Food Science (FDSC)

Courses

FDSC 10101. Exploring Topics in Food Science. 1 Hour.
Introduces the depth and scope of Food Science as a profession. This course emphasizes the importance of science in processing and preservation of food and discusses current topics and issues. Practical information on food processing, composition, additives, labeling, environmental issues, regulations, safety, sensory analysis, and health benefits will be provided. Curriculum offerings in Food Science will be related to job responsibilities as a Food Scientist. Lecture/discussions, 2 hours per week for 8 weeks. (Typically offered: Fall)

FDSC 11003. Introduction to Food Science. 3 Hours.
This course is designed to provide students with a general application and understanding of current issues associated with food products and food ingredients. Discussions will focus on controversial subjects involving food products, food additives, food safety and preservation techniques based on scientific principles and popular belief. Lecture/discussions/demonstrations, 3 hours per week. (Typically offered: Fall and Spring)

FDSC 22001. The Science of Chocolate. 1 Hour.
The objective of this course is to introduce you to the science and technology of chocolate production. You will learn the history, chemistry, and physics of chocolate. This course will provide you with an understanding of chocolate production steps, including cacao bean harvesting, fermentation, drying, roasting, grinding, and manufacturing, and how these unit operations affect chocolate texture and flavor. Special focus will be given to fat and sugar crystallization, sensory evaluation, and sustainability of chocolate production. (Typically offered: Spring)

FDSC 220H1. Honors The Science of Chocolate. 1 Hour.
The objective of this course is to introduce you to the science and technology of chocolate production. You will learn the history, chemistry, and physics of chocolate. This course will provide you with an understanding of chocolate production steps, including cacao bean harvesting, fermentation, drying, roasting, grinding, and manufacturing, and how these unit operations affect chocolate texture and flavor. Special focus will be given to fat and sugar crystallization, sensory evaluation, and sustainability of chocolate production. Prerequisite: Honors standing. (Typically offered: Spring)

FDSC 24001. Uncorked: Vines to Wines. 1 Hour.
This introductory course is designed to provide students with an understanding of the basic concepts of growing grapes and winemaking, including history, grape growing, cultivars, chemistry, wine microorganisms, fermentation, winery operations, wine marketing, and the sensory and appreciation of wine. Coursework is expected to integrate lecture and guest presenters with supplement reading assignments. This course will not include wine tasting, therefore there are no age restrictions for enrollment. (Typically offered: Fall)

FDSC 240H1. Honors Uncorked: Vines to Wines. 1 Hour.
This introductory course is designed to provide students with an understanding of the basic concepts of growing grapes and winemaking, including history, grape growing, cultivars, chemistry, wine microorganisms, fermentation, winery operations, wine marketing, and the sensory and appreciation of wine. Coursework is expected to integrate lecture and guest presenters with supplement reading assignments. This course will not include wine tasting, therefore there are no age restrictions for enrollment. Prerequisite: Honors standing. (Typically offered: Fall)

FDSC 25203. Sanitation and Safety in Food Processing Operations. 3 Hours.
Topics covered will provide an understanding of the control of microbial, chemical, and physical food hazards as well as emerging food safety issues. Course will include a discussion of sanitation, cleaners and sanitizers, sanitary equipment and facility designs, and microbial growth and control in food processing operations. Lecture/discussion. (Typically offered: Spring)

FDSC 26003. The Science of Cooking. 3 Hours.
In recent years science has found its way into the kitchen and cooking into laboratories and food processing plants. This course is designed to integrate science and cooking to help students appreciate the chemical and physical properties of foods and understand how the processes used when handling, preparing, and storing foods affect these properties. (Typically offered: Fall)

FDSC 27001. Food for Health. 1 Hour.
The course is designed for students interested in how foods affect one's health. This course provides students with a background of functional food that will enable them to understand, discuss, and evaluate functionality of food in relation to health. This class is designed to appeal to students studying food science, nutrition, biology, chemistry, nursing, and health and human performance. (Typically offered: Spring)

FDSC 27401. Brewing Brilliance: Exploring the General Science of Fermented Beverages (Beer, Wine, and Spirits). 1 Hour.
This course is an introduction to the world of alcoholic beverages. Students will explore the general science, history, production, and cultural significance of beer, wine, spirits, and sake. Through presentations, readings, discussions, and tastings (of nonalcoholic products) students will gain a deeper appreciation for the complexity and diversity of these beverages. (Typically offered: Fall)

FDSC 31003. Principles of Food Processing. 3 Hours.
The course is designed as an overview of the unit; food processing operations common to all types of food processing plants. Examples will be drawn from international food processing operations processing fruits and vegetables, poultry and meats, and oil seeds and cereal grains. Emphasis on oral communication and critical thinking skills. Corequisite: Lab component. Prerequisite: CHEM 14203 and CHEM 14201 and (MATH 22003 or MATH 24004). (Typically offered: Fall)

FDSC 32002. Introduction to Food Law. 2 Hours.
Discussion of government laws and regulations affecting the manufacture of food. Emphasis is on federal regulations relating to food safety, labeling, and the FDA. Discussion relates to practical use of food law. Lecture 2 hours per week. (Typically offered: Spring)

FDSC 320H2. Honors Introduction to Food Law. 2 Hours.
Discussion of government laws and regulations affecting the manufacture of food. Emphasis is on federal regulations relating to food safety, labeling, and the FDA. Discussion relates to practical use of food law. Prerequisite: Honors standing. (Typically offered: Spring)

FDSC 4000V. Special Problems. 1-4 Hour.
Investigation of assigned problems in food science. Prerequisite: Junior standing. (Typically offered: Fall, Spring and Summer)

FDSC 41101. Food Analysis Lab. 1 Hour.
Laboratory exercises providing students with experience of analytical techniques and instrumentation used in food analysis. Laboratory 3 hours per week. Corequisite: FDSC 41103. Prerequisite: FDSC 43004 and CHEM 14203 and CHEM 14201 and CHEM 26103 and CHEM 26101 or (CHEM 36053 and CHEM 36051). (Typically offered: Spring)

FDSC 41103. Food Analysis. 3 Hours.
Methods of analysis, instrumentation, and laboratory techniques for measuring the chemical composition of raw and value-added products. Lecture 3 hours. Corequisite: FDSC 41101. Prerequisite: FDSC 43004 and CHEM 14203 and CHEM 14201 and CHEM 26103 and CHEM 26101 or (CHEM 36053 and CHEM 36051). (Typically offered: Spring)

FDSC 41201. Food Microbiology Lab. 1 Hour.
A hands-on laboratory course designed to teach students microbiological techniques and certain enumeration and plating techniques of specific food spoilage and pathogenic bacteria. Prerequisite: BIOL 20003 and BIOL 20001. Pre- or Corequisite: FDSC 41202. (Typically offered: Fall)

FDSC 41202. Food Microbiology. 2 Hours.
The study of food microbiology including classification/ taxonomy, contamination, preservation and spoilage of different kinds of foods, pathogenic microorganisms, food poisoning, sanitation, control and inspection and beneficial uses of microorganisms. Prerequisite: BIOL 20003 and BIOL 20001 or BIOL 25473. (Typically offered: Fall)

FDSC 43004. Food Chemistry. 4 Hours.
Water, carbohydrates, lipids, proteins, vitamins, and minerals in foods; biochemical and functional properties, enzymes, food additives (emulsifiers, pigments, colors, flavors, preservatives, and sweeteners) and texture as related to properties in food systems and during processing. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: CHEM 14203 and CHEM 14201 and CHEM 26103 and CHEM 26101 or (CHEM 36053 and CHEM 36051). (Typically offered: Fall)

FDSC 4310V. Internship in Food Science. 1-4 Hour.
The Food Science Internship is a supervised practical work experience with a food industry, research program or governmental agency to gain professional experience and insight into career opportunities. Prerequisite: Junior standing and consent. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.

FDSC 44103. Sensory Evaluation of Food. 3 Hours.
Principles and procedures for sensory evaluation of food. Appropriate uses of specific tests are discussed, along with physiological, psychological, and environmental factors affecting sensory verdicts. Lecture 2 hours, laboratory 2 hours per week. Corequisite: Lab component. Prerequisite: MATH 21003 or BUSI 10303 or STAT 28233 or PSYC 20103. (Typically offered: Fall)

FDSC 45103. Cereal Processing Technology. 3 Hours.
Fundamental concepts of heat and mass transport in grains; cereal/grain structure, property and composition; cereal/grain processing systems and technology; cereal/grain co-product processing technology and value recovery; cereal/grain quality metrics, grading standards and food safety assurance. Prerequisite: FDSC 31003 or FDSC 47504 or with instructor permission. (Typically offered: Spring Odd Years)

FDSC 45203. Brewing Science. 3 Hours.
The class is designed to give a thorough review of the biological and chemical processes involved in brewing beer and an appreciation for beer styles and flavors. Students will be introduced to industry professionals as well as employment opportunities that support the brewing industry from raw materials to packaged beer. Although not required, this course will be designed as a preparation course for students who may want to take an internationally recognized brewing exam/certificate such as the General Certificate in Brewing from the Institute of Brewing & Distilling (https://www.ibd.org.uk/ibd-qualifications/brewing-qualifications/general-certificate-in-brewing/). Prerequisite: (CHEM 14203 or CHEM 12103) and (BIOL 10103 or BIOL 10104). (Typically offered: Fall)

FDSC 47103. Product Innovation for the Food Scientist. 3 Hours.
This is a capstone course integrating knowledge developed in Food Science to the development of new food products. This course will take an integrated multidisciplinary approach to developing innovative food products and will provide learning experiences in new product development and Research & Development. Topics include product formulation, ingredient interactions, sensory analysis, packaging, labeling, food safety and food law. Corequisite: Lab component. Pre- or Corequisite: FDSC 41103 and FDSC 41101. Prerequisite: Senior standing, FDSC 43004, FDSC 31003, and FDSC 44103. (Typically offered: Spring)

FDSC 4720V. Special Topics in Food Science. 1-4 Hour.
Discussion focused on selected topics of particular fields of raw product physiology, food processing, chemistry, physiology, microbiology, evaluation, sensory analysis, and preservation. (Typically offered: Irregular) May be repeated for up to 4 hours of degree credit.

FDSC 47504. Engineering Principles of Food Processing. 4 Hours.
Basic mechanics of refrigeration, temperature controls, materials handling and mechanical problems as applied to foods and food processing. Lecture 3 hours, laboratory 3 hours per week. Corequisite: Lab component. Prerequisite: MATH 12003, MATH 24004, PHYS 20103, PHYS 20101 and FDSC 31003. (Typically offered: Spring)

FDSC 50001. Seminar. 1 Hour.
Presentation and discussion of graduate student research. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for up to 2 hours of degree credit.

FDSC 5090V. Special Problems Research. 1-6 Hour.
Original investigation on assigned problems in food science. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.

FDSC 51101. Food Analysis Lab. 1 Hour.
Laboratory exercises providing students with experience of analytical techniques and instrumentation used in food analysis. Laboratory 3 hours per week. Graduate degree credit will not be given for both FDSC 41101 and FDSC 51101. Corequisite: FDSC 41103 or FDSC 51103. Prerequisite: FDSC 43004 or FDSC 53004 and CHEM 14203 and CHEM 14201 and CHEM 26103 and CHEM 26101 or (CHEM 36053 and CHEM 36051). (Typically offered: Spring)

FDSC 51103. Food Analysis. 3 Hours.
Methods of analysis, instrumentation, and laboratory techniques for measuring the chemical composition of raw and value-added products. Lecture 3 hours. Graduate degree credit will not be given for both FDSC 41103 and FDSC 51103. Corequisite: FDSC 41101 or FDSC 51101. Prerequisite: FDSC 43004 or FDSC 53004 and CHEM 14203 and CHEM 14201 and CHEM 26103 and CHEM 26101 or (CHEM 36053 and CHEM 36051). (Typically offered: Spring)

FDSC 51201. Food Microbiology Lab. 1 Hour.
A hands-on laboratory course designed to teach students microbiological techniques and certain enumeration and plating techniques of specific food spoilage and pathogenic bacteria. Graduate degree credit will not be given for both FDSC 41201 and FDSC 51201. Prerequisite: BIOL 20003 and BIOL 20001. Pre- or Corequisite: FDSC 41202 or FDSC 51202 (formerly FDSC 41202). (Typically offered: Fall)

FDSC 51202. Food Microbiology. 2 Hours.
The study of food microbiology including classification/ taxonomy, contamination, preservation and spoilage of different kinds of foods, pathogenic microorganisms, food poisoning, sanitation, control and inspection and beneficial uses of microorganisms. Graduate degree credit will not be given for both FDSC 41202 and FDSC 51202. Prerequisite: BIOL 20003 and BIOL 20001 or BIOL 25473. (Typically offered: Fall)

FDSC 52203. Food Biosecurity. 3 Hours.
This course is the study of the security of agricultural products and the protection of our food supply from intentional and accidental, domestic and international contamination. Prerequisite: Graduate standing. (Typically offered: Spring Even Years)

FDSC 53004. Food Chemistry. 4 Hours.
Water, carbohydrates, lipids, proteins, vitamins, and minerals in foods; biochemical and functional properties, enzymes, food additives (emulsifiers, pigments, colors, flavors, preservatives, and sweeteners) and texture as related to properties in food systems and during processing. Lecture 3 hours, laboratory 3 hours per week. Graduate degree credit will not be given for both FDSC 43004 and FDSC 53004. Corequisite: Lab component. Prerequisite: CHEM 14203 and CHEM 14201 and CHEM 26103 and CHEM 26101 or (CHEM 36053 and CHEM 36051). (Typically offered: Fall)

FDSC 5310V. Food Science Internship. 1-3 Hour.
The Food Science Internship is a supervised practical work experience with a food industry, research program or governmental agency to gain professional experience and insight into career opportunities. Prerequisite: Completion of first year of graduate studies and instructor consent. (Typically offered: Fall, Spring and Summer) May be repeated for up to 3 hours of degree credit.

FDSC 54103. Sensory Evaluation of Food. 3 Hours.
Principles and procedures for sensory evaluation of food. Appropriate uses of specific tests are discussed, along with physiological, psychological, and environmental factors affecting sensory verdicts. Lecture 2 hours, laboratory 2 hours per week. Graduate degree credit will not be given for both FDSC 44103 and FDSC 54103. Corequisite: Lab component. Prerequisite: MATH 21003 or BUSI 10303 or AGST 50203 or STAT 28233 or PSYC 20103. (Typically offered: Fall)

FDSC 54203. Foodborne Diseases. 3 Hours.
This course will introduce students to the major pathogens associated with foodborne diseases, their epidemiology, and approaches to outbreak investigation and control of foodborne illness. An emphasis will be placed on understanding the relationships between the host, the etiologic agent, and the environment as they relate to disease causation. The student will gain knowledge through lectures, case studies, readings, and an individual project. An understanding of basic biology principles is expected for this course. (Typically offered: Summer Odd Years)

FDSC 55003. Safety and Sanitation for the Food Industry. 3 Hours.
This web-based course will provide an appreciation of the need for sanitation in food processing and increase the students' knowledge of sanitary techniques. Topics will include contamination sources, plant and equipment design, cleaners and sanitizers, HACCP, and food biosecurity. Also covered will be considerations in selecting, establishing and maintaining a sanitation program. An understanding of general microbiology and chemistry principles is expected for this course. (Typically offered: Summer Even Years)

FDSC 55103. Cereal Processing Technology. 3 Hours.
Fundamental concepts of heat and mass transport in grains; cereal/grain structure, property and composition; cereal/grain processing systems and technology; cereal/grain co-product processing technology and value recovery; cereal/grain quality metrics, grading standards and food safety assurance. Prerequisite: FDSC 31003 or FDSC 47504 or instructor permission. (Typically offered: Spring Odd Years)

FDSC 55203. Brewing Science. 3 Hours.
The class is designed to give a thorough review of the biological and chemical processes involved in brewing beer and an appreciation for beer styles and flavors. Students will be introduced to industry professionals as well as employment opportunities that support the brewing industry from raw materials to packaged beer. Although not required this course will be designed as a preparation course for students who may want to take an internationally recognized brewing exam/certificate. Prerequisite: (CHEM 14203 or CHEM 12103) and (BIOL 10103 or BIOL 10104). (Typically offered: Fall)

FDSC 57103. Product Innovation for the Food Scientist. 3 Hours.
This is a capstone course integrating knowledge developed in Food Science to the development of new food products. This course will take an integrated multidisciplinary approach to developing innovative food products and will provide learning experiences in new product development and Research & Development. Topics include product formulation, ingredient interactions, sensory analysis, packaging, labeling, food safety and food law. Graduate degree credit will not be given for both FDSC 47103 and FDSC 57103. Corequisite: Lab component. Pre- or Corequisite: FDSC 41103 or FDSC 51103 (formerly FDSC 41103) and FDSC 41101 or FDSC 51101 (formerly FDSC 41101). Prerequisite: FDSC 43004 or FDSC 53004 (formerly FDSC 43004), FDSC 31003, and FDSC 44103 or FDSC 54103 (formerly FDSC 44103). (Typically offered: Spring)

FDSC 57504. Engineering Principles of Food Processing. 4 Hours.
Basic mechanics of refrigeration, temperature controls, materials handling and mechanical problems as applied to foods and food processing. Lecture 3 hours, laboratory 3 hours per week. Graduate degree credit will not be given for both FDSC 47504 and FDSC 57504. Corequisite: Lab component. Prerequisite: MATH 12003, PHYS 20103, and PHYS 20101. (Typically offered: Spring Even Years)

FDSC 58203. Principles of Food Microbiology. 3 Hours.
This web-based course is a study of the fundamentals of food microbiology to include its history, classifications, spores and their importance, and the most common and serious pathogenic food microorganisms. Fermentation, spoilage microorganisms and control methodology are also discussed. (Typically offered: Fall Even Years)

FDSC 59803. Global Horticulture and Human Nutrition to Enhance Community Resilience and Food Security. 3 Hours.
This course covers three broad areas (Global Horticulture, Sustainable International Development, Human Health and Nutrition) and experts on three campuses created the instruction. The course is intended to be multi-disciplinary, and students should use their contextual knowledge to add to weekly discussions. Prerequisite: Graduate standing. (Typically offered: Spring Even Years)

FDSC 6000V. Master's Thesis. 1-6 Hour.
Master's Thesis. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

FDSC 6020V. Special Topics. 1-3 Hour.
Discussions focused on selected topics of particular fields of raw product physiology and food processing. chemistry, physiology, microbiology, evaluation, sensory analysis and preservation. Prerequisite: Graduate standing. (Typically offered: Irregular) May be repeated for degree credit.

FDSC 60303. Food Biochemistry. 3 Hours.
Biochemical characteristics, functions, regulation and impact of components in raw and processed foods of plant origin. Lecture/discussion 3 hours per week. Prerequisite: CHEM 38103. (Typically offered: Fall Odd Years)

FDSC 61403. Advanced Food Processing and Packaging and their Environmental Impact. 3 Hours.
The course is directed to graduate students in food science and related fields. Students will learn advanced food processing technologies and packaging as well as the environmental issues associated to food production, processing, and distribution. An understanding of basic food processing/food engineering principles and knowledge of food processing operations is expected for this course. (Typically offered: Spring)

FDSC 63203. Nutraceuticals and Functional Foods. 3 Hours.
Course will include past, present and future of nutraceuticals and functional foods, chemistry, mechanism, novel technologies, nutrigenomics, processing, healthy lifestyle, regulation, safety, marketing, international aspects, and industry project. Prerequisite: CHEM 26103 (or CHEM 36053) and CHEM 38103 and FDSC 43004 or instructor consent. (Typically offered: Spring Even Years)

FDSC 63403. Vitamin Nutrition and Metabolism. 3 Hours.
The vitamins required for humans and domestic animals for a healthy life with emphasis on absorption, transport, metabolism, biopotency, mechanism of action, tissue retention and turnover. Prerequisite: CHEM 38103. (Typically offered: Fall Odd Years)

FDSC 64003. Epidemiologic Principles in Food Safety and Public Health. 3 Hours.
This course will provide an introduction to epidemiologic methods used in foodborne disease outbreak investigations. The importance of surveillance systems in detecting outbreaks and in the development of effective disease prevention and control strategies will also be presented. An emphasis will be placed on understanding the relationships between the host, the etiologic agent, and the environment as they relate to disease causation. In addition, molecular methods utilized for the identification of etiologic agents will be discussed. Selected important foodborne diseases will be discussed in detail to clarify the role of epidemiology in understanding the pathogenesis of infectious processes in individuals and communities. Prerequisite: FDSC 41202 or FDSC 51202 or equivalent. (Typically offered: Fall Even Years)

FDSC 64403. Metabolism of Xenobiotics. 3 Hours.
This course is designed to provide in-depth knowledge of the integration of molecular, cellular, and physiologic aspects of xenobiotics (e.g phytochemicals)/micronutrients and metabolism. This course will also discuss the current understanding of the mechanism and regulation of gene expression by xenobiotics/micronutrients. Examination of current research literature to understand how xenobiotics/micronutrients and physiological states metabolize and influence gene expression, as well as the research methodology used to address these relations. Prerequisite: CHEM 38103. (Typically offered: Fall Even Years)

FDSC 66003. Chemosensory Perception and Measurement. 3 Hours.
This course is designed to address advanced techniques and current issues in sensory and consumer sciences, with a focus on chemosensory perception. This course consists of two main modules: I) anatomy and physiology of the chemosensory senses and II) measurement/analysis of chemosensory responses. This course includes both individual and group projects with an emphasis of four aspects of "C": "Concept," "Creativity," "Critical thinking skills," and "Communication." Prerequisite: FDSC 44103 or FDSC 54103. (Typically offered: Fall Odd Years)

FDSC 7000V. Doctoral Dissertation. 1-18 Hour.
The doctoral program in food science is an interdepartmental program offered by the departments of Food Science, Animal and Poultry Sciences, and Human Environmental Sciences. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.