FOOD SCIENCE & TECHNOLOGY

DESCRIPTION

Food science and technology students find career opportunities with food processing firms, government agencies, and educational institutions. Types of positions available to food science and technology graduates include new product development, quality assurance, food plant management, food research, food marketing and sales, and education.

The curriculum includes a balance of courses in food science, biological sciences, physical sciences, mathematics, social sciences, and humanities. Food science courses include food engineering, food analysis, food chemistry, food microbiology, nutrition, quality assurance, and commodity processing courses. Students are encouraged to participate in an internship program that provides summer employment in the food industry.

College Requirements

College Admission

Requirements for admission into the College of Agricultural Sciences and Natural Resources (CASNR) are consistent with general University admission requirements (one unit equals one high school year): 4 units of English, 4 units of mathematics, 3 units of natural sciences, 3 units of social sciences, and 2 units of world language. Students must also meet performance requirements: a 3.0 cumulative high school grade point average OR an ACT composite of 20 or higher, writing portion not required OR a score of 1040 or higher on the SAT Critical Reading and Math sections OR rank in the top one-half of graduating class; transfer students must have a 2.0 (on a 4.0 scale) cumulative grade point average and 2.0 on the most recent term of attendance.

Admission Deficiencies/Removal of Deficiencies

Students who are admitted to CASNR with core course deficiencies must remove these deficiencies within the first 30 credit hours at the University of Nebraska–Lincoln, or within the first calendar year at Nebraska, whichever takes longer, excluding foreign languages. Students have up to 60 credit hours to remove world language deficiencies. College-level coursework taken to remove deficiencies may be used to meet degree requirements in CASNR.

Deficiencies in the required entrance subjects can be removed by the completion of specified courses in the University or by correspondence.

The Office of Admissions, Alexander Building (south entrance), City Campus, provides information to new students on how deficiencies can be removed.

College Degree Requirements

Curriculum Requirements

The curriculum requirements of the College consist of three areas: ACE (Achievement-Centered Education), College of Agricultural Sciences and Natural Resources Core, and Degree Program requirements and electives. All three areas of the College Curriculum Requirements are incorporated within the description of the Major/Degree Program sections of the catalog. The individual major/degree program listings of classes ensures that a student will meet the minimum curriculum requirements of the College.

World Languages/Language Requirement

Two units of a world language are required. This requirement is usually met with two years of high school language.

Experiential Learning

All undergraduates in the College of Agricultural Sciences and Natural Resources must take an Experiential Learning (EL) designated course. This may include 0-credit courses designed to document co-curricular activities recognized as Experiential Learning.

Minimum Hours Required for Graduation

The College grants the bachelors degree in programs associated with agricultural sciences, natural resources, and related programs. Students working toward a degree must earn at least 120 semester hours of credit. A minimum cumulative grade point average of C (2.0 on a 4.0 scale) must be maintained throughout the course of studies and is required for graduation. Some degree programs have a higher cumulative grade point average required for graduation. Please check the degree program on its graduation cumulative grade point average.

Grade Rules

Removal of C-, D, and F Grades

Only the most recent letter grade received in a given course will be used in computing a student's cumulative grade point average if the student has completed the course more than once and previously received a grade or grades below C in that course.

The previous grade (or grades) will not be used in the computation of the cumulative grade point average, but it will remain a part of the academic record and will appear on any transcript.

A student can remove from his/her cumulative average a course grade of C-, D+, D, D-, or F if the student repeats the same course at the University of Nebraska and receives a grade other than P (pass), I (incomplete), N (no pass), W (withdrew), or NR (no report). If a course is no longer being offered, it is not eligible for the revised grade point average computation process.

For complete procedures and regulations, see the Office of the University Registrar website at http://www.unl.edu/regrec/course-repeats (http://www.unl.edu/regrec/course-repeats/).

Pass/No Pass

Students in CASNR may take any course offered on a Pass/No Pass basis within the 24-hour limitation established by the Faculty Senate. However, a department may specify that the Pass/No Pass status of its courses be limited to non-majors or may choose to offer some courses for letter grades only.

GPA Requirements

A minimum cumulative grade point average of C (2.0 on a 4.0 scale) must be maintained throughout the course of studies and is required for graduation. Some degree programs have a higher cumulative grade point average required for graduation. Please check the degree program on its graduation cumulative grade point average.

Transfer Credit Rules

To be considered for admission a transfer student, Nebraska resident or nonresident, must have an accumulated average of C (2.0 on a 4.0 scale) and a minimum C average in the last semester of attendance at another

college. Transfer students who have completed less than 12 credit hours of college study must submit either ACT or SAT scores.

Ordinarily, credits earned at an accredited college are accepted by the University. The College, however, will evaluate all hours submitted on an application for transfer and reserves the right to accept or reject any of them. Sixty (60) is the maximum number of hours the University will accept on transfer from a two-year college. Ninety (90) is the maximum number of hours the University will accept from a four-year college. Transfer credit in the degree program must be approved by the degree program advisor on a Request for Substitution Form to meet specific course requirements, group requirements, or course level requirements in the major. At least 9 hours in the major field, including the capstone course, must be completed at the University of Nebraska–Lincoln regardless of the number of hours transferred.

The College will accept no more than 10 semester hours of C-, D+, D, and D- grades from other schools. The C-, D+, D, and D- grades can only be applied to free electives. This policy does not apply to the transfer of grades from UNO or UNK to the University of Nebraska–Lincoln.

Joint Academic Transfer Programs

The College of Agricultural Sciences and Natural Resources has agreements with many institutions to support joint academic programs. The transfer programs include dual degree programs and cooperative degree programs. Dual degree programs offer students the opportunity to receive a degree from a participating institution and also to complete the requirements for a bachelor of science degree in CASNR. Cooperative programs result in a single degree from either the University of Nebraska–Lincoln or the cooperating institution.

Dual Degree Programs

A to B Programs

The A to B Program, a joint academic program offered by the CASNR and participating community colleges, allows students to complete the first two years of a degree program at the participating community college and continue their education and study in a degree program leading toward a bachelor of science degree.

The A to B Program provides a basic knowledge plus specialized coursework. Students transfer into CASNR with junior standing.

Depending on the community college, students enrolled in the A to B Program may complete the requirements for an associate of science at the community college, transfer to the University of Nebraska–Lincoln, and work toward a bachelor of science degree.

Participating community colleges include:

- Central Community College
- Metropolitan Community College
- Mid-Plains Community College
- Nebraska College of Technical Agriculture
- Nebraska Indian Community College
- Northeast Community College
- Southeast Community College
- Western Nebraska Community College

3+2 Programs

Two specialized degree programs in **animal science** and **veterinary science** are offered jointly with an accredited college or school of veterinary medicine. These two programs permit CASNR animal science or veterinary science students to receive a bachelor of science degree from the University of Nebraska–Lincoln with a degree in animal science or veterinary science after successfully completing two years of the professional curriculum in veterinary medicine at an accredited veterinary school. Students who successfully complete the 3+2 Program, must provide transcripts and complete the Application for Degree form via MyRED. Students without MyRED access may apply for graduation in person at Husker Hub in the Canfield Administration Building, or by mail. Students should discuss these degree programs with their academic advisor.

Cooperative Degree Programs

Academic credit from the University and a cooperating institution are applied towards a four-year degree from either the University of Nebraska–Lincoln (University degree-granting program) or the cooperating institution (non-University degree-granting program). All have approved programs of study.

UNL Degree-Granting Programs

A University of Nebraska–Lincoln degree-granting program is designed to provide students the opportunity to complete a two-year program of study at one of the four-year institutions listed below, transfer to CASNR, and complete the requirements for a bachelor of science degree.

Chadron State College. Chadron State College offers a 2+2 program leading to a grassland ecology and management degree program and a transfer program leading to a bachelor of science in agricultural education in the teaching option.

Wayne State College. Wayne State College offers a 3+1 program leading to a bachelor of science in plant biology in the ecology and management option and a 3+1 program leading to a bachelor of science in Applied Science.

University of Nebraska at Kearney. Transfer programs are available for students pursuing degree programs leading to a bachelor of science degree.

University of Nebraska at Omaha. Transfer programs are available for students pursuing degree programs leading to a bachelor of science degree.

Non University of Nebraska–Lincoln Degree-Granting Programs

CASNR cooperates with other institutions to provide coursework that is applied towards a degree at the cooperating institution. Pre-professional programs offered by CASNR allow students to complete the first two or three years of a degree program at the University prior to transferring and completing a degree at the cooperating institution.

Chadron State College–Range Science. The 3+1 Program in range science allows Chadron State College students to pursue a range science degree through Chadron State College. Students complete three years of coursework at Chadron State College and one year of specialized range science coursework (32 credit hours) at CASNR.

Dordt College (Iowa)–Agricultural Education: Teaching Option. This program allows students to pursue an Agricultural Education Teaching Option degree leading toward a bachelor of science in agricultural education. Students at Dordt College will complete 90 credit hours in the Agricultural Education: Teaching Option Transfer Program.

Residency

Students must complete at least 30 of the total hours for their degree using University of Nebraska–Lincoln credits. At least 18 of the 30 credit hours must be in courses offered through CASNR[1] (>299) including

the appropriate ACE 10 degree requirement or an approved ACE 10 substitution offered through another Nebraska college and excluding independent study regardless of the number of hours transferred. Credit earned during education abroad may be used toward the residency requirement if students register through the University of Nebraska–Lincoln and participate in prior-approved education abroad programs. The University of Nebraska–Lincoln open enrollment and summer independent study courses count toward residence.

[1] *Includes courses taught by CASNR faculty through interdisciplinary prefixes (e.g., LIFE, MBIO, ENVR, SCIL, EAEP, HRTM, ENSC) and CASNR crosslisted courses taught by non-CASNR faculty.*

Online and Distance Education

There are many opportunities to earn college credit online through the University of Nebraska–Lincoln. Some of these credits may be applicable not only as elective credits but also toward the fulfillment of the College's education requirements. Credits earned online may count toward residency. However, certain offerings may not be counted toward scholarship requirements or academic recognition criteria.

For further information, contact:

Office of Online and Distance Education
University of Nebraska–Lincoln
305 Brace Labs
Lincoln, NE 68588-0109
402-472-4681
http://online.unl.edu/

Independent Study Rules

Students wishing to take part in independent studies must obtain permission; complete and sign a contract form; and furnish copies of the contract to the instructor, advisor, departmental office, and the Dean's Office. The contract should be completed before registration. Forms are available in 103 Agricultural Hall or online at the CASNR website.

Independent study projects include research, literature review or extension of coursework under the supervision and evaluation of a departmental faculty member.

Students may only count 12 hours of independent study toward their degrees and no more than 6 hours can be counted during their last 36 hours earned, excluding senior thesis, internships, and courses taught under an independent study number.

Other College Degree Requirements

Capstone Course Requirement

A capstone course is required for each CASNR degree program. A capstone course is defined as a course in which students are required to integrate diverse bodies of knowledge to solve a problem or formulate a policy of societal importance.

ACE Requirements

All students must fulfill the Achievement Centered Education (ACE) requirements. Information about the ACE program may be viewed at ace.unl.edu (https://ace.unl.edu/).

The minimum requirements of CASNR reflect the common core of courses that apply to students pursuing degrees in the college. Students should work with an advisor to satisfy ACE outcomes 1, 2, 3, 4, 6, and 10 with the college requirements.

Catalog Rule

Students must fulfill the requirements stated in the catalog for the academic year in which they are first admitted to the University of Nebraska–Lincoln or when they were first admitted to a Joint Academic Transfer Program. Students transferring from a community college, but without admission to a Joint Academic Transfer Program, may be eligible to fulfill the requirements as stated in the catalog for an academic year in which they were enrolled at the community college prior to attending the University of Nebraska-Lincoln. This decision should be made in consultation with academic advisors, provided the student a) was enrolled in a community college during the catalog year they are utilizing, b) maintained continuous enrollment at the previous institution for 1 academic year or more, and c) continued enrollment at the University of Nebraska-Lincoln within 1 calendar year from their last term at the previous institution. In consultation with advisors, a student may choose to follow a subsequent catalog for any academic year in which they are admitted to and enrolled as a degree-seeking student at the University of Nebraska–Lincoln in the College of Agricultural Sciences and Natural Resources. Students must complete all degree requirements from a single catalog year. The catalog which a student follows for degree requirements may not be more than 10 years old at the time of graduation.

Learning Outcomes

Graduates of food science and technology will be able to:

1. Demonstrate ability to apply chemical, microbiological, and engineering principles to the processing and preservation of safe, nutritious, and appealing food products.
2. Effectively communicate scientific, technical, and other information, both orally and in writing, to supervisors, colleagues, subordinates and consumers.
3. Understand the role of government regulatory agencies and other groups responsible for making and enforcing rules, regulations, and guidelines related to food composition, processing, and safety.
4. Access and use technical and human resources, such as the World Wide Web, library systems, and consultants.
5. Represent the field of food science in a scientific and professional manner and participate in professional societies.
6. Recognize ethical responsibilities regarding scientific and professional conduct, as well as the responsibility to the consumer to produce safe and nutritious food products.
7. Develop analytical and creative thinking skills necessary to approach scientific and other issues, problems, and situations.
8. Demonstrate ability to work effectively in a team or group.

Major Requirements

College Integrative Course (ACE 8)		
SCIL 101	Science and Decision-Making for a Complex World	3
Credit Hours Subtotal:		3
Natural Sciences		
BIOS 312	Microbiology	3
CHEM 109A & CHEM 109L	General Chemistry I and General Chemistry I Laboratory	4
CHEM 110A & CHEM 110L	General Chemistry II and General Chemistry II Laboratory	4
CHEM 251	Organic Chemistry I [1]	3

CHEM 253	Organic Chemistry I Laboratory [1]	1
LIFE 120 & LIFE 120L	Fundamentals of Biology I and Fundamentals of Biology I laboratory	4
LIFE 121 & LIFE 121L	Fundamentals of Biology II and Fundamentals of Biology II Laboratory	4
Select one of the following:		4-5
BIOC 401 & BIOC 401L	Elements of Biochemistry and Laboratory for Elements of Biochemistry	
BIOC 431 / BIOS 431 / CHEM 431 & BIOC 433 / BIOS 433 / CHEM 433	Biochemistry I: Structure and Metabolism and Biochemistry Laboratory	
Select one of the following:		4
AGST 109	Physical Principles in Agriculture and Life Sciences	
PHYS 151	Elements of Physics	
Credit Hours Subtotal:		31
Mathematics and Statistics		
STAT 218	Introduction to Statistics	3
or ECON 215	Statistics	
Select one of the following:		3-5
MATH 104	Applied Calculus	
MATH 106	Calculus I	
Credit Hours Subtotal:		8
Communications		
ACE Outcome 1		
Select one of the following:		3
ENGL 150	Writing and Inquiry	
ENGL 151	Writing and Argument	
ENGL 254	Writing and Communities	
JGEN 120	Basic Business Communication	
JGEN 200	Technical Communication I	
JGEN 300	Technical Communication II	
ACE Outcome 2		
Select one of the following:		3
ALEC 102	Interpersonal Skills for Leadership	
COMM 101	Communication in the 21st Century	
COMM 209	Public Speaking	
COMM 210	Communicating in Small Groups	
COMM 286	Business and Professional Communication	
NRES 301	Environmental Communication Skills	
Credit Hours Subtotal:		6
Economics, Humanities and Social Sciences		
ACE Outcome 6		
Select one of the following:		3
AECN 141	Introduction to the Economics of Agriculture	
ECON 200	Economic Essentials and Issues	
ECON 211	Principles of Macroeconomics	
ECON 212	Principles of Microeconomics	
ACE Courses		
Select one course each from ACE outcomes 5, 7, and 9		9
Credit Hours Subtotal:		12
Food Science & Technology Requirements		
Core Courses		
FDST 101	Introductory Food Science	2
FDST 132	Practical Applications in Food Science	1
FDST 280	Contemporary Issues in Food Science	3
FDST 403	Food Quality Assurance	3
FDST 430	Sensory Evaluation	3
FDST 451	Food Science and Technology Seminar	1
FDST 460	Food Product Development Concepts I	3
Process Technology Courses		
FDST 363 / AGST 363	Heat and Mass Transfer	3
FDST 465 / AGST 465	Food Engineering Unit Operations	3
Select two of the following:		6
ASCI 310	Fresh Meats	
ASCI 410	Processed Meats	
FDST 412	Cereal Technology	
FDST 413	Baking Technology	
FDST 429	Dairy Products Technology	
FDST 420	Fruit and Vegetable Technology	
FDST 455 / MBIO 455 & FDST 455L / MBIO 455L	Microbiology of Fermented Foods and Microbiology of Fermented Foods Laboratory	
Food Chemistry		
FDST 205	Food Composition and Analysis	3
FDST 448	Food Chemistry	3
FDST 449	Food Chemistry Laboratory	1
FDST 458	Advanced Food Analysis	3
Food Microbiology		
FDST 405 / BIOS 445	Food Microbiology	3
FDST 406 / BIOS 446	Food Microbiology Laboratory	2
Nutrition		
Select one of the following:		3
ASCI 421	Advanced Animal Nutrition	
NUTR 250	Human Nutrition and Metabolism	
NUTR 455	Advanced Nutrition	
Credit Hours Subtotal:		46
Technical Electives		
Select 6 hours from the following courses/areas: [2]		6
FDST 415	Molds and Mycotoxins in Food, Feed, and the Human Environment	
FDST 424	Food Safety Microbiology	
FDST 425	Food Toxicology	
FDST 442	My Gut, My Health, My Food	
FDST 452	Physical Chemistry of Foods	
FDST 455	Microbiology of Fermented Foods	
FDST 455L	Microbiology of Fermented Foods Laboratory	

FDST 470	Nutraceuticals and Functional Foods	
FDST 492	Special Topics in Food Science and Technology ("Food Safety Auditor")	
FDST 391	International Study Tour	
FDST 392	Food Industry Study Tour	
FDST 396	Independent Study in Food Science and Technology	
FDST 495	Internship Experience	
FDST 498	Undergraduate Research Experience	
FDST 499H	Honors Thesis	
AECN 225	Agribusiness Entrepreneurship in Food Products Marketing	
AGRI 115	Biotechnology: Food, Health and Environment	
ASCI 210	Animal Products	
ASCI 411	HACCP and Food Safety Systems for the Food Industry	
PLAS 429A	Food Security: A Global Perspective	
PLAS 352	Production and Physiology of Horticultural Crops	
PLAS 353	Vegetable Crop Production Laboratory	
PLAS 354	Fruit Production Laboratory	
PLAS 439	Organic Farming and Food Systems	
PLAS 471	Vines, Wines and You	
NUTR 344	Nutrition and Food for Optimal Health	
The above are courses/areas that most directly relate to Food Science. Students may also select from ACCT, AECN (except AECN 100), ALEC (except ALEC 134), AGST, ASCI, BIOC (except BIOC 101), BIOS, BLAW, BSAD (except BSAD 92, BSAD 97, BSAD 98, BSAD 111, BSAD 222, BSAD 333, BSAD 444), BSEN (except BSEN 100), CHEM (except CHEM 101, CHEM 131), CHME (except CHME 113), CSCE, ECON, FDST (except FDST 101, FDST 131, FDST 301), FINA (except FINA 97), MATH 107 or higher, MNGT, MRKT, NUTR (except NUTR 131, NUTR 150, NUTR 372), PHYS, STAT, VBMS		
Credit Hours Subtotal:		6
Free Electives		
Select 8-10 hours		8-10
Credit Hours Subtotal:		8
Total Credit Hours		**120**

1 *Students interested in a career in research, or planning to seek an advanced degree, should take* CHEM 251, CHEM 252, CHEM 253 *and* CHEM 254.

2 *Students are encouraged to consider* FDST 430 *as one of the courses used to fulfill the technical electives.*

ADDITIONAL MAJOR REQUIREMENTS

Grade Rules

Pass/No Pass

Students in food science and technology may not take food science and technology courses Pass/No Pass, except for Independent Study.

Requirements for Minor Offered by Department

12-Hour Minor

Requirements for the minor include a minimum of 12 hours in food science and technology at the 300 level or above, including the following specified courses:

Core Courses		
FDST 405 / BIOS 445	Food Microbiology	3
FDST 406 / BIOS 446	Food Microbiology Laboratory	2
FDST 448	Food Chemistry	3
FDST 449	Food Chemistry Laboratory	1
Select one of the following:		3
FDST 363 / AGST 363	Heat and Mass Transfer	
FDST 465 / AGST 465	Food Engineering Unit Operations	
Credit Hours Subtotal:		12
Total Credit Hours		**12**

18-Hour Minor

Requirements for the minor include a minimum of 18 hours in food science and technology, including a minimum of 6 hours at the 300 level or above. No more than 3 hours of FDST 396 Independent Study in Food Science and Technology can be applied to the minor.

Core Courses		
FDST 205	Food Composition and Analysis	3
FDST 280	Contemporary Issues in Food Science	3
Select one of the following:		2-3
FDST 101	Introductory Food Science	
FDST 131 / CHEM 131 / NUTR 131	The Science of Food	
Credit Hours Subtotal:		9
Additional FDST courses		
Select 10-11 hours		9-10
Credit Hours Subtotal:		9
Total Credit Hours		**18**

Fermentation Science Minor

The requirement for the fermentation science minor is 12 hours, consisting of 6 hours of core courses and 6 hours from a selection of additional supporting courses. This minor requires interested students to have completed prerequisites of 8 credit hours of basic life science with laboratory, 4 credit hours of organic chemistry, and BIOS 312 or equivalent before taking courses required for the minor.

Required Courses		
FDST 415	Molds and Mycotoxins in Food, Feed, and the Human Environment	3

FDST 455 / MBIO 455 & FDST 455L / MBIO 455L	Microbiology of Fermented Foods and Microbiology of Fermented Foods Laboratory	3
Credit Hours Subtotal:		6
Elective Courses		
Choose 6 credit hours from the following:		6
BIOC 431 / BIOS 431 / CHEM 431	Biochemistry I: Structure and Metabolism	
BIOC 432 / BIOS 432 / CHEM 432	Biochemistry II: Metabolism and Biological Information	
BIOC 434 / BIOS 434 / CHEM 434 / PLAS 434	Plant Biochemistry	
BSEN 303 / AGEN 303	Principles of Process Engineering	
BSEN 445	Bioprocess Engineering	
BSEN 446 / AGEN 446	Unit Operations of Biological Processing	
CHME 473	Biochemical Engineering	
FDST 495	Internship Experience (in fermentation science-related field)	
MBIO 421 / BIOS 421	Microbial Diversity	
MBIO 440 / BIOS 440 / VBMS 440	Microbial Physiology	
PLAS 415	Applied Plant Breeding and Genetics	
PLAS 471 / HRTM 471 / NUTR 471	Vines, Wines and You	
Credit Hours Subtotal:		6
Total Credit Hours		**12**

FDST 101 Introductory Food Science
Description: Food composition, safety, processing, packaging, labeling, product development, food marketing and related topics.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Prerequisite for: FDST 205

FDST 131 The Science of Food
Crosslisted with: CHEM 131, NUTR 131
Description: 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.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: FDST 205
ACE: ACE 4 Science

FDST 131H The Science of Food
Crosslisted with: CHEM 131H, NUTR 131H
Description: 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.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 4 Science

FDST 132 Practical Applications in Food Science
Prerequisites: Food science and technology major.
Description: Food processing, preservation, nutrition, safety, quality, marketing, and related topics. Food processing procedures and equipment. Microbiological and chemical procedures.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

FDST 205 Food Composition and Analysis
Prerequisites: CHEM 109A and 109L and CHEM 110A and 110L; FDST 101 or 131.
Description: 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.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: FDST 367, AGST 367

FDST 280 Contemporary Issues in Food Science
Description: Current issues in food science, including the impact of COVID-19 in food science, food psychology and culture, the edible cannabis industry, organic foods, obesity, world hunger, food allergens, plant-based meat and milk, food safety, GMOs, probiotics and gut health, and sustainability.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL
Experiential Learning: Case/Project-Based Learning

FDST 301 Chemistry of Food
Notes: A chemistry course for non-majors taught via distance education. Will not count toward a FDST major. A previous course in chemistry or Food Science may be helpful but is not required.
Description: Emphasizes essential principles of chemistry and their application to food systems. Covers the molecular properties of food components (proteins, carbohydrates, and lipids) and their chemical reactions. Provides understanding of how chemistry impacts food quality and contributes to wellness.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING
ACE: ACE 4 Science

FDST 363 Heat and Mass Transfer
Crosslisted with: AGST 363
Prerequisites: MATH 104 or 106; AGST 109 or PHYS 141 or 151.
Description: Fundamentals of food engineering including material and energy balances, fluid mechanics, heat transfer and mass transfer.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 367 Pet Food Manufacturing
Crosslisted with: AGST 367
Prerequisites: FDST 205
Notes: Field trips are required and may occur outside of scheduled class time.
Description: The companion animal industry, products, processes and career opportunities.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL

FDST 391 International Study Tour
Prerequisites: Permission
Notes: Sophomore standing or higher recommended
Description: Individual or group educational experience combining classroom lectures, discussions, and/or seminars with tours to broaden the student's knowledge of specific aspects of food science and technology in a foreign country. Choice of subject matter and coordination of on- and off-campus study is at the discretion of the instructor.
Credit Hours: 0-3
Min credits per semester:
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

FDST 392 Food Industry Study Tour
Prerequisites: Permission
Description: Study tour of food industry processors and government agencies. Provide an understanding of the industry's operations and problems.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 3
Grading Option: Pass No Pass

FDST 396 Independent Study in Food Science and Technology
Prerequisites: Permission.
Description: Individual or group projects in research, literature review, or extension of course work under supervision and evaluation of a departmental faculty member.
Credit Hours: 1-5
Min credits per semester: 1
Max credits per semester: 5
Max credits per degree: 12
Grading Option: Graded with Option

FDST 401 Teaching Applications of Food Science
Crosslisted with: FDST 801
Prerequisites: BIOS 101 and CHEM 109A and 109L
Notes: Will not count toward a FDST major or minor.
Description: Overview of the science of food and how food can be used in the classroom to enhance science education.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 403 Food Quality Assurance
Crosslisted with: FDST 803
Prerequisites: FDST 205; STAT 218.
Description: 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).
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 405 Food Microbiology
Crosslisted with: BIOS 445, BIOS 845, FDST 805
Prerequisites: BIOS 312
Notes: BIOC 401 or BIOC 431 recommended
Description: Nature, physiology, and interactions of microorganisms in foods. Introduction to food-borne diseases, the effect of food processing systems on the microflora of foods, principles of food preservation, food spoilage, and foods produced by microorganisms. Food plant sanitation and criteria for establishing microbial standards for food products.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL/SPR
Prerequisite for: BIOS 446, BIOS 846, FDST 406, FDST 806; FDST 424, FDST 824; FDST 425, FDST 825; FDST 455L, FDST 855L, MBIO 455L; FDST 460, FDST 860; FDST 867; FDST 875; FDST 877; FDST 908B

FDST 406 Food Microbiology Laboratory
Crosslisted with: BIOS 446, BIOS 846, FDST 806
Prerequisites: Parallel in FDST 405/805/BIOS 446/846.
Description: The microorganisms in foods and the methods used to study them.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Course and Laboratory Fee: $40

FDST 412 Cereal Technology
Crosslisted with: FDST 812
Prerequisites: FDST 205.
Description: Chemistry and technology of the cereal grains. Post-harvest processing and utilization for food and feed. Current industrial processes and practices, and the theoretical basis for these operations.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 413 Baking Technology
Crosslisted with: FDST 813
Prerequisites: FDST 205
Description: Chemistry and technology of bakery products, including formulation, ingredient functionality, processing, and quality evaluation.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: FALL

FDST 415 Molds and Mycotoxins in Food, Feed, and the Human Environment
Crosslisted with: FDST 815
Prerequisites: Junior or Senior standing, 3 hours BIOS or LIFE
Description: Occurrence, growth, and mycotoxin production of molds in human foods, animal feeds, and the human environment. Spoilage, mycotoxin production conditions, toxicity, and pathological effects. Culture media, methods and techniques for enumerating and identifying molds, analytical methods for mycotoxins, and effects of food and feed processing on mycotoxin stability.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: FALL

FDST 419 Meat Investigations
Crosslisted with: ASCI 419, ASCI 819, FDST 819
Prerequisites: ASCI 210
Description: Conduct independent research and study meat industry problems in processing, production, storage, and preparation of meat and meat products.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 420 Fruit and Vegetable Technology
Crosslisted with: FDST 820
Prerequisites: FDST 205.
Description: Harvesting and postharvest handling of fruit and vegetables, processing and safety issues, processes of ripening and/or maturation in fresh fruits and vegetables.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $25

FDST 424 Food Safety Microbiology
Crosslisted with: FDST 824
Prerequisites: FDST 405
Description: Microbiological sampling, testing, and foodborne pathogen detection tools to support current food safety and sanitation regulatory requirements and the design and implementation of food safety management systems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Offered: SPRING

FDST 425 Food Toxicology
Crosslisted with: FDST 825
Prerequisites: FDST 405/805, BIOC 401, or equivalent.
Description: 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 and the effects of food processing and handling on food-borne toxicants.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option

FDST 429 Dairy Products Technology
Crosslisted with: FDST 829
Prerequisites: FDST 205.
Notes: Offered spring semester of odd-numbered calendar years.
Description: Physical, chemical, and microbiological properties of milk. Principles of milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 430 Sensory Evaluation
Crosslisted with: FDST 830, STAT 430, STAT 830
Prerequisites: Introductory course in statistics.
Description: Food evaluation using sensory techniques and statistical analysis.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $10

FDST 442 My Gut, My Health, My Food
Crosslisted with: FDST 842
Prerequisites: Junior or Senior standing
Description: Detailed examples and conceptual overview of studies that define the digestive tract microbial ecosystem both at the local and systemic scale in the context of omnivores such as humans and animals are presented. The concepts in focus are associated with high-dimensional datasets (or big data) used for studying these complex biosystems, and the multi-dimensional interactions between the microbiomes in its ecosystem. Topics include the host-cycle of life in health and disease in relation to the bacteria of the digestive tract, as well as the modification of their ecology due to health issues, nutrition, and microbial competition or chemical modification.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded
Offered: SPRING

FDST 448 Food Chemistry
Crosslisted with: FDST 848
Prerequisites: FDST 205; CHEM 251; BIOC 401.
Description: Molecular components of various foods and the reactions of these components during the processing of foods.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: ASCI 917; FDST 449, FDST 849; FDST 452, FDST 852; FDST 458, FDST 858; FDST 460, FDST 860; NUTR 449

FDST 449 Food Chemistry Laboratory
Crosslisted with: FDST 849
Prerequisites: FDST 205; FDST 448/848 or parallel; BIOC 401.
Description: Experiments involving the isolation, purification, and characterization of the molecular components of foods.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Prerequisite for: FDST 458, FDST 858
Course and Laboratory Fee: $20

FDST 451 Food Science and Technology Seminar
Prerequisites: Permission.
Description: Student presentations of food science literature and research.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

FDST 452 Physical Chemistry of Foods
Crosslisted with: FDST 852
Prerequisites: FDST 448/848 or instructor approval.
Description: 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.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded

FDST 455 Microbiology of Fermented Foods
Crosslisted with: FDST 855, MBIO 455
Prerequisites: BIOS 312
Notes: On-campus students must also register for FDST 455L/855L.
Description: 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.
Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Offered: SPRING

FDST 455L Microbiology of Fermented Foods Laboratory
Crosslisted with: FDST 855L, MBIO 455L
Prerequisites: FDST 405/805 and parallel FDST 455/855/MBIO 455
Description: Experiments involving the microorganisms and fermentation of foods and beverages.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option
Offered: SPRING

FDST 458 Advanced Food Analysis
Crosslisted with: FDST 858
Prerequisites: FDST 205, 448/848, and FDST 449/849.
Description: 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.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Course and Laboratory Fee: $20

FDST 460 Food Product Development Concepts I
Crosslisted with: FDST 860
Prerequisites: FDST 405/805 and FDST 448/848.
Notes: Capstone course.
Description: Develop a commercially viable food product using chemical, microbiological and sensory analysis principles, and marketing and packaging sciences.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
ACE: ACE 10 Integrated Product
Course and Laboratory Fee: $40
Experiential Learning: Case/Project-Based Learning

FDST 465 Food Engineering Unit Operations
Crosslisted with: FDST 865, AGST 465, AGST 865
Prerequisites: FDST/AGST 363.
Description: Unit operations and their applications to food processing.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 470 Nutraceuticals and Functional Foods
Crosslisted with: FDST 870
Prerequisites: BIOC 401 or BIOC/BIOS/CHEM 431/831.
Description: Evaluation of natural compounds impact on human health. Inflammation, cancer, heart disease, and the impact of gut micro-flora on health.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

FDST 492 Special Topics in Food Science and Technology
Crosslisted with: FDST 892
Prerequisites: FDST 205 or BIOS 312 or CHEM 251 or CHEM 253 or junior standing or higher
Description: Special topics that address current and emerging issues in food science and technology.
Credit Hours: 1-6
Min credits per semester: 1
Max credits per semester: 6
Max credits per degree: 24
Grading Option: Graded with Option

FDST 495 Internship Experience
Prerequisites: Permission
Notes: Sophomore standing or higher and permission
Description: Professional experience in a food science and technology area. Experience may be with a business, government agency, organization, or a university research, extension, or teaching program.
Credit Hours: 0-3
Min credits per semester:
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Pass No Pass

FDST 498 Undergraduate Research Experience
Prerequisites: Permission
Notes: Sophomore standing or higher
Description: Conduct a scholarly research project investigating a specific problem.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

FDST 499H Honors Thesis
Prerequisites: Permission
Notes: AGRI 299H recommended.
Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.
Credit Hours: 1-3
Min credits per semester: 1
Max credits per semester: 3
Max credits per degree: 6
Grading Option: Graded with Option

PLEASE NOTE
This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your college or department academic advisor. Advisors also can help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Career Information

The following represents a sample of the internships, jobs and graduate school programs that current students and recent graduates have reported.

Jobs of Recent Graduates

- Associate Food Scientist, ConAgra Foods - Omaha, NE
- Leadership Development Program - Quality Emphasis, Ardent Mills - Wichita, KS
- Quality Assurance/Food Safety Specialist, Smithfield Farmland - Wichita, KS
- Food Safety, Quality and Regulatory Associate, Cargill - Columbus, NE
- Lab Technician, SensoryEffects - Lincoln, NE
- Quality Development Associate, ConAgra Brands - Russellville, AR
- Associate Food Scientist, International Spices - Fremont, NE
- Leadership Development Program - Operations, Ardent Mills - Denver, CO
- Quality Assurance, Hormel Foods - Rochelle, IL

Internships

- Quality Assurance Intern, Ardent Mills - Kenosha, WI
- Product Development Intern, ConAgra - Omaha, NE
- Dairy Foods R&D - Product Development Intern, Land O'Lakes - Arden Hills, MN
- Quality Chemist Intern, Cargill - Wahpeton, ND
- Food Safety Intern, Land O'Frost - Lansing, IL
- Quality Intern, ConAgra Foods - Marshall, MO
- Quality Assurance Intern, Tyson Fresh Meats - Sioux City, IA
- Quality Assurance Intern, Land O' Frost Deli Meats - Madisonville, KY
- Lab Intern, Pro-Pet LLC - St. Marys, OH
- Research and Development Intern, Cargill - Wayzata, MN

Graduate & Professional Schools

- Master's in Food Science & Technology, University of Nebraska-Lincoln - Lincoln, NE
- Master's in Food Science, Kansas State University - Manhattan, KS
- Doctor of Pharmacy, University of Nebraska Medical Center - Omaha, NE
- Master's in Food Science, Cornell University - Ithaca, NY
- Master's Food Science, Purdue University - West Lafayette, IN
- Ph.D., University of Nebraska Medical Center - Omaha, NE
- Master's in Complex Biosystems, University of Nebraska - Lincoln, NE
- Master's Food Science, University of Illinois Urbana-Champaign - Champaign, IL
- Dentistry, University of Iowa - Iowa City, IA