

FOOD SCIENCE AND TECHNOLOGY

Spring 2025 Courses



Pre-Session – January 2-17, 2025

FDST 492/892-PP3

Special Topics: Brewing Fundamentals and Analysis

3 credit hours

Dr. Andrew Rasmussen

Offered In-Person – Prerequisites: FDST 205 or BIOS 312 or CHEM 251 or CHEM 253 or junior standing or higher.

Explore the basic science behind the production of one of the most popular fermented beverages in the world—beer! Topics covered include hands-on beer brewing from grain to glass, in-depth discussion of the components of beer, proper packaging and storing of beer, beer recipe design, and beer sensory analysis.

This course includes brewing on home and industrial scales, yeast culture and health labs, lectures, readings, beer evaluation, and videos. Grading will be based on quizzes, short writing assignments, student presentations, and a final exam.

Full Semester – Starts January 21, 2025

FDST/NUTR/CHEM 131

The Science of Food

ACE 4 – 3 credit hours

[Dr. Andreia Bianchini](#)

Offered In-Person (section 001) and Online using asynchronous and interactive approaches (section 700)

Explore the World of the Science of Food!

Covers general and food chemistry, nutrition, food microbiology, food safety and quality, standards that are enforced by regulatory agencies, and food processes applied to improve food quality, shelf life and safety.

After taking the Science of Food, you will be able to:

- Apply basic principles of physics, chemistry, and biology to food science, while learning how food properties may determine food quality and safety;
- Understand the various components of food and how they may affect their nutritional value; and
- Appreciate the scientific basis of food processes applied to food to improve shelf life and ensure consumer safety.
- Demonstrate understanding and application of scientific methods as part of ACE 4 outcomes.



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FDST/NUTR/CHEM 131H Honors The Science of Food

ACE 4 – 3 credit hours

[Dr. Andrea Bianchini](#)

Offered In-Person (section 001) and Online using asynchronous and interactive approaches (section 700)

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- Appreciate the scientific basis of food processes applied to food to improve shelf life and ensure consumer safety.
- Demonstrate understanding and application of scientific methods as part of ACE 4 outcomes.
- Demonstrate ability to apply integrative learning, problem solving, and/or communication skills to topics and issues associated with food science.

FDST 132 Practical Applications in Food Science

1 credit hour

[Dr. Rossana Villa Rojas](#)

Offered In-Person – Prerequisites: food science and technology major or instructor permission

Food processing, preservation, nutrition, safety, quality, marketing, and related topics. Food processing procedures and equipment. Microbiological and chemical procedures.

FDST 205 Food Composition and Analysis

3 credit hours

[Dr. Junsi Yang](#)

Offered In-Person – Prerequisites: CHEM 109A/L and 110A/L; FDST 101 or 131 or instructor permission

Major components of foods, their structures, and their role in the functional and nutritional properties of foods. Chemical methods for the determination and characterization of major food components.



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FDST 301 Chemistry of Food

ACE 4 – 3 credit hours

[Dr. Devin Rose](#)

Offered Online using asynchronous and interactive approaches (section 700)

There are no prerequisites for this course. Targeted to non-majors interested in food-related careers (nutrition, entrepreneurship, and agribusiness). *Note: FDST majors are required to take FDST 448.*

Covers the properties of food components and chemistry affecting food quality and nutritional value.

FDST 403/803 Food Quality Assurance

3 credit hours

[Dr. Byron Chaves](#)

Offered In-Person – Prerequisite: FDST 205; STAT 218

Quality related issues as they pertain to manufacturing, processing, and/or testing of foods, with a major emphasis on food regulations, statistical process control and Hazard Analysis of Critical Control Points (HACCP).

FDST 405/805 or BIOS 445/845 Food Microbiology

3 credit hours

[Dr. Heather Hallen-Adams](#)

Offered In-Person – Prerequisite: BIOS 312

Learn about the microbes involved in all aspects of food production. We study microbes that cause foodborne diseases, the effect of food processing on the microbiota of foods, principles of food preservation, food spoilage, and foods produced by microorganisms.



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FDST 425/825 Food Toxicology

2 credit hours

[Dr. Joe Baumert](#) and [Dr. Melanie Downs](#)

Offered In-Person – Prerequisite: FDST 405/805, BIOC 401

While microbial food safety hazards are often in the spotlight, chemical hazards continue to cause challenges behind the scenes for food producers and manufacturers.

This course will discuss toxic substances that may be found in foods with emphasis on bacterial toxins, mycotoxins, and naturally occurring toxicants of plants, animals, and seafood. Basic toxicological methodology will be introduced and the effects of food processing and handling on food-borne toxicants will be reviewed.

Another critical type of chemical food safety hazard is undeclared food allergens, and this course will introduce major concepts in food allergies and food allergen management.

FDST 426/826 (formerly 492/892-006) Food Safety Auditor

2 credit hours

[Dr. Jayne Stratton](#)

Offered In-Person – Prerequisites: Major in Food Science & Technology and Senior Standing

Preparation for a career that will include inspections and audits as a standard part of ensuring a safe food production chain.

Includes team activities such as a mock inspection of our food processing pilot plant and creating a food safety plan using a model food. Receive certification as a Preventive Controls Qualified Individual, recognized by the FDA as qualifying them to create a food safety plan.

FDST 451 Food Science and Technology Seminar

1 credit hour

[Dr. Rossana Villa Rojas](#)

Offered In-Person – Prerequisite: instructor permission for students outside food science and technology

Student presentations of food science literature and research.



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FDST 452/852

Physical Chemistry of Foods

2 credit hours

[Dr. Junsi Yang](#)

Offered In-Person – Prerequisite: FDST 448/848

The basic theory of physical chemistry that is relevant in food science and technology. Understand and predict changes occurring in a food during processing, storage, and handling using physical chemistry theory. Design and improvement of processes to make foods having specific qualities in an efficient way.

FDST 455/855

Microbiology of Fermented Foods

2 credit hours

[Dr. Jennifer Auchtung](#)

Offered In-Person – Prerequisite: BIOS 312 or instructor permission

Physiology, biochemistry, and genetics of microorganisms important in food fermentation. How microorganisms are used in fermentation and the effects of processing and manufacturing conditions on production of fermented foods.

FDST 455L/855L

Microbiology of Fermented Foods Laboratory

1 credit hour

[Dr. Jennifer Auchtung](#)

Offered In-Person – Prerequisite: request permission code from instructor or FDST 405/805 and parallel FDST 455/855/MBIO 455

Experiments involving the microorganisms and fermentation of foods and beverages.

FDST 458/858

Advanced Food Analysis

3 credit hours

[Dr. Deniz Ciftci](#)

Offered In-Person – Prerequisites: FDST 205, 448/848, and FDST 449/849

Theory and application of molecular and atomic spectroscopy, immunochemistry and thermal methods to the analysis of foods. Chemical separation techniques for the isolation of food constituents.



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FDST 460/860 **Food Product Development Concepts**

ACE 10

3 credit hours

[Dr. Devin Rose](#) and [Dr. Junsi Yang](#)

Offered In-Person – Prerequisites: FDST 405/805 and FDST 448/848

Develop a commercially viable food product using chemical, microbiological and sensory analysis principles, and marketing and packaging sciences.

FDST 465/865 or AGST 465/865 **Food Engineering Unit Operations**

3 credit hours

[Dr. Ozan Ciftci](#)

Offered In-Person – Prerequisites: FDST/MYSM 363

Unit operations and their applications to food processing.

FDST 492-250 and 251 **Special Topics: Food Preservation Principles and Packaging**

3 credit hours

[Dr. Curtis Weller](#)

Offered In-Person – Prerequisites: FDST 205 or BIOS 312 or CHEM 251 or CHEM 253 or junior standing or higher

Shelf-life is determined by several interrelated and interdependent factors, including microbiological, chemical, physical, and organoleptic deterioration. This course integrates principles of food chemistry, food microbiology, food processing and packaging to extend the shelf-life of food products.



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FDST 823 Food Safety Risk Analysis

3 credit hours

[Dr. Bing Wang](#) and [Dr. Joe Baumert](#)

Offered In-Person

Risk analysis principles applied to food safety issues; quantitative approaches for risk assessment using epidemiological, statistical and simulation tools; step-by-step demonstration of quantitative risk assessment model development; methods for framing risk management questions; introduction of risk communication; real-world examples of microbial, food allergen, and chemical risk assessment.

FDST 892-700 Special Topics: New Trends and Innovation in Food Engineering

1 credit hour

[Dr. Ozan Ciftci](#)

Offered online (section 700)

This multi-institutional course provides a broad perspective of innovation as applied to food engineering. The course will provide a general overview and case studies of current and emerging research areas in food and agricultural engineering and processing by different research groups in the nation. The course will demonstrate the efforts among food engineers and scientists in the nation to advance engineering knowledge and technologies for the purpose of improving food safety, quality and security, and enhance health benefits of food products through extensive research in focused areas.

FDST 908B Food Borne Pathogens

2 credit hours

[Dr. Andrew Benson](#)

Offered In-Person – Prerequisites: FDST 805/BIOS 845 and BIOS 820, or instructor permission

Survey of current research topics in the molecular biology of agents of food borne disease. Includes structure-function analyses of toxin molecules and other virulence determinants; genetic mechanisms of phenotypic variation, coordinate regulation of virulence gene expression; mobile genetic elements that contribute to pathogenesis; invasion of host tissues; and stress-response systems and survival.



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FDST 952 Professional Food Science Communication

1 credit hour

[Dr. Heather Hallen-Adams](#)

Offered In-Person – Prerequisite: instructor permission for students outside food science and technology

Course: January 22-April 15, 2024, finishing with one-day Food Science and Technology Research Symposium

Best practices for science communication through practical delivery of food science and technology knowledge to a variety of audiences.

FDST 993 (section 952) Extrusion Workshop

1 credit hour

Food Processing Center Workshop

April 22-24, 2024

Permission required before registering. In addition to tuition and fees, there is an additional workshop fee due at time of enrollment, see Julie Reiling at Food Processing Center.

This workshop is geared towards food technicians, scientists and product developers already working or desiring to work in the area of extrusion or any food industry professionals with the goal of expanding their extrusion knowledge base. The Extrusion Workshop is an introductory, hands-on workshop combining extrusion theory and techniques with pilot plant exercises emphasizing real-world product development in a variety of food categories. The workshop combines lectures and pilot plant demonstrations from both industry and faculty experts.



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Online IDEA Courses for Food Safety and Defense

How to Enroll

- Fill out the online course request form: <https://form.jotform.com/CASNR/GPIDEaregistrationform>
- Receive a permission code from Melissa Sailors and register online [MyRED](#).

FDST 878

Food Protection & Defense: Essential Concepts

2 credit hours

Offered Online by Kansas State University

Session: January 21-May 16, 2024

Foundational concepts relevant to protecting the food supply from intentional contamination. Section 1 addresses the nature of the policy and regulatory aspects of food defense, threats to food and agricultural systems, as well as concepts and strategies related to response and mitigation of food protection incidents. Section 2 provides an understanding of the principles required in a food defense program for a food manufacturing, warehousing, or distribution center.

FDST 892 (section 992)

Advanced Food Microbiology and Biotechnology

2 credit hours

Offered Online by University of Missouri

Session: January 21-May 16, 2024

Basic principles in biotechnology and applied food microbiology. Current topics of interest in food biotechnology. Introduction to recombinant DNA techniques and how they are applied to genetically modify microorganisms. The use of nucleic acids as tools of rapid detection of microorganisms in foods, basic enzyme immobilization and down-stream processing techniques, and regulatory aspects of food biotechnology.



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Getting to Nebraska Innovation Campus

Bus #22 and Van Service #23

Specific Nebraska Innovation Campus Route 22 bus service to City Campus and Route 23 van service to East Campus can be found at <https://parking.unl.edu/innovation-campus-routes>.

A bus pass is required to board and ride StarTran buses. Passes are coordinated through Token Transit. Register and receive your mobile bus pass through the Token Transit app at <https://tokentransit.com/startran/unl-pass>. The bus pass is also good for all StarTran routes in the city.

Parking

UNL Campus maps, select parking at the bottom for green C and purple P lots - <https://maps.unl.edu/innovation/>

If you plan to park at Nebraska Innovation Campus (NIC) using your UNL student parking permit, UNL student permit holders must notify Parking and Transit Services and request being added to reciprocal visitor lists. Requests can be made by sending email to unlpts@unl.edu from an official campus email account.

If you do not have a UNL commuter student parking permit, you will need to use the Passport Parking app to pay for street parking. More information is at <https://innovate.unl.edu/parking-nic>. Parking Zones:

- The paved lot north of Transformation Drive is Zone 9900
- On-street parking at NIC is Zone 80.



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