FOOD SCIENCE (FOOD SCI)

FOOD SCI 1 — COOPERATIVE EDUCATION/CO-OP IN FOOD SCIENCE
1 credit.

Full-time off-campus work experience which combines classroom theory with practical knowledge of operations to provide students with a background upon which to base a professional career. Students receive credit only for the term in which they are actively enrolled and working. The same work experience may not count towards credit in Food Sci 399.

Requisites: So st, and consent of supervising instructor and academic advisor.
Repeatable for Credit: No

FOOD SCI 120 — SCIENCE OF FOOD
3 credits.

Lecture. Relationship between food, additives, processing and health. How foods are processed. Current food controversies.

Requisites: None
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Elementary
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No

FOOD SCI 201 — DISCOVERING FOOD SCIENCE
1 credit.

Introduction to the food industry for incoming (freshmen and transfers) Food Science majors. Provides a brief introduction to the different areas of study and career opportunities within the food industry.

Requisites: Fr or So st or cons inst
Repeatable for Credit: No

FOOD SCI 289 — HONORS INDEPENDENT STUDY
1-2 credits.

Inter-Ag 288
Requisites: Enrolled in the CALS Honors Program Sophomore or Junior standing.
Course Designation: Honors - Honors Only Courses (H)
Repeatable for Credit: Yes, unlimited number of completions

FOOD SCI 299 — INDEPENDENT STUDY
1-3 credits.

Requisites: Open to Freshmen, Sophomore or Junior standing written consent of instructor
Repeatable for Credit: Yes, unlimited number of completions

FOOD SCI 301 — INTRODUCTION TO THE SCIENCE AND TECHNOLOGY OF FOOD
3 credits.

Introduction to the science and the technology of food manufacture. Course covers the basic chemical, physical and microbiological properties of food and manipulation of these properties in the manufacture of food products.

Requisites: Declared major in Food Science, Nutritional Sciences (Dietetics, International Agriculture and Natural Resources) or Biological Systems Engineering; and algebra, 1 semester of general chemistry, and 1 semester biology, or concurrent registration, or consent of instructor
Repeatable for Credit: No

FOOD SCI/AN SCI 305 — INTRODUCTION TO MEAT SCIENCE AND TECHNOLOGY
4 credits.

Application of biological, technological, and economical principles to muscle and related tissue utilized for food.

Requisites: Zoo 101102, or Zoo 151152, CHEM 103
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No

FOOD SCI/AN SCI 321 — FOOD LAWS AND REGULATIONS
1 credit.

Food laws and regulations, regulatory and commercial grading standards used in the food industry.

Requisites: Jr st or cons inst
Repeatable for Credit: No

FOOD SCI/MICROBIO 324 — FOOD MICROBIOLOGY LABORATORY
2 credits.

Lab exercises dealing with food preservation, spoilage, and food poisoning. Isolation, identification and quantification of specific microbes occurring in foods, and food fermentations by bacteria and yeast.

Requisites: (MICROBIO 102 or MICROBIO 304) and MICROBIO/FOOD SCI/ MICROBIO 325 or concurrent enrollment
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI/MICROBIO 325 — FOOD MICROBIOLOGY
3 credits.

Principles of food preservation, epidemiology of foodborne illness, agents of foodborne illness, food fermentations and biotechnology.

Requisites: MICROBIO 101, MICROBIO 303, or M M & I 301
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017
FOOD SCI 375 — SPECIAL TOPICS
1-3 credits.

Subjects of current interest to undergraduates.
Requisites: None
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Spring 2018

FOOD SCI 399 — COORDINATIVE INTERNSHIP/COOPERATIVE EDUCATION
1-8 credits.

Requisites: So or Jr or Sr st cons supervising inst, advisor internship coordinator
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S Workplace - Workplace Experience Course
Repeatable for Credit: Yes, unlimited number of completions

FOOD SCI 400 — STUDY ABROAD IN FOOD SCIENCE
1-6 credits.

Provides an area equivalency for courses taken on Madison Study Abroad Programs that do not equate to existing UW courses. Enroll Info: Current enrollment in a UW-Madison study abroad program
Requisites: None
Repeatable for Credit: Yes, unlimited number of completions

FOOD SCI 410 — FOOD CHEMISTRY
3 credits.

Nature and chemical behavior of food constituents including proteins, lipids, carbohydrates, water, and enzymes.
Requisites: Food Sci 301 (BC or better); CHEM 343 concurrent registration in BIOCHEM 501 or consent of instructor or ABE or PAE degree classification CHEM 343
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI 412 — FOOD ANALYSIS
4 credits.

Lecture and lab. Application of quantitative techniques to the determination of composition and quality of food products.
Requisites: STAT 301 or 371 (or equivalent) Food Sci 410, or consent of instructor
Repeatable for Credit: No

FOOD SCI 432 — PRINCIPLES OF FOOD PRESERVATION
3 credits.

Fundamentals of food preservation methods: post-harvest, thermal processing, refrigeration and freezing, control of water activity, chemical preservation, nonthermal methods and control of food packaging.
Requisites: FOOD SCI/MICROBIO/FOOD SCI 325, FOOD SCI 410 and 440; or declared in Biological Systems Engineering and FOOD SCI/MICROBIO/FOOD SCI 325 and FOOD SCI 410
Repeatable for Credit: No

FOOD SCI 437 — FOOD SERVICE OPERATIONS
3 credits.

Principles and methods of technical operations in quantity foodservice systems; menu planning, purchasing, production, service and cost control.
Requisites: Students in the dietetics program be ADI approved as a new prerequisite for this course and have taken Food Science 301
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI 438 — FOOD SERVICE OPERATIONS LAB
1 credit.

Procurement and production methods used to control costs in foodservice operations; field trips.
Requisites: Con reg Food Sci 437
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI 440 — PRINCIPLES OF FOOD ENGINEERING
3 credits.

Lecture. Application of engineering principles in the analysis of food process operations: properties of gases and vapors, psychrometrics, material and energy balances, fluid flow, heat transfer, microwave heating, mass transfer, packaging film permeability, dehydration.
Requisites: Food Sci 301 (BC or better); MATH 211 or MATH 221 (or equivalent); PHYSICS 103 (or equivalent); or consent of instructor
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI/BSE/M E 441 — RHEOLOGY OF FOODS AND BIOMATERIALS
3 credits.

Fundamentals of rheology and rheological evaluations of food and biomaterials; structure-function relationships.
Requisites: PHYSICS 201 or CBE/B M E 320 or ME 363 or cons inst
Repeatable for Credit: No

FOOD SCI 464 — STATISTICS FOR FOOD INDUSTRY QUALITY CONTROL
3 credits.

Application of statistics for the purpose of monitoring and controlling food industry production. Applications of discrete and continuous distributions as tools for inferring production quality and efficiency. Topics include hypothesis formation and testing, confidence intervals, and graphics for presentation.
Requisites: Stat 201 or equiv
Repeatable for Credit: No
FOOD SCI/AN SCI/DY SCI/SOIL SCI 472 — ANIMAL AGRICULTURE AND GLOBAL SUSTAINABLE DEVELOPMENT
1 credit.

This course examines issues related to global agriculture and healthy sustainable development. Using a regional approach and focusing on crops and livestock case studies, students will learn the interdependence between US agriculture and agriculture in emerging economies. Some topics covered include population and food, immigration, the environment; crop and livestock agriculture; global trade; sustainability; food security, the role of women in agriculture, and the role of dairy products in a healthy diet.

Requisites: None
Repeatable for Credit: No

FOOD SCI/AN SCI/DY SCI/SOIL SCI 473 — INTERNATIONAL FIELD STUDY IN ANIMAL AGRICULTURE AND SUSTAINABLE DEVELOPMENT
2 credits.

This course is the field study component to DY SCI/AN SCI/FOOD SCI/SOIL SCI 472, which examines issues related to global agriculture and healthy sustainable development. Using a regional approach and focusing on crops and livestock case studies, students will learn the interdependence between US agriculture and agriculture in emerging economies. Some topics covered include population and food, immigration, the environment; crop and livestock agriculture; global trade; sustainability; and the role of women in agriculture and the role of dairy products in a healthy diet.

Requisites: DY SCI/AN SCI/FOOD SCI/SOIL SCI 472
Repeatable for Credit: No

FOOD SCI 511 — CHEMISTRY AND TECHNOLOGY OF DAIRY PRODUCTS
3 credits.

Chemistry of milk components (i.e. protein, lipids, carbohydrate, salts, enzymes) with an emphasis on chemical and physical changes that occur during the manufacture of a range of milk products (i.e. ice cream, butter, cheese). Dairy technology and microbiological quality.

Requisites: Food Sci 410, or consent of instructor
Repeatable for Credit: No

FOOD SCI 512 — PRINCIPLES OF FOOD CHEMISTRY-LAB
2 credits.

Lectures and demonstrations on methodology in food chemistry; experiments on the chemistry of organic constituents; lipids, proteins, carbohydrates and other organic constituents of foods.

Requisites: Food Sci 410 or consent of instructor
Repeatable for Credit: No
Last Taught: Fall 2009

FOOD SCI 514 — INTEGRATED FOOD FUNCTIONALITY
4 credits.

Molecular basis of food functional properties; impact of ingredients and processing on functional properties (texture, flavor, nutrition and structure); design of new or reformulating foods to meet specific quality expectations.

Requisites: Food Sci 602 or cons inst
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level - Intermediate
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: No

FOOD SCI/AN SCI 515 — COMMERCIAL MEAT PROCESSING
2 credits.

Principles and procedures in the commercial manufacture of processed meat products; sausage manufacturing, curing, smoking, freezing and packaging. Zool 101 102, or Zool 151 152 (recommended); CHEM 103
Requisites: An Sci 305 or Food Sci 410 or cons inst.
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI 532 — INTEGRATED FOOD MANUFACTURING
4 credits.

Procedures used to process and preserve foods on a commercial basis, with emphasis on concentration, dehydration and fractionation process, plant sanitation/HACCP/GMP, statistical process control, and environmental impacts..

Requisites: Declared in Food Science or Biological Systems Engineering; and FOOD SCI 432
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI 535 — CONFECTIONERY SCIENCE AND TECHNOLOGY
3 credits.

Through a combination of on-line lectures, classroom activities, evaluation of commercial samples and discovery-based labs, the science and technology of confections from hard candy to chocolate will be covered.

Requisites: FOOD SCI 410 and FOOD SCI 432
Repeatable for Credit: No
Last Taught: Fall 2017

FOOD SCI 537 — ORGANIZATION AND MANAGEMENT OF FOOD AND NUTRITION SERVICES
3 credits.

Lecture. Principles of organization; the management process in foodservice systems; allocation of resources; budget development, personnel supervision and evaluation.

Requisites: Food Sci 437 M H R 300
Repeatable for Credit: No
**FOOD SCI/BSE 542 — FOOD ENGINEERING OPERATIONS**  
4 credits.

Lectures and experiments in food engineering operations selected from topics such as: thermodynamics, transport processes, biological kinetics and bioreactor design, thermal process calculations, separation processes, process instrumentation and control, process design and economics, and the use of computers.  
**Requisites:** Food Sci 440, Sr st, or cons inst  
**Course Designation:** Gen Ed - Quantitative Reasoning Part B  
Breadth - Biological Sci. Counts toward the Natural Sci req  
Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
**Repeatable for Credit:** No

**FOOD SCI 550 — FERMENTED FOODS AND BEVERAGES**  
2 credits.

Lecture. Chemistry, microbiology, and technology of foods and beverages in which fermentations are important (e.g. cheese, bread, pickles, beer). Fermentation techniques in developing new foods and food additives. Instrumentation and mechanization of food fermentations. Field trips.  
**Requisites:** BIOCHEM 501 or consent of instructor  
**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req  
Level - Advanced  
L&S Credit - Counts as Liberal Arts and Science credit in L&S  
**Repeatable for Credit:** No

**FOOD SCI 551 — FOOD FERMENTATION LABORATORY**  
1 credit.

Offers students the opportunity to learn to produce fermented beverages and dairy products in laboratory and scalable production facilities. Individual labs are designed to introduce students to the chemical and physical basis for development of specific characteristics associated with individual styles of products as well as analytical methods to qualify those characteristics. Course is intended for students who are 21 years of age or older and have completed or are concurrently enrolled in FOOD SCI 550.  
**Requisites:** Consent of Instructor  
**Repeatable for Credit:** No

**FOOD SCI 552 — FOOD FERMENTATION LABORATORY: THE SCIENCE OF WINE**  
1 credit.

Designed to provide students with opportunities to apply and further develop their understanding of fermentation science through the production and analysis of wine. Students learn to produce wine at the laboratory and commercial scale. Individual labs are designed to introduce students to the chemical constituents of wine through laboratory analysis. Enroll info: Course is intended for students who are 21 years of age or older and have completed or are concurrently enrolled in FOOD SCI 550.  
**Requisites:** Consent of Instructor  
**Repeatable for Credit:** No

**FOOD SCI 600 — PROFESSIONAL PRACTICE IN FOOD SCIENCE**  
1 credit.

Addresses information retrieval, use of statistics in experimental design, professional responsibility and ethics; mechanics of writing technical reports and giving oral presentations; proposal writing; creative thinking and problem-solving.  
**Requisites:** Sr or Grad st  
**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement  
**Repeatable for Credit:** No

**FOOD SCI 602 — SENIOR PROJECT**  
2 credits.

Part one of senior capstone requirement. Working as teams, students conduct research around a problem pertinent to the food industry. Weekly discussions plus laboratory. Data collection and analysis and report writing are critical components of this course.  
**Requisites:** Food Sci 412 Sr st in food sci, or cons inst  
**Repeatable for Credit:** No  
**Last Taught:** Fall 2017

**FOOD SCI 603 — SENIOR SEMINAR**  
1 credit.

Part two of senior capstone requirement. Students will present data gathered and analyzed as part of the senior project.  
**Requisites:** FOOD SCI 602  
**Course Designation:** Gen Ed - Communication Part B  
**Repeatable for Credit:** No

**FOOD SCI 610 — FOOD PROTEINS**  
2 credits.

Lecture. Protein structure and functions; techniques of protein isolation and characterization; functional properties important in food processing.  
**Requisites:** BIOCHEM 501 or 601 cons inst  
**Repeatable for Credit:** No

**FOOD SCI 611 — CHEMISTRY AND TECHNOLOGY OF DAIRY PRODUCTS**  
3 credits.

Chemistry of milk components (i.e. protein, lipids, carbohydrate, salts, enzymes) with an emphasis on chemical and physical changes that occur during the manufacture of a range of milk products (i.e. ice cream, butter, cheese). Dairy technology and microbiological quality.  
**Requisites:** Food Sci 310 or consent of instructor  
**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement  
**Repeatable for Credit:** No
FOOD SCI/BSE 642 — FOOD AND PHARMACEUTICAL SEPARATIONS
3 credits.

Basic principles of production-scale separation processes in the food and pharmaceutical industries including gravity sedimentation and centrifugation, extraction, adsorption, chromatography, precipitation, conventional and membrane filtration, crystallization, and drying. Third credit adds group term project, integrating principles with experiments, defined by students' interests.

Requisites: None
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Spring 2017

FOOD SCI/MICROBIO 650 — ADVANCED MICROBIOLOGY OF FOODBORNE PATHOGENS
3 credits.

Infectious and toxigenic agents of foodborne disease; detection, identification, and control methods; ecology and survival strategies of pathogens in foods; virulence mechanisms of foodborne pathogens.

Requisites: Bact/Food Sci 325 or cons inst
Course Designation: Breadth - Biological Sci. Counts toward the Natural Sci req
Level: Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No

FOOD SCI 681 — SENIOR HONORS THESIS
2-4 credits.

Requisites: Honors program candidacy
Course Designation: Honors - Honors Only Courses (H)
Repeatable for Credit: No

FOOD SCI 682 — SENIOR HONORS THESIS
2-4 credits.

Continuation of 681.

Requisites: Honors program candidacy Food Sci 682
Course Designation: Honors - Honors Only Courses (H)
Repeatable for Credit: No

FOOD SCI 699 — SPECIAL PROBLEMS
1-3 credits.

Requisites: Consent of instructor
Course Designation: Level - Advanced
L&S Credit - Counts as Liberal Arts and Science credit in L&S
Repeatable for Credit: Yes, unlimited number of completions

FOOD SCI 718 — COLLOID CHEMISTRY OF FOODS
2 credits.

Application of principles of colloid chemistry to various food colloids, for example, casein, milk fat globules, gelatin, gluten, starch. These systems are studied from the following standpoints: size distribution; transport behavior; suspension stability.

Requisites: CHEM 561 or 565 or equiv; BIOCHEM 501 or equiv
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No
Last Taught: Fall 2010

FOOD SCI 799 — PRACTICUM IN FOOD SCIENCE TEACHING
1-3 credits.

Teaching experience for PhD candidates.

Requisites: Consent of instructor
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: No

FOOD SCI 875 — SPECIAL TOPICS
1-3 credits.

New graduate and courses of current interest.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions
Last Taught: Fall 2016

FOOD SCI 900 — SEMINAR ADVANCED
1 credit.

Research literature and current departmental research.

Requisites: Food Sci 600 or equiv
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions

FOOD SCI 990 — RESEARCH
1-12 credits.

Requisites: Graduate or professional standing
Course Designation: Grad 50% - Counts toward 50% graduate coursework requirement
Repeatable for Credit: Yes, unlimited number of completions