

# 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. 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 ensure 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 their 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.

### 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<sup>1</sup> (>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.

<sup>1</sup> Includes courses taught by CASNR faculty through interdisciplinary prefixes (e.g., LIFE, MBIO, ENVR, SCIL, EAEP, 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/) (<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. Integrate knowledge and experience from across disciplines and apply it to novel situations.
4. Define and work within relevant aspects of food law and regulation, and industry best practices.

## Major Requirements

### College Integrative Course (ACE 8)

SCIL 101	Science and Decision-Making for a Complex World	3
Credit Hours Subtotal:		3

### Natural Sciences (ACE 4)

CHEM 109A & CHEM 109L	General Chemistry I and General Chemistry I Laboratory	4
LIFE 120 & 120L	Fundamentals of Biology I and Fundamentals of Biology I laboratory	4
Credit Hours Subtotal:		8

### Additional Science Course Requirements

CHEM 110A & CHEM 110L	General Chemistry II and General Chemistry II Laboratory	4
LIFE 121 & 121L	Fundamentals of Biology II and Fundamentals of Biology II Laboratory	4
BIOS 312	Microbiology	3
Select one of the following series:		4-5

CHEM 251 & CHEM 253 Organic Chemistry I and Organic Chemistry I Laboratory <sup>1</sup>

OR

CHEM 261 & CHEM 263 Mechanistic Organic Chemistry I and Mechanistic Organic Chemistry I Laboratory

Select one of the following series: 4-5

BIOC 401 & 401L	Elements of Biochemistry and Laboratory for Elements of Biochemistry	
OR		
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 141	Physics for Life Sciences I	
PHYS 151	Elements of Physics	
PHYS 211	General Physics I	
Credit Hours Subtotal:		23-24
<b>Mathematics and Statistics (ACE 3)</b>		
STAT 218 or ECON 215	Introduction to Statistics Statistics	3
Select one of the following:		3-5
MATH 104	Applied Calculus	
MATH 106	Calculus I	
Credit Hours Subtotal:		8
<b>Communications (ACE 1)</b>		
Select one of the following:		3
ENGL 150	Writing and Inquiry	
ENGL 151	Writing for Change	
ENGL 254	Writing and Communities	
JGEN 120	Basic Business Communication	
JGEN 200	Technical Communication I	
JGEN 300	Technical Communication II	
Credit Hours Subtotal:		3
<b>ACE 2 Outcome</b>		
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 215	Visual Communication	
COMM 283	Interpersonal Communication	
COMM 286	Business and Professional Communication	
JGEN 300	Technical Communication II	
MRKT 257	Sales Communication	
NRES 301	Environmental Communication Skills	
TMFD 121	Visual Communication with Animation	
Credit Hours Subtotal:		3
<b>Economics (ACE 6)</b>		
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	

PSYC 181	Introduction to Psychology	
PSYC 288	The Psychology of Social Behavior	
SOCI 101	Introduction to Sociology	
Credit Hours Subtotal:		3
<b>ACE Requirement</b>		
<i>Humanities (ACE 5)</i>		3
Select one course from the approved ACE 5 list ( <a href="https://ace.unl.edu/courses">https://ace.unl.edu/courses</a> ( <a href="https://ace.unl.edu/courses/">https://ace.unl.edu/courses/</a> )) Consider PHIL 105 The Philosophy of Food		
<i>Arts (ACE 7)</i>		3
Select one course from the approved ACE 7 list ( <a href="https://ace.unl.edu/courses">https://ace.unl.edu/courses</a> ( <a href="https://ace.unl.edu/courses/">https://ace.unl.edu/courses/</a> ))		
<i>Global Awareness/Human Diversity (ACE 9)</i>		3
Select one course from the approved ACE 9 list ( <a href="https://ace.unl.edu/courses">https://ace.unl.edu/courses</a> ( <a href="https://ace.unl.edu/courses/">https://ace.unl.edu/courses/</a> )) Consider GLST 214 Food and Culture or NUTR 253 Cultural Aspects of Food and Nutrition		
Credit Hours Subtotal:		9
<b>Food Science &amp; Technology Core Requirements</b>		
FDST 101	Introductory Food Science	2
FDST 132	Practical Applications in Food Science	1
FDST 205	Food Composition and Analysis	3
FDST 280	Contemporary Issues in Food Science	3
FDST 403	Food Quality Assurance	3
FDST 405 / BIOS 445	Food Microbiology	3
BIOS 446	Food Microbiology Laboratory	2
FDST 448	Food Chemistry	3
FDST 449	Food Chemistry Laboratory	1
FDST 451	Food Science and Technology Seminar	1
FDST 458	Advanced Food Analysis	3
FDST 460	Food Product Development Concepts I (ACE 10)	3
<i>Nutrition</i>		
Select one of the following:		3
NUTR 250	Human Nutrition and Metabolism	
NUTR 455	Advanced Nutrition	
ASCI 421	Advanced Animal Nutrition	
Credit Hours Subtotal:		31
<b>Total Credit Hours</b>		<b>91-92</b>

<sup>1</sup> 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.

<sup>2</sup> Students are encouraged to consider FDST 430 as one of the courses used to fulfill the technical electives.

## Food and Technology Option

### Required Courses

FDST 430 / STAT 430	Sensory Evaluation	3
FDST 363 / AGST 363	Heat and Mass Transfer	3

FDST 465 / AGST 465	Food Engineering Unit Operations	3
Select two of the following:		6
FDST 367	Pet Food Manufacturing	
FDST 369	Food Preservation Principles and Packaging	
ASCI 310	Fresh Meats	
ASCI 410	Processed Meats	
Select two of ACCT, AECN (except AECN 100), ALEC (except ALEC 134), AGRI 115, AGST, ASCI, BIOC (except BIOC 101), BIOS (except BIOS 100), BLAW, BSAD (except 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 131), FINA, MATH 107 or higher, MNGT, MRKT, NUTR (except NUTR 131, NUTR 150, NUTR 372), PLAS, PLPT, PHYS, STAT (except STAT 100), VBMS		3-7
Credit Hours Subtotal:		18-22
<b>Total Credit Hours</b>		<b>18-22</b>

## Food and Health Option

### Required Courses

BIOS 314	Microbiology Laboratory	1
BIOS 201	General Genetics	4
Select one of the following:		3-5
BIOS 213 & 213L	Human Physiology and Human Physiology Laboratory	
BIOS 214	Human Anatomy	
ASCI 340	Animal Physiological Systems	
Select three of the following:		8-9
FDST 415	Food Mycology	
FDST 425	Food Toxicology	
FDST 442	My Gut, My Health, My Food	
FDST 455 / MBIO 455 & FDST 455L / MBIO 455L	Microbiology of Fermented Foods and Microbiology of Fermented Foods Laboratory	
FDST 470	Nutraceuticals and Functional Foods	
Credit Hours Subtotal:		16-19
<b>Total Credit Hours</b>		<b>16-19</b>

## 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 (FDST 396).

## 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
<b>Total Credit Hours</b>		<b>12</b>

### 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
<b>Additional FDST courses</b>		
Select 10-11 hours		9-10
Credit Hours Subtotal:		9
<b>Total Credit Hours</b>		<b>18</b>

### 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	Food Mycology	3
FDST 455 / MBIO 455 & FDST 455L / MBIO 455L	Microbiology of Fermented Foods and Microbiology of Fermented Foods Laboratory	3



Credit Hours Subtotal:	6
<b>Elective Courses</b>	
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
<b>Total Credit Hours</b>	<b>12</b>

**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

**Course and Laboratory Fee:** \$5

**FDST 131H The Science of Food**

**Crosslisted with:** CHEM 131H, NUTR 131H

**Prerequisites:** Credit toward the degree cannot be earned in both FDST/CHEM/NUTR 131 and FDST/CHEM/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

**Course and Laboratory Fee:** \$5

**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

**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:** CHEM 106A and 106L or CHEM 110A and 110L

**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 369 Food Preservation Principles and Packaging

**Prerequisites:** CHEM 105A/L or CHEM 109A/L or CHEM 113A/L; STAT 218

**Description:** Examination of additions, removals, treatments, packaging and preventions taken in order to maintain safety, quality and healthiness of food materials during distribution and storage for the benefit of the global population and its food system.

**Credit Hours:** 3

**Max credits per semester:** 3

**Max credits per degree:** 3

**Grading Option:** Graded

**Offered:** SPRING

### 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 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 445/845.

**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 Food Mycology****Crosslisted with:** FDST 815**Prerequisites:** Junior or Senior standing, 3 hours BIOS or LIFE**Description:** The role of fungi in human food, including edible and poisonous mushrooms, fungi used in food processing (especially yeasts), and the occurrence, growth, and mycotoxin production of molds in human foods, animal feeds, and the human environment. Methods and techniques for culturing, enumerating and identifying molds, yeasts, and mushrooms. 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**Course and Laboratory Fee:** \$50**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 426 Food Safety Auditor****Crosslisted with:** FDST 826**Prerequisites:** Major in Food Science & Technology and Senior Standing**Notes:** 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.**Description:** Preparation for a career that will include inspections and audits as a standard part of ensuring a safe food production chain.**Credit Hours:** 2**Max credits per semester:** 2**Max credits per degree:** 2**Grading Option:** Graded**Offered:** SPRING**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

**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:** 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

**Course and Laboratory Fee:** \$50

**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

## 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