

# FOOD SCIENCE (FOOD SCI)

## FOOD SCI 120 – SCIENCE OF FOOD

3 credits.

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

**Last Taught:** Summer 2023

## FOOD SCI 140 – THE CHOCOLATE EXPERIENCE: SCIENCE, SOCIETY, AND SUSTAINABILITY

3 credits.

Learn about the history of cocoa and chocolate production, the cultivation of cocoa and processing of cocoa beans to the production of chocolate from cocoa beans. Other topics covered include nutrition and health aspects of cocoa and chocolate consumption and socioeconomic and sustainability issues in cocoa production.

**Requisites:** None

**Repeatable for Credit:** No

**Last Taught:** Summer 2023

## FOOD SCI 150 – FERMENTED FOOD AND BEVERAGES: SCIENCE, ART AND HEALTH

3 credits.

Explores the science behind fermented food and beverages, popularized by brewing, winemaking and breadmaking at home and in retail. Introduces the scientific principles that underlie food and beverage processing through fermentation. Covers how basic sciences such as chemistry, biochemistry and microbiology influence the process and desired outcomes when fermenting vegetables, milk, fruit, and grains.

**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

**Last Taught:** Summer 2023

## FOOD SCI 201 – DISCOVERING FOOD SCIENCE

1 credit.

Provides a brief introduction to the different areas of study and career opportunities within the food industry.

**Requisites:** None

**Repeatable for Credit:** No

**Last Taught:** Spring 2023

## FOOD SCI 289 – HONORS INDEPENDENT STUDY

1-2 credits.

Research work for honors students under direct guidance of a faculty member in an area encompassing Food Science. Students are responsible for arranging the work and credits with the supervising instructor.

**Requisites:** Consent of instructor

**Course Designation:** Honors - Honors Only Courses (H)

**Repeatable for Credit:** Yes, unlimited number of completions

## FOOD SCI 299 – INDEPENDENT STUDY

1-3 credits.

Research work for students under direct guidance of a faculty member in an area encompassing Food Science. Students are responsible for arranging the work and credits with the supervising instructor.

**Requisites:** Consent of instructor

**Repeatable for Credit:** Yes, unlimited number of completions

**Last Taught:** Summer 2023

## FOOD SCI 301 – INTRODUCTION TO THE SCIENCE AND TECHNOLOGY OF FOOD

3 credits.

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

**Requisites:** (MATH 112, 114 or 217) and (CHEM 103, 109 or 115) and (ZOOLOGY/BIOLOGY 101, 102, BOTANY/BIOLOGY 130, or ZOOLOGY/BIOLOGY/BOTANY 151) or (BSE 349 or concurrent enrollment)

**Repeatable for Credit:** No

**Last Taught:** Spring 2023

## 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:** (ZOOLOGY/BIOLOGY/BOTANY 152 or ZOOLOGY/BIOLOGY 101 and 102) and (CHEM 103, 109, or 115) or graduate/professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**Last Taught:** Fall 2022

## 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:** Junior standing

**Repeatable for Credit:** No

**Last Taught:** Spring 2023

**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 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 2022

**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, 303, or M M & I 301 or graduate/professional standing

**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 2022

**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:** Fall 2022

**FOOD SCI 399 – COORDINATIVE INTERNSHIP/COOPERATIVE EDUCATION**

1-8 credits.

An internship under guidance of a faculty or instructional academic staff member in the Food Science department and a internship site supervisor. Students are responsible for arranging the work and credits with the faculty or instructional academic staff member and the internship site supervisor.

**Requisites:** Consent of instructor

**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

**Last Taught:** Summer 2023

**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.

**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, CHEM 343, and (BIOCHEM 501 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 2022

**FOOD SCI 412 – FOOD ANALYSIS**

4 credits.

Application of quantitative techniques to the determination of composition and quality of food products.

**Requisites:** (STAT 301 or 371) and FOOD SCI 410

**Repeatable for Credit:** No

**Last Taught:** Spring 2023

**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:** MICROBIO/FOOD SCI 325, FOOD SCI 410, and 440

**Repeatable for Credit:** No

**Last Taught:** Spring 2023

**FOOD SCI 437 – FOOD SERVICE OPERATIONS**

4 credits.

Fundamentals, principles, and practices of the United States Food Systems, Food Service, and Food Service Management. Introduction to the food service industry as applied in diverse settings, including but not limited to schools, hospitals and restaurants.

**Requisites:** FOOD SCI 301 and declared in Nutritional Sciences BS or BS-Nutrition and Dietetics

**Repeatable for Credit:** No

**Last Taught:** Fall 2022

**FOOD SCI 440 – PRINCIPLES OF FOOD ENGINEERING**

3 credits.

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, (MATH 217 or 221), and (PHYSICS 201 or 207)

**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 2022

**FOOD SCI/AN SCI/DY SCI/SOIL SCI 472 – ANIMAL AGRICULTURE AND GLOBAL SUSTAINABLE DEVELOPMENT**

1 credit.

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**Last Taught:** Spring 2022**FOOD SCI/AN SCI/DY SCI/SOIL SCI 473 – INTERNATIONAL FIELD STUDY IN ANIMAL AGRICULTURE AND SUSTAINABLE DEVELOPMENT**

2 credits.

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**Repeatable for Credit:** No**Last Taught:** Spring 2023**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**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Intermediate

L&amp;S Credit - Counts as Liberal Arts and Science credit in L&amp;S

**Repeatable for Credit:** No**Last Taught:** Spring 2023**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.

**Requisites:** AN SCI/FOOD SCI 305, FOOD SCI 410, or graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2023**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/GMP, statistical process control, and environmental impacts.

**Requisites:** FOOD SCI 432 or (BSE 461 or concurrent enrollment)**Repeatable for Credit:** No**Last Taught:** Fall 2022**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 2022**FOOD SCI 537 – ORGANIZATION AND MANAGEMENT OF FOOD AND NUTRITION SERVICES**

3 credits.

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

**Requisites:** None**Repeatable for Credit:** No**Last Taught:** Spring 2015**FOOD SCI 550 – FERMENTED FOODS AND BEVERAGES**

2 credits.

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.

**Requisites:** BIOCHEM 501**Course Designation:** Breadth - Biological Sci. Counts toward the Natural Sci req

Level - Advanced

L&amp;S Credit - Counts as Liberal Arts and Science credit in L&amp;S

**Repeatable for Credit:** No**Last Taught:** Spring 2023

**FOOD SCI 551 – FOOD FERMENTATION LABORATORY**

1 credit.

Offers the opportunity to learn to produce fermented beverages and dairy products in laboratory and scalable production facilities. Designed to introduce 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. Enrollment limited to students 21 years of age or older

**Requisites:** FOOD SCI 550 or concurrent enrollment**Repeatable for Credit:** No**Last Taught:** Spring 2023**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 and 432**Repeatable for Credit:** No**Last Taught:** Fall 2022**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**Last Taught:** Spring 2023**FOOD SCI 610 – FOOD PROTEINS**

2 credits.

Protein structure and functions; techniques of protein isolation and characterization; functional properties important in food processing.

**Requisites:** BIOCHEM 501 or 601**Repeatable for Credit:** No**Last Taught:** Spring 2018**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 410 or graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Spring 2023**FOOD SCI 681 – SENIOR HONORS THESIS**

2-4 credits.

Individual study for majors completing theses for Honors degrees as arranged with a faculty member.

**Requisites:** Consent of instructor**Course Designation:** Honors - Honors Only Courses (H)**Repeatable for Credit:** No**Last Taught:** Fall 2013**FOOD SCI 682 – SENIOR HONORS THESIS**

2-4 credits.

Second semester of individual study for majors completing theses for Honors degrees as arranged with a faculty member.

**Requisites:** Consent of instructor**Course Designation:** Honors - Honors Only Courses (H)**Repeatable for Credit:** No**Last Taught:** Spring 2014**FOOD SCI 699 – SPECIAL PROBLEMS**

1-3 credits.

Individual advanced work in an area of Food Science under the direct guidance of a faculty member.

**Requisites:** Consent of instructor**Course Designation:** Level - Advanced

L&amp;S Credit - Counts as Liberal Arts and Science credit in L&amp;S

**Repeatable for Credit:** Yes, unlimited number of completions**Last Taught:** Spring 2023**FOOD SCI/AN SCI 710 – CHEMISTRY OF THE FOOD LIPIDS**

2 credits.

Chemical constitution, structures, reactions, stereochemistry of fats, phospholipids, related compounds; methods of isolation, characterization; synthesis; relation of structure to physical properties.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No**Last Taught:** Fall 2021**FOOD SCI/AN SCI 711 – FOOD BIOCHEMISTRY**

3 credits.

Explores methods for interrogating structure-function relationships, molecular profiles, and microstructure of foods. Provides hands-on experience using computational approaches to model protein-small molecule interactions, analysis of small molecules using high-resolution MS, and protein composition and morphology with fluorescence spectroscopy and microscopy. Knowledge of food chemistry or organic chemistry (such as FOOD SCI 410, CHEM 341, 343, or 345) required.

**Requisites:** Graduate/professional standing**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement**Repeatable for Credit:** No

**FOOD SCI 725 – ADVANCED FOOD MICROBIOLOGY**

3 credits.

Principles and problems covering fundamental concepts in Food Microbiology; application of concepts in fermentation, pathogenesis, and gut health; development and control of a sustainable and safe food and fiber system.

**Requisites:** Graduate/professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** No

**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

**Last Taught:** Fall 2019

**FOOD SCI 875 – SPECIAL TOPICS**

1-3 credits.

New graduate and courses of current interest.

**Requisites:** Graduate/professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** Yes, unlimited number of completions

**Last Taught:** Spring 2023

**FOOD SCI 900 – SEMINAR ADVANCED**

1 credit.

Research literature and current departmental research.

**Requisites:** Graduate/professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** Yes, unlimited number of completions

**Last Taught:** Spring 2023

**FOOD SCI 990 – RESEARCH**

1-12 credits.

Full lab and literature review of a problem in food science. Leads to preparation of thesis and publication.

**Requisites:** Graduate/professional standing

**Course Designation:** Grad 50% - Counts toward 50% graduate coursework requirement

**Repeatable for Credit:** Yes, unlimited number of completions

**Last Taught:** Summer 2023