Quality Assurance**

**Crosslisted with:** FDST 403

**Prerequisites:** FDST 205; STAT 218.

**Description:** Quality related issues as they pertain to manufacturing, processing, and/or testing of foods, with a major emphasis on food regulations, statistical process control and Hazard Analysis of Critical Control Points (HACCP).

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

## **FDST 805 Food Microbiology**

**Crosslisted with:** BIOS 445, BIOS 845, FDST 405

**Prerequisites:** BIOS 312

**Notes:** BIOC 401 or BIOC 431 recommended

**Description:** Nature, physiology, and interactions of microorganisms in foods. Introduction to food-borne diseases, the effect of food processing systems on the microflora of foods, principles of food preservation, food spoilage, and foods produced by microorganisms. Food plant sanitation and criteria for establishing microbial standards for food products.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**Offered:** FALL/SPR

**Prerequisite for:** BIOS 446, BIOS 846, FDST 406, FDST 806; FDST 424, FDST 824; FDST 425, FDST 825; FDST 455L, FDST 855L, MBIO 455L; FDST 460, FDST 860; FDST 867; FDST 875; FDST 877; FDST 908B

## **FDST 806 Food Microbiology Laboratory**

**Crosslisted with:** BIOS 446, BIOS 846, FDST 406

**Prerequisites:** Parallel in FDST 405/805/BIOS 446/846.

**Description:** The microorganisms in foods and the methods used to study them.

**Credit Hours:** 2

**Max credits per semester:** 2

**Max credits per degree:** 2

**Grading Option:** Grade Pass/No Pass Option

**Course and Laboratory Fee:** \$40

## **FDST 812 Cereal Technology**

**Crosslisted with:** FDST 412

**Prerequisites:** FDST 205.

**Description:** Chemistry and technology of the cereal grains. Post-harvest processing and utilization for food and feed. Current industrial processes and practices, and the theoretical basis for these operations.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

## **FDST 813 Baking Technology**

**Crosslisted with:** FDST 413

**Prerequisites:** FDST 205

**Description:** Chemistry and technology of bakery products, including formulation, ingredient functionality, processing, and quality evaluation.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Offered:** FALL

## **FDST 815 Molds and Mycotoxins in Food, Feed, and the Human Environment**

**Crosslisted with:** FDST 415

**Prerequisites:** Junior or Senior standing, 3 hours BIOS or LIFE

**Description:** Occurrence, growth, and mycotoxin production of molds in human foods, animal feeds, and the human environment. Spoilage, mycotoxin production conditions, toxicity, and pathological effects. Culture media, methods and techniques for enumerating and identifying molds, analytical methods for mycotoxins, and effects of food and feed processing on mycotoxin stability.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**Offered:** FALL

## **FDST 819 Meat Investigations**

**Crosslisted with:** ASCI 419, ASCI 819, FDST 419

**Prerequisites:** ASCI 210

**Description:** Conduct independent research and study meat industry problems in processing, production, storage, and preparation of meat and meat products.

**Credit Hours:** 1-3

**Min credits per semester:** 1

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

## **FDST 820 Fruit and Vegetable Technology**

**Crosslisted with:** FDST 420

**Prerequisites:** FDST 205.

**Description:** Harvesting and postharvest handling of fruit and vegetables, processing and safety issues, processes of ripening and/or maturation in fresh fruits and vegetables.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**Course and Laboratory Fee:** \$25

**FDST 823 Food Safety Risk Analysis****Prerequisites:** Instructors' approval**Description:** Risk analysis principles applied to food safety issues; quantitative approaches for risk assessment using epidemiological, statistical and simulation tools; step-by-step demonstration of quantitative risk assessment model development; methods for framing risk management questions; introduction of risk communication; real-world examples of microbial, food allergen, and chemical risk assessment.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** SPRING**FDST 824 Food Safety Microbiology****Crosslisted with:** FDST 424**Prerequisites:** FDST 405**Description:** Microbiological sampling, testing, and foodborne pathogen detection tools to support current food safety and sanitation regulatory requirements and the design and implementation of food safety management systems.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Grade Pass/No Pass Option**Offered:** SPRING**FDST 825 Food Toxicology****Crosslisted with:** FDST 425**Prerequisites:** FDST 405/805, BIOC 401, or equivalent.**Description:** Toxic substances that may be found in foods with emphasis on bacterial toxins, mycotoxins, and naturally occurring toxicants of plants, animals, and seafood. Basic toxicological methodology and the effects of food processing and handling on food-borne toxicants.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 829 Dairy Products Technology****Crosslisted with:** FDST 429**Prerequisites:** FDST 205**Notes:** Offered spring semester of odd-numbered calendar years.**Description:** Physical, chemical, and microbiological properties of milk. Principles of milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Grade Pass/No Pass Option**FDST 830 Sensory Evaluation****Crosslisted with:** FDST 430, STAT 430, STAT 830**Prerequisites:** Introductory course in statistics.**Description:** Food evaluation using sensory techniques and statistical analysis.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Grade Pass/No Pass Option**Course and Laboratory Fee:** \$10**FDST 842 My Gut, My Health, My Food****Crosslisted with:** FDST 442**Prerequisites:** Junior or Senior standing**Description:** Detailed examples and conceptual overview of studies that define the digestive tract microbial ecosystem both at the local and systemic scale in the context of omnivores such as humans and animals are presented. The concepts in focus are associated with high-dimensional datasets (or big data) used for studying these complex biosystems, and the multi-dimensional interactions between the microbiomes in its ecosystem. Topics include the host-cycle of life in health and disease in relation to the bacteria of the digestive tract, as well as the modification of their ecology due to health issues, nutrition, and microbial competition or chemical modification.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Graded**Offered:** SPRING**FDST 848 Food Chemistry****Crosslisted with:** FDST 448**Prerequisites:** FDST 205; CHEM 251; BIOC 401.**Description:** Molecular components of various foods and the reactions of these components during the processing of foods.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Grade Pass/No Pass Option**Prerequisite for:** ASCI 917; FDST 449, FDST 849; FDST 452, FDST 852; FDST 458, FDST 858; FDST 460, FDST 860; NUTR 449**FDST 849 Food Chemistry Laboratory****Crosslisted with:** FDST 449**Prerequisites:** FDST 205; FDST 448/848 or parallel; BIOC 401.**Description:** Experiments involving the isolation, purification, and characterization of the molecular components of foods.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 1**Grading Option:** Grade Pass/No Pass Option**Prerequisite for:** FDST 458, FDST 858**Course and Laboratory Fee:** \$20**FDST 852 Physical Chemistry of Foods****Crosslisted with:** FDST 452**Prerequisites:** FDST 448/848 or instructor approval.**Description:** The basic theory of physical chemistry that is relevant in food science and technology. Understand and predict changes occurring in a food during processing, storage, and handling using physical chemistry theory. Design and improvement of processes to make foods having specific qualities in an efficient way.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded

**FDST 855 Microbiology of Fermented Foods**

**Crosslisted with:** FDST 455, MBIO 455

**Prerequisites:** BIOS 312

**Notes:** On-campus students must also register for FDST 455L/855L.

**Description:** Physiology, biochemistry, and genetics of microorganisms important in food fermentation. How microorganisms are used in fermentation and the effects of processing and manufacturing conditions on production of fermented foods.

**Credit Hours:** 2

**Max credits per semester:** 2

**Max credits per degree:** 2

**Grading Option:** Grade Pass/No Pass Option

**Offered:** SPRING

**FDST 855L Microbiology of Fermented Foods Laboratory**

**Crosslisted with:** FDST 455L, MBIO 455L

**Prerequisites:** FDST 405/805 and parallel FDST 455/855/MBIO 455

**Description:** Experiments involving the microorganisms and fermentation of foods and beverages.

**Credit Hours:** 1

**Max credits per semester:** 1

**Max credits per degree:** 1

**Grading Option:** Grade Pass/No Pass Option

**Offered:** SPRING

**FDST 858 Advanced Food Analysis**

**Crosslisted with:** FDST 458

**Prerequisites:** FDST 205, 448/848, and FDST 449/849.

**Description:** Theory and application of molecular and atomic spectroscopy, immunochemistry and thermal methods to the analysis of foods. Chemical separation techniques for the isolation of food constituents.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**Course and Laboratory Fee:** \$20

**FDST 860 Food Product Development Concepts I**

**Crosslisted with:** FDST 460

**Prerequisites:** FDST 405/805 and FDST 448/848.

**Notes:** Capstone course.

**Description:** Develop a commercially viable food product using chemical, microbiological and sensory analysis principles, and marketing and packaging sciences.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**Course and Laboratory Fee:** \$40

**Experiential Learning:** Case/Project-Based Learning

**FDST 865 Food Engineering Unit Operations**

**Crosslisted with:** FDST 465, AGST 465, AGST 865

**Prerequisites:** FDST/AGST 363.

**Description:** Unit operations and their applications to food processing.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**FDST 866 Scientific Method in Practice**

**Notes:** The course is pass/no pass.

**Description:** Introduction to the concepts of scientific inquiry (the scientific method, logical fallacies, publication, scientific ethics). Practical aspects of the modern research environment (academic and non-academic career paths), scientific communication and intellectual property.

**Credit Hours:** 1

**Max credits per semester:** 1

**Max credits per degree:** 1

**Grading Option:** Pass No-Pass

**Offered:** SUMMER

**FDST 867 Computational Genomics for Food and Nutritional Sciences**

**Prerequisites:** FDST 805 or BIOC 801

**Notes:** Prerequisite can also be any coursework in Microbiology and Biochemistry or by permission

**Description:** Metagenome taxonomic and functional profiling, protein functional annotation, pangenome analysis, genomic context-based genome mining, benchmark evaluation of bioinformatics tools, microbiome produced metabolites, metabolic enzymes of dietary fibers, polyphenols, and proteins

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Offered:** FALL

**FDST 870 Nutraceuticals and Functional Foods**

**Crosslisted with:** FDST 470

**Prerequisites:** BIOC 401 or BIOC/BIOS/CHEM 431/831.

**Description:** Evaluation of natural compounds impact on human health. Inflammation, cancer, heart disease, and the impact of gut micro-flora on health.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Grade Pass/No Pass Option

**FDST 871 A Multidisciplinary Overview of Food Safety and Security**

**Prerequisites:** 3 hrs BIOS or CHEM

**Description:** Instruction in FDST 871 is provided by numerous subject matter experts. Multidisciplinary food safety and security perspectives. Food safety policy, ag bioterrorism, border security, animal ID, food defense, and site security, risk analysis, crisis communication, epidemiology, Hazard Analysis and Critical Control Point System, and more.

**Credit Hours:** 2

**Max credits per semester:** 2

**Max credits per degree:** 2

**Grading Option:** Grade Pass/No Pass Option

**FDST 872 Principles of Hazard Analysis and Critical Control Point System**

**Prerequisites:** 3 hrs BIOS or CHEM

**Description:** The Hazard Analysis and Critical Control Point (HACCP) System and its application in the food industry.

**Credit Hours:** 2

**Max credits per semester:** 2

**Max credits per degree:** 2

**Grading Option:** Grade Pass/No Pass Option

**FDST 873 Food-borne Toxicants****Prerequisites:** 3 hrs BIOS or CHEM**Description:** Mechanisms of action, metabolism, sources, remediation and/or detoxification, and risk assessment of major food-borne toxicants of current interest. Design of Hazard Analysis and Critical Control Point plans for use in food industries to target food-borne toxicants.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 874 Food Laws, Regulations, and the Regulatory Process****Prerequisites:** 3 hrs FDST at 200 level or above**Description:** FDST 874 has presentations by state and federal food regulators. History of the development of the current federal state food regulations. Guidelines that govern the practice of regulating the wholesomeness of red meats, poultry, and eggs.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 875 Rapid Methods in Food Microbiology****Prerequisites:** FDST 405/805/BIOS 445/845**Description:** The different types of rapid microbial detection approaches available for use in foods. Commercial reagents and detection platforms, and the "next generation" approaches currently under development in academia or industry. Challenges to detection posed by the complexity of most food matrices and the sample preparation methods for separating microorganisms from such matrices.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 876 Risk Assessment for Food, Agriculture, and Veterinary Medicine****Prerequisites:** 3 hrs STAT**Description:** Risk assessment principles as applied to biological systems. Exposure and effects characterization in human and animal health and ecological risk assessment. Risk analysis frameworks and regulatory decision-making. Introduction to quantitative methods for risk assessment using epidemiological and distributional analyses. Uncertainty analysis.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Grade Pass/No Pass Option**FDST 877 Advanced Food Microbiology and Biotechnology****Prerequisites:** FDST 405/805/BIOS 445/845**Description:** Basic principles in biotechnology and applied food microbiology. Current topics of interest in food biotechnology. Introduction to recombinant DNA techniques and how they are applied to genetically modify microorganisms. The use of nucleic acids as tools of rapid detection of microorganisms in foods, basic enzyme immobilization and down-stream processing techniques, and regulatory aspects of food biotechnology.**Credit Hours:** 3**Max credits per semester:** 3**Max credits per degree:** 3**Grading Option:** Grade Pass/No Pass Option**FDST 878 Food Protection and Defense: Essential Concepts****Prerequisites:** Admission to Food Safety & Defense certificate program; and permission**Description:** Foundational concepts relevant to protecting the food supply from intentional contamination. Section 1 addresses the nature of the policy and regulatory aspects of food defense, threats to food and agricultural systems, as well as concepts and strategies related to response and mitigation of food protection incidents. Section 2 provides an understanding of the principles required in a food defense program for a food manufacturing, warehousing, or distribution center.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 880 Advanced Food Science: Selected Topics****Credit Hours:** 2-6**Min credits per semester:** 2**Max credits per semester:** 6**Max credits per degree:** 6**Grading Option:** Grade Pass/No Pass Option**FDST 880A Food Carbohydrates****Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 880L Food Lipids****Description:** n-depth discussion of: composition, quality, and chemical and physical properties and reactions of fats and oils in food systems; processing and refining of food fats and oils; manufacture of various fat and oil products; current research related to fats and oils.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 880P Food Proteins****Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 892 Special Topics in Food Science and Technology****Crosslisted with:** FDST 492**Prerequisites:** FDST 205 or BIOS 312 or CHEM 251 or CHEM 253 or junior standing or higher**Description:** Special topics that address current and emerging issues in food science and technology.**Credit Hours:** 1-6**Min credits per semester:** 1**Max credits per semester:** 6**Max credits per degree:** 24**Grading Option:** Grade Pass/No Pass Option**FDST 895 Graduate Internship Experience****Description:** Professional experience in a food science and technology area. Experience may be with a business, government agency, organization, or a university research, extension, or teaching program.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 3**Grading Option:** Pass No-Pass

**FDST 896 Independent Study in Food Science and Technology****Prerequisites:** 12 hrs FDST or closely related areas**Description:** Individual or group projects in research, literature review, or extension of course work under supervision and evaluation of a departmental faculty member.**Credit Hours:** 1-5**Min credits per semester:** 1**Max credits per semester:** 5**Max credits per degree:** 5**Grading Option:** Pass No-Pass**FDST 897 MS Project****Prerequisites:** Admission to masters degree program**Description:** Applied food science and technology experience to design, develop and complete a project to apply knowledge gained from course work to create an original body of work focusing on an area of personal or professional interest.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 6**Grading Option:** Pass No-Pass**FDST 899 Masters Thesis****Prerequisites:** Admission to masters degree program and permission of major adviser**Credit Hours:** 1-10**Min credits per semester:** 1**Max credits per semester:** 10**Max credits per degree:** 99**Grading Option:** Pass No-Pass**FDST 908 Topics in Advanced Food Microbiology****Description:** Current topics in food microbiology.**Credit Hours:** 2-8**Min credits per semester:** 2**Max credits per semester:** 8**Max credits per degree:** 8**Grading Option:** Grade Pass/No Pass Option**FDST 908B Food Borne Pathogens****Prerequisites:** FDST 805 (BIOS 845). BIOS 820, or permission. BIOC 831 and 832 recommended**Description:** Survey of current research topics in the molecular biology of agents of food borne disease. Includes structure-function analyses of toxin molecules and other virulence determinants; genetic mechanisms of phenotypic variation, coordinate regulation of virulence gene expression; mobile genetic elements that contribute to pathogenesis; invasion of host tissues; and stress-response systems and survival.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 908E Readings in Food Microbiology****Prerequisites:** FDST 805**Description:** Primarily a literature course focusing on current and emerging topics in food microbiology. Relevant articles from basic and applied microbiology journals reviewed and discussed. Emphasis on foodborne pathogen detection, testing, characterization, control, and epidemiology.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded**Offered:** SPRING**FDST 951 Advanced Food Science Seminar****Prerequisites:** Permission**Description:** Advanced study and discussion of the scientific literature and research pertaining to food science.**Credit Hours:** 1-2**Min credits per semester:** 1**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Grade Pass/No Pass Option**FDST 952 Professional Food Science Communication****Description:** Best practices for science communication through practical delivery of food science and technology knowledge to a variety of audiences.**Credit Hours:** 1**Max credits per semester:** 1**Max credits per degree:** 12**Grading Option:** Graded**Offered:** SPRING**FDST 993 Professional Development Workshop****Description:** Special workshops that address current and emerging skills in food science and technology. Include description specific to the workshop.**Credit Hours:** 1-3**Min credits per semester:** 1**Max credits per semester:** 3**Max credits per degree:** 12**Grading Option:** Grade Pass/No Pass Option**FDST 996 Research in Food Science and Technology****Prerequisites:** 6 hrs microbiology, 12 hrs chemistry**Description:** Studies and investigational work relating to chemistry, microbiology, and processing of food products.**Credit Hours:** 1-8**Min credits per semester:** 1**Max credits per semester:** 8**Max credits per degree:** 8**Grading Option:** Grade Pass/No Pass Option**FDST 999 Doctoral Dissertation****Prerequisites:** Admission to doctoral degree program and permission of supervisory committee chair**Credit Hours:** 1-24**Min credits per semester:** 1**Max credits per semester:** 24**Max credits per degree:** 99**Grading Option:** Pass No-Pass