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 studies, and 2 units of foreign language. Students must also meet performance requirements: ACT composite of 20 or higher OR combined SAT score of 950 or higher OR combined SAT score of 16 on 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. For students entering the PGA Golf Management degree program, a certified golf handicap of 12 or better (e.g., USGA handicap card) or written ability (MS Word file) equivalent to a 12 or better handicap by a PGA professional or high school golf coach is required. For more information, please visit: http://pgm.unl.edu/requirements.

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 UNL, or within the first calendar year at Nebraska, whichever takes longer, excluding foreign languages. Students have up to 60 credit hours to remove foreign 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 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.

Foreign Languages/Language Requirement

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

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.

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

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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 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 degree 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
- 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 is 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. The University of Nebraska at Omaha (UNO) cooperates with CASNR in providing four-semester pre-agricultural sciences, pre-natural resources, pre-food science and technology, pre-horticulture, and pre-turfgrass and landscape management transfer programs.

A student enrolled in these programs may transfer all satisfactorily completed academic credits identified in the suggested program of study and enter CASNR to study toward a degree program leading to a bachelor of science degree. The total program would require a minimum of four years or eight semesters (16 credit hours/semester or 120 credit hours).

Nebraska CASNR faculty teach horticulture and food science and technology courses at UNO to assist an urban population in better understanding the food processing, horticulture, and landscape horticulture industries.

For more information, contact the CASNR Dean's Office, 800-472-8800, ext. 2541.

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 UNL and participate in prior-approved education abroad programs. 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 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. 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 Nebraska 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

<table>
<thead>
<tr>
<th>College Integrative Course (ACE 8)</th>
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</thead>
<tbody>
<tr>
<td>SCIL 101</td>
</tr>
</tbody>
</table>

Credit Hours Subtotal: 3

Natural Sciences
Select one of the following: 4-5

<table>
<thead>
<tr>
<th>BIOC 401 &amp; BIOC 401L</th>
<th>Elements of Biochemistry and Laboratory for Elements of Biochemistry</th>
</tr>
</thead>
</table>
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 2
FDST 403 Food Quality Assurance 3
FDST 451 Food Science and Technology Seminar 1
FDST 460 Food Product Development Concepts I 3

Process Technology Courses

FDST 363 / MSYM 363 Heat and Mass Transfer 3
FDST 465 / MSYM 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 Microbiology of Fermented Foods & MSYM 455L 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: 42

Technical Electives

Select 10-11 hours from the following areas: 2

ACCT, AECN (except 100), AGRO (except 110), ALEC (except 134), ASCI (except 101), BIOL (except 101), BIOS, BLAw, BSAD (except 111), BSEN (except 100), CHEM (except 101), CHME (except 113), CSCE, Econ, FDST (except 101, 131, 372), FINA, HORT (352, 353, 354, 471), MATH 107 or higher, MNGT, MRKT, MSYM, NUTR (except 150, 372), PHYS, STAT, VBMS (except 101)

Credit Hours Subtotal: 42

Economics, Humanities and Social Sciences

Select one of the following: 3

ECON 211 Principles of Macroeconomics
Credit Hours Subtotal: 10

Free Electives
Select 3-7 hours 3-7
Credit Hours Subtotal: 4
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 / MSYM 363 Heat and Mass Transfer
FDST 465 / MSYM 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
Select one of the following: 2-3
FDST 101 Introductory Food Science
FDST 131 / CHEM 131 / NUTR 131 The Science of Food
FDST 205 Food Composition and Analysis 3
FDST 280 Contemporary Issues in Food Science 2
Credit Hours Subtotal: 7-8

Additional FDST courses
Select 10-11 hours 10-11
Credit Hours Subtotal: 10-11
Total Credit Hours 17-19

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 107 Introduction to the Companion Animal Food Industry
Crosslisted with: ASCI 107
Description: The companion animal food industry, products, processes, and career opportunities.
Credit Hours: 1
Max credits per semester: 1
Max credits per degree: 1
Grading Option: Graded with Option

FDST 131 The Science of Food
Crosslisted with: CHEM 131, NUTR 131
Description: General scientific concepts in biology, chemistry, and physics using food as a model. What food is from both chemical and nutritional perspectives, and the fate of food from when it leaves the farm to when it becomes a part of the individual. Assists students in making intelligent decisions about many food related controversial issues (e.g., food irradiation, food additives, health foods).
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

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 109 and 110; 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 414, FDST 814

ACE: ACE 4 Science
FDST 280 Contemporary Issues in Food Science

Description: Current issues in food science, organic foods, obesity and the food industry, food safety, allergens, biotechnology and GMOs, functional foods, food psychology and culture, and other contemporary topics.

Credit Hours: 2
Max credits per semester: 2
Max credits per degree: 2
Grading Option: Graded with Option
Offered: FALL

FDST 301 Chemistry of Food

Notes: Will not count toward a FDST major.

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: MSYM 363
Prerequisites: MATH 104 or 106; MSYM 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 372 Food Safety and Sanitation

Crosslisted with: NUTR 372
Prerequisites: One course in chemistry and one course in biological sciences.

Description: Various factors that result in food illness: food allergy, natural toxins, parasites, microbial and viral food borne infections and food borne intoxications. Students will assess hazards, identify critical control points and establish monitoring and system verification procedures.

Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option

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 109

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

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

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

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
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Crosslisted with</th>
<th>Prerequisites</th>
<th>Description</th>
<th>Credit Hours</th>
<th>Max credits per semester:</th>
<th>Max credits per degree:</th>
<th>Grading Option</th>
<th>Offered</th>
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</thead>
<tbody>
<tr>
<td>FDST 413</td>
<td>Baking Technology</td>
<td></td>
<td></td>
<td>Chemistry and technology of bakery products, including formulation, ingredient functionality, processing, and quality evaluation.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded</td>
<td>FALL</td>
</tr>
<tr>
<td>FDST 414</td>
<td>Egg Processing from Science to Technology</td>
<td></td>
<td></td>
<td>Chemistry and chemical composition of an egg. Principles, equipment, and quality assessment of egg processing and preservation operations.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
<td>FALL</td>
</tr>
<tr>
<td>FDST 415</td>
<td>Molds and Mycotoxins in Food, Feed, and the Human Environment</td>
<td></td>
<td></td>
<td>Occurrence, growth, and mycotoxin production of molds in human foods, animal feeds, and the human environment.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
<td>FALL</td>
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<tr>
<td>FDST 419</td>
<td>Meat Investigations</td>
<td></td>
<td></td>
<td>Conduct independent research and study meat industry problems in processing, production, storage, and preparation of meat and meat products.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
<td>FALL</td>
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<tr>
<td>FDST 420</td>
<td>Fruit and Vegetable Technology</td>
<td></td>
<td></td>
<td>Harvesting and postharvest handling of fruit and vegetables, processing and safety issues, processes of ripening and/or maturation in fresh fruits and vegetables.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
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<tr>
<td>FDST 425</td>
<td>Food Toxicology</td>
<td></td>
<td></td>
<td>Toxic substances that may be found in foods with emphasis on bacterial toxins, mycotoxins, and naturally occurring toxicants of plants, animals, and seafood.</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>Graded with Option</td>
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<tr>
<td>FDST 430</td>
<td>Sensory Evaluation</td>
<td></td>
<td></td>
<td>Principles of milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
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<tr>
<td>FDST 441</td>
<td>Functional Properties of Food</td>
<td></td>
<td></td>
<td>Relationship of structure and functionality of ingredients in food systems.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
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<tr>
<td>FDST 442</td>
<td>Omnivore's Digestive-Tract Microbiome</td>
<td></td>
<td></td>
<td>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.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
<td></td>
</tr>
<tr>
<td>FDST 448</td>
<td>Sensory Evaluation</td>
<td></td>
<td></td>
<td>Principles of milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.</td>
<td>3</td>
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<td>Graded with Option</td>
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<tr>
<td>FDST 813</td>
<td>Baking Technology</td>
<td></td>
<td></td>
<td>Principles of milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.</td>
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<td>Graded with Option</td>
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<tr>
<td>FDST 819</td>
<td>Meat Investigations</td>
<td></td>
<td></td>
<td>Conduct independent research and study meat industry problems in processing, production, storage, and preparation of meat and meat products.</td>
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<td>3</td>
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<td>Graded with Option</td>
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<tr>
<td>FDST 820</td>
<td>Fruit and Vegetable Technology</td>
<td></td>
<td></td>
<td>Harvesting and postharvest handling of fruit and vegetables, processing and safety issues, processes of ripening and/or maturation in fresh fruits and vegetables.</td>
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<td>Graded with Option</td>
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<tr>
<td>FDST 825</td>
<td>Food Toxicology</td>
<td></td>
<td></td>
<td>Toxic substances that may be found in foods with emphasis on bacterial toxins, mycotoxins, and naturally occurring toxicants of plants, animals, and seafood.</td>
<td>2</td>
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<td>Graded with Option</td>
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<tr>
<td>FDST 829</td>
<td>Dairy Products Technology</td>
<td></td>
<td></td>
<td>Principles of milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.</td>
<td>3</td>
<td>3</td>
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<td>Graded with Option</td>
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<tr>
<td>FDST 830</td>
<td>Sensory Evaluation</td>
<td></td>
<td></td>
<td>Principles of milk processing and manufacture of cultured dairy products, cheeses, ice cream, and concentrated dairy products.</td>
<td>3</td>
<td>3</td>
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<td>Graded with Option</td>
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</tr>
<tr>
<td>NUTR 441</td>
<td>Functional Properties of Food</td>
<td></td>
<td></td>
<td>Relationship of structure and functionality of ingredients in food systems.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>Graded with Option</td>
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</tr>
</tbody>
</table>

*Prerequisites:* BIOS 312 or equivalent.

*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.
FDST 445 Experimental Foods
Crosslisted with: FDST 845, NUTR 445, NUTR 845
Prerequisites: NUTR 244 and 245; BIOC 401.
Description: Introduction to food research. Application of research techniques to selected problems.
Credit Hours: 3
Max credits per semester: 3
Max credits per degree: 3
Grading Option: Graded with Option
Prerequisite for: NUTR 449

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

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

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: FDST 405/805
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

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

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

FDST 465 Food Engineering Unit Operations
Crosslisted with: FDST 865, MSYM 465, MSYM 865
Prerequisites: FDST/MSYM 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 490 Food Industry Experience
Prerequisites: Junior or senior standing and permission.
Notes: Required seminars/discussions to be completed prior to the internship. At the completion of the internship, a written report of the experience and a seminar presentation of the same material is required.
Description: Obtain a working knowledge of the food industry and begin developing professional credentials.
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 499H Honors Thesis
Prerequisites: Admission to the University Honors Program and permission, AGRI 299H recommended.
Description: Conduct a scholarly research project and write a University Honors Program or undergraduate thesis.
Credit Hours: 3-6
Min credits per semester: 3
Max credits per semester: 6
Max credits per degree: 6
Grading Option: Graded

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
- Graduate Student, University of Nebraska - Lincoln NE
- 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 Brands - 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
- Graduate Student in Food Science & Technology, University of Nebraska-Lincoln - Lincoln NE
- Graduate Student in Food Science, Kansas State University - Manhattan KS
- Doctor of Pharmacy, University of Nebraska Medical Center - Omaha NE
- Graduate Student in Food Science, Cornell University - Ithaca NY
- Graduate Student in Food Science, Purdue University - West Lafayette IN
- Doctorate of Medicine, University of Nebraska Medical Center - Omaha NE
- Complex Biosystems, University of Nebraska - Lincoln NE
- Food Science, University of Illinois Urbana-Champaign - Champaign IL
- Dentistry, University of Iowa - Iowa City IA