Food Science (FDSC)

Courses

FDSC 1011. 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.

FDSC 1103. Introduction to Food Science. 3 Hours.
This course is designed to provide students with a general 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.

FDSC 2111. Math Elements for Food Science and Technology. 1 Hour.
Basic data interpretation and analysis, problem interpretation and equation formulation, manipulation of algebraic functions representing applications in food science and technology, predictive models and curve fittings to determine model constants applied in food science and processing. Pre- or Corequisite: MATH 2043 or MATH 2554.

FDSC 2401. 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.

FDSC 2401H. 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.

FDSC 2503. Food Safety and Sanitation. 3 Hours.
Principles of sanitation, cleaners and sanitizers, sanitary equipment and plant design, and microbial growth and control in food processing operations. Lecture/discussion/demonstrations, 3 hours per week. Students may not receive credit for both FDSC 2503 and FDSC 2523.

FDSC 2523. Sanitation and Safety in Food Processing Operations. 3 Hours.
Topics to be covered include understanding and control of microbial, chemical, and physical food hazards as well as emerging food safety issues. Course will include a study of cleaners and sanitizers and sanitary equipment and plant designs. Bioterrorism and food safety will also be discussed. Students may not receive credit for both FDSC 2523 and FDSC 2503. Web-based course.

FDSC 2603. Science in the Kitchen. 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.

FDSC 2701. 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.

FDSC 3103. 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 1123 and CHEM 1121L and (MATH 2043 or MATH 2554).

FDSC 3202. 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.

FDSC 3923H. Honors Molecular Gastronomy. 3 Hours.
Lecture, demonstration, and hands-on exercises will be used to explain and demonstrate selected principles of chemistry by utilizing a modern culinary approach. Hands-on exercises will provide students with experience in applying the knowledge learned from the class to explicate fundamental principles in chemistry. Demonstrations and hands-on exercises will take place during scheduled lecture time. High school physics and chemistry will be useful in this course.

FDSC 400V. Special Problems. 1-4 Hour.
Investigation of assigned problems in food science. Prerequisite: Junior standing.

FDSC 4111L. 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 4113. Prerequisite: FDSC 4304 and CHEM 1123 and CHEM 2613 and CHEM 2611L or (CHEM 3603 and CHEM 3601L).

FDSC 4113. 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 4111L. Prerequisite: FDSC 4304 and CHEM 1123 and CHEM 1121L and CHEM 2613 and CHEM 2611L or (CHEM 3603 and CHEM 3601L).

FDSC 4121L. 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. Pre- or Corequisite: FDSC 4122.

FDSC 4122. 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 2013 and BIOL 2011L or BIOL 2533. This course is cross-listed with BIOL 4122.

FDSC 4304. 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 1123 and CHEM 1121L and CHEM 2613 and CHEM 2611L or (CHEM 3603 and CHEM 3601L).
FDSC 431V. 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. May be repeated for up to 6 hours of degree credit.

FDSC 4333. Molecular Biology Techniques Applied to Nutrition and Food Science. 3 Hours.
This course will provide advanced knowledge on current molecular biology techniques and how they can be used in nutrition and food science. A specific emphasis will be given on learning how to understand and interpret results generated through these methods. Therefore, the course is of interest to a wider audience, as such analytic skills are valuable for a diverse array of disciplines. Methods covered will include DNA and RNA-based techniques (PCR, microarrays, sequencing, genomics and metagenomics), protein-based techniques (blots, proteomics) and other molecules-based techniques (metabolomics, immunoblots). Prerequisite: Junior or senior standing.

FDSC 4413. 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: STAT 2303 or WCOB 1033 or AGST 4023 or STAT 2023 or PSYC 2013.

FDSC 4563. Experiencing the Food Industry. 3 Hours.
This course will expose students to the food industry by providing insight into the food processing, packaging, distribution and retailing components of the food industry. The course will include local and regional food industry related tours. May be repeated for up to 6 hours of degree credit.

FDSC 4713. 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. Prerequisite: FDSC 4113 and FDSC 4111L. Prerequisite: Senior standing, FDSC 4304, FDSC 3103, and FDSC 4413.

FDSC 472V. 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. May be repeated for up to 4 hours of degree credit.

FDSC 4754. 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 1213, PHYS 2013, and PHYS 2011L.

FDSC 4823. 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 microbiology and control methodology are also discussed.

FDSC 5001. Seminar. 1 Hour.
Presentation and discussion of graduate student research. Prerequisite: Graduate standing. May be repeated for up to 2 hours of degree credit.

FDSC 509V. Special Problems Research. 1-6 Hour.
Original investigation on assigned problems in food science. Prerequisite: Graduate standing. May be repeated for up to 6 hours of degree credit.

FDSC 5111L. Food Analysis Lab. 1 Hour.
(Formerly FDSC 4111L) 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 4111L and FDSC 5111L. Corequisite: FDSC 4113 or FDSC 5113 (formerly FDSC 4113). Prerequisite: FDSC 4304 or FDSC 5304 (formerly FDSC 4304) and CHEM 1123 and CHEM 1121L and CHEM 2613 and CHEM 2611L or (CHEM 3603 and CHEM 3601L).

FDSC 5113. Food Analysis. 3 Hours.
(Formerly FDSC 4113.) 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 4113 and FDSC 5113. Corequisite: FDSC 4111L or FDSC 5111L (formerly FDSC 4111L). Prerequisite: FDSC 4304 or FDSC 5304 (formerly FDSC 4304) and CHEM 1123 and CHEM 1121L and CHEM 2613 and CHEM 2611L or (CHEM 3603 and CHEM 3601L).

FDSC 5121L. Food Microbiology Lab. 1 Hour.
(Formerly FDSC 4121L) 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 4121L and FDSC 5121L. Pre- or Corequisite: FDSC 4122 or FDSC 5122 (formerly FDSC 4122).

FDSC 5122. Food Microbiology. 2 Hours.
(Formerly FDSC 4122.) 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 4122 and FDSC 5122. Prerequisite: BIOL 2013 and 2011L or BIOL 2533.

FDSC 5223. 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.

FDSC 5304. Food Chemistry. 4 Hours.
(Formerly FDSC 4304.) 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 4304 and FDSC 5304. Corequisite: Lab component. Prerequisite: CHEM 1123 and CHEM 1121L and CHEM 2613 and CHEM 2611L or (CHEM 3603 and CHEM 3601L).

FDSC 531V. Internship in Food Science. 1-4 Hour.
(Formerly FDSC 431V.) 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. Graduate degree credit will not be given for both FDSC 431V and FDSC 531V. Prerequisite: Completion of first year of graduate studies and instructor consent. May be repeated for up to 4 hours of degree credit.

FDSC 5333. Molecular Biology Techniques Applied to Nutrition and Food Science. 3 Hours.
This course will provide advanced knowledge on current molecular biology techniques and how they can be used in nutrition and food science. A specific emphasis will be given on learning how to understand and interpret results generated through these methods. Therefore, the course is of interest to a wider audience, as such analytic skills are valuable for a diverse array of disciplines. Methods covered will include DNA and RNA-based techniques (PCR, microarrays, sequencing, genomics and metagenomics), protein-based techniques (blots, proteomics) and other molecules-based techniques (metabolomics, immunoblots). Prerequisite: Graduate standing.
FDSC 5413. Sensory Evaluation of Food. 3 Hours.
(Formerly FDSC 4413.) 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 4413 and FDSC 5413. Corequisite: Lab component. Prerequisite: STAT 2303 or WCOB 1033 or AGST 4023 or AGST 5023 (formerly AGST 4023) or STAT 2023 or PSYC 2013.

FDSC 5423. 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. Prerequisite: BIOL 1543 or equivalent.

FDSC 5503. 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. Prerequisite: General Microbiology or Food Microbiology; General Chemistry.

FDSC 5563. Experiencing the Food Industry. 3 Hours.
(Formerly FDSC 4563.) This course will expose students to the food industry by providing insight into the food processing, packaging, distribution and retailing components of the food industry. The course will include local and regional food industry related tours. Graduate degree credit will not be given for both FDSC 4563 and FDSC 5563. May be repeated for up to 6 hours of degree credit.

FDSC 5713. Product Innovation for the Food Scientist. 3 Hours.
(Formerly FDSC 4713.) 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 4713 and FDSC 5713. Corequisite: Lab component. Pre- or Corequisite: FDSC 4113 or FDSC 5113 (formerly FDSC 4113) and FDSC 4111L or FDSC 5111L (formerly FDSC 4111L). Prerequisite: FDSC 4304 or FDSC 5304 (formerly FDSC 4304), FDSC 3103, and FDSC 4413 or FDSC 5413 (formerly FDSC 4413).

FDSC 5754. Engineering Principles of Food Processing. 4 Hours.
(Formerly FDSC 4754.) 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 4754 and FDSC 5754. Corequisite: Lab component. Prerequisite: MATH 1213, PHYS 2013, and PHYS 2011L.

FDSC 5823. Principles of Food Microbiology. 3 Hours.
(Formerly FDSC 4823.) 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. Graduate degree credit will not be given for both FDSC 4823 and FDSC 5823.

FDSC 600V. Master's Thesis. 1-6 Hour.
Master's Thesis. Prerequisite: Graduate standing. May be repeated for degree credit.

FDSC 602V. 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. May be repeated for degree credit.

FDSC 6033. 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 3813.

FDSC 6123. Food Carbohydrate Chemistry. 3 Hours.
Focus is on carbohydrate chemistry including molecular structures and physical properties, production and food applications, analytical methods for food carbohydrates, and interactions among food polysaccharides. Prerequisite: FDSC 4304 or FDSC 5304 (formerly FDSC 4304).

FDSC 6133. Food Lipid Chemistry. 3 Hours.
Chemistry and technology of commercial fats and oils in food systems with discussion of lipid changes affecting food quality and human health. Prerequisite: FDSC 4304 or FDSC 5304 (formerly FDSC 4304).

FDSC 6143. 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. Prerequisite: FDSC 3103 or equivalent, or food processing/engineering background with knowledge of basic food processing operations.

FDSC 6233. 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 2613 (or CHEM 3603) and CHEM 3813 and FDSC 4304 or instructor consent.

FDSC 6333. Food Protein Chemistry and Functionality. 3 Hours.
This course is a study in advanced food protein chemistry, including molecular structures, characterization, physicochemical bases of food protein functionality, structure-function relationship, processing technologies to improve functionality, as well as hands-on experiences with timely, practical projects related to food proteins. Lecture and problem solving projects for 3 hours per week. Pre- or Corequisite: FDSC 4304 or FDSC 5304 (formerly FDSC 4304).

FDSC 6403. 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 4122 or FDSC 5122 (formerly FDSC 4122) or equivalent.
FDSC 6443. 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 3813.

FDSC 700V. 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. May be repeated for degree credit.