

FOOD SCIENCE (GRADUATE GROUP)

College of Agricultural & Environmental Sciences

Maria L. Marco, Ph.D., Chairperson of the Group

Group Office

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Faculty

Includes members from nine departments in the Colleges of Agricultural & Environmental Sciences, Letters & Science, and Engineering, and the Schools of Medicine and Veterinary Medicine.

- Food Science, Master of Science (<https://catalog.ucdavis.edu/departments-programs-degrees/food-science-graduate-group/food-science-ms/>)
- Food Science, Doctor of Philosophy (<https://catalog.ucdavis.edu/departments-programs-degrees/food-science-graduate-group/food-science-phd/>)

Food Science & Technology (FST)

FST 201 – Food Chemistry & Biochemistry (4 units)

Course Description: Advanced topics in food chemistry and biochemistry, emphasizing the application of the basic principles of chemistry and biochemistry to food composition, properties, preservation and processing. Chemical structures, interactions, reaction mechanisms and experimental methods are stressed.

Prerequisite(s): Undergraduate courses in organic chemistry and biochemistry; undergraduate course in food chemistry is recommended.

Learning Activities: Lecture 4 hour(s).

Enrollment Restriction(s): Restricted to Food Science graduate level standing or consent of instructor.

Grade Mode: Letter.

FST 202 – Physical Chemistry of Foods (4 units)

Course Description: Fundamental principles of chemistry and physics are applied to a study of changes in water binding properties and activity, changes in proteins, nutrients, toxic constituents, and other compounds during storage, heating, freezing, dehydrating, and concentrating of food materials.

Prerequisite(s): CHE 107A; CHE 107B; BIS 102 recommended.

Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).

Grade Mode: Letter.

FST 203 – Food Processing (4 units)

Course Description: Principles of food engineering applied to food processing. Relationship of Newtonian and non-Newtonian fluid properties to heat and momentum transfer. Application of mass transfer in controlling kinetics and quality changes of foods.

Prerequisite(s): FST 110A; PHY 007C; CHE 107B; or consent of instructor.

Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).

Grade Mode: Letter.

FST 204 – Advanced Food Microbiology (4 units)

Course Description: Principles and recent developments in food microbiology. Mechanisms of foodborne disease, pathogen detection, parameters of microbial growth and control in foods, intestinal microbiology including probiotics and prebiotics, and the microbiology of food and beverage fermentations.

Prerequisite(s): Undergraduate level coursework in microbiology, or consent of instructor.

Learning Activities: Lecture 3 hour(s), Discussion 1 hour(s).

Grade Mode: Letter.

FST 205 – Industrial Microbiology (3 units)

Course Description: Use of microorganisms for producing substances such as amino acids, peptides, enzymes, antibiotics and organic acids. Emphasis on metabolic regulation of pathways leading to fermentation products, on yeast fermentations, and on genetic manipulations (including recombinant DNA techniques) of industrial microorganisms.

Prerequisite(s): BIS 001A; BIS 102; BIS 103; MIC 130A and MIC 130B or BIS 101 recommended.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

FST 207 – Advanced Sensory-Instrumental Analyses (3 units)

Course Description: Basic principles of measurement of color, texture, and flavor of foods by sensory and instrumental methods. Advanced statistical analysis of relation of colorimetry, texturometry, and chemistry of volatile compounds to perception of appearance, texture, flavor.

Prerequisite(s): FST 107; and consent of instructor.

Learning Activities: Lecture 2 hour(s), Laboratory 3 hour(s).

Grade Mode: Letter.

FST 210 – Proteins: Functional Activities & Interactions (3 units)

Course Description: Relationships of structure of proteins to their biological functions. Structural proteins, complexing proteins, and catalytic proteins in plant and animal materials and products.

Prerequisite(s): BIS 103.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

FST 211 – Lipids: Chemistry & Nutrition (3 units)

Course Description: Chemistry of lipids as it pertains to research in food and nutrition. Relations between lipid structure and their physical properties in tissues and foods. Regulation of absorption, transport, and metabolism of lipids. Implications of dietary fats and health.

Prerequisite(s): BIS 103; CHE 107B; CHE 128B.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

FST 213 – Flavor Chemistry of Foods & Beverages (3 units)

Course Description: Become familiar with basic principles of flavor chemistry, analysis, and formation in fresh and processed foods.

Required to read and critically evaluate flavor chemistry literature.

Prerequisite(s): CHE 008B; VEN 123; (VEN 123L or FST 103); or consent of instructor.

Learning Activities: Lecture/Discussion 3 hour(s).

Cross Listing: VEN 213.

Grade Mode: Letter.

FST 217 – Advanced Food Sensory Science (3 units)

Course Description: Advanced study of the techniques and theory of the sensory measurement of food as an analytical tool and as a measure of consumer perception and acceptance. Advanced examination of the sensory and cognitive systems associated with the perception of food.

Prerequisite(s): FST 107 (can be concurrent); or consent of instructor.

Learning Activities: Lecture 3 hour(s).

Grade Mode: Letter.

FST 219 – Biochemistry, Microbiology & Technology of Cheeses of the World (4 units)

Course Description: Compositional and physico-chemical aspects of milk and their implications on cheesemaking; enzymatic, microbiological and physical aspects of cheesemaking; cheese as a biological composite; designing cheese quality attributes; cheese aging. Cheese from all over the world tasted and discussed.

Prerequisite(s): FST 119; (BIS 103 or FST 100A); FST 123; BIS 103; CHE 107B; CHE 128B; or consent of instructor.

Learning Activities: Lecture 4 hour(s).

Enrollment Restriction(s): Restricted to graduate level students or senior undergraduate students with appropriate background in biochemistry and microbiology.

Grade Mode: Letter.

FST 227 – Food Perception & the Chemical Senses (2 units)

Course Description: Examination of the anatomy and physiology of the chemical senses (taste, smell, and the trigeminal senses) and how they are involved in the perception of food and food intake.

Prerequisite(s): FST 107B (can be concurrent); and consent of instructor.

Learning Activities: Lecture 2 hour(s).

Grade Mode: Letter.

FST 228 – Sustainable Food Systems (3 units)

Course Description: Environmental impacts of food systems. Methods for quantifying resource use and managing waste for food production and processing. Influence of policies, technologies, and consumer demand on advancing sustainable food systems.

Learning Activities: Lecture/Discussion 3 hour(s).

Grade Mode: Letter.

FST 230 – Food & Gut Microbiota (4 units)

Course Description: Impact of specific food structures on the structure and function of the animal gut microbiota. How food is transformed by, and modulates, the gut microbiota to provide the host with nutrients and protection.

Prerequisite(s): Microbiology and molecular biology undergraduate coursework or consent of instructor.

Learning Activities: Lecture 1.50 hour(s), Discussion 1.50 hour(s), Term Paper.

Enrollment Restriction(s): Upper division or graduate standing.

Grade Mode: Letter.

FST 259 – Design Thinking of Food (4 units)

Course Description: Tools of design thinking as applied to high-impact, food-related challenges through a multi-disciplinary team based, experiential learning process. Application of the field of food studies to the social and cultural contexts of eating habits, food systems, and the design solutions that respond to these factors. Working with stakeholders to design innovative solutions to food system challenges.

Learning Activities: Lecture/Discussion 3 hour(s); Fieldwork.

Enrollment Restriction(s): Open to Graduate students only.

Grade Mode: Letter.

FST 290 – Seminar (1 unit)

Course Description: Seminar.

Learning Activities: Seminar 1 hour(s).

Repeat Credit: May be repeated.

Grade Mode: Satisfactory/Unsatisfactory only.

FST 290C – Advanced Research Conference (1 unit)

Course Description: Critical presentation and evaluation of original research by graduate students. Planning of research programs and proposals. Discussion led by individual major instructors for their research group.

Prerequisite(s): Consent of instructor; graduate standing.

Learning Activities: Discussion 1 hour(s).

Grade Mode: Satisfactory/Unsatisfactory only.

FST 291 – Advanced Food Science Seminar (1 unit)

Course Description: Oral presentation of student's original research, discussion, and critical evaluation.

Prerequisite(s): FST 290; completion of at least one quarter of FST 290.

Learning Activities: Seminar 1 hour(s).

Grade Mode: Satisfactory/Unsatisfactory only.

FST 298 – Group Study (1-5 units)

Course Description: Group study.

Learning Activities: Variable.

Grade Mode: Satisfactory/Unsatisfactory only.

FST 299 – Research (1-12 units)

Course Description: Research.

Prerequisite(s): Consent of instructor; graduate standing.

Learning Activities: Variable.

Grade Mode: Satisfactory/Unsatisfactory only.