

# Food Science (BS): Science Concentration

To see more about what you will learn in this program, visit the Learning Outcomes website (<https://apps.oirp.ncsu.edu/pgas/>)!

The Food Science Bachelor of Science degree is offered through two curricula emphasizing science or technology. The science curriculum is designed for students desiring a more analytically intense program leading to technical careers in the food industry or graduate school. Students with an interest in business opportunities will find the technology program permits greater flexibility to pursue coursework in business, agricultural economics, or related fields.

## Plan Requirements

Code	Title	Hours	Counts towards
<b>Orientation</b>			
ALS 103	Freshman Transitions and Diversity in Agriculture & Life Sciences	1	
or ALS 303	Transfer Transitions and Diversity in Agriculture & Life Sciences		
<b>Communication</b>			
COM 110	Public Speaking	3	
or COM 112	Interpersonal Communication		
<b>Mathematical Sciences</b>			
MA 107	Precalculus I	3	
MA 131 & MA 132	Calculus for Life and Management Sciences A and Computational Mathematics for Life and Management Sciences	4	
MA 231	Calculus for Life and Management Sciences B	3	
ST 311	Introduction to Statistics	3	
<b>Sciences</b>			
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
or BIO 183	Introductory Biology: Cellular and Molecular Biology		
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory	4	

CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	4
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	4
CH 223 & CH 224	Organic Chemistry II and Organic Chemistry II Lab	4
BCH 351	General Biochemistry	3
MB 351 & MB 352	General Microbiology and General Microbiology Laboratory	4
PY 211	College Physics I	4
PY 212	College Physics II	4
<b>Major Requirements</b>		
FS 201	Introduction to Food Science	3
FS 231	Principles of Food and Bioprocess Engineering	4
FS 290	Careers in Food and Bioprocessing Sciences	1
FS 402	Chemistry of Food and Bioprocessed Materials	4
FS 403	Analytical Techniques in Food & Bioprocessing Science	4
FS 405	Food Microbiology	3
FS 406	Food Microbiology Lab 1	1
FS 421	Food Preservation	3
FS 475	Problems and Design in Food and Bioprocessing Science	3
NTR 301	Introduction to Human Nutrition	3

Food Science Electives (p. 2)	6
<b>GEP Courses</b>	
ENG 101 Academic Writing and Research <sup>1</sup>	4
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	6
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	6
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	2
GEP US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</a> )	3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	5
GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> ) (verify requirement)	
Foreign Language Proficiency ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/</a> ) (verify requirement)	
<b>Free Electives</b>	
Free Electives (12 Hr S/U Lmt) <sup>2</sup>	7
<b>Total Hours</b>	<b>120</b>

<sup>1</sup> A grade of C- or higher is required.

<sup>2</sup> Students should consult their academic advisors to determine which courses fill this requirement.

## Food Science Electives

Code	Title	Hours	Counts towards
Select a course with a FS prefix (except those required in major) not used to satisfy another requirement. A total of 35 credits in Food Science are required.			
FS 250	Basics of Food Safety & Quality	3	
FS 322	Muscle Foods and Eggs	3	
FS 324	Milk and Dairy Products	3	

FS 325	Introduction to Brewing Science and Technology	3
FS 330	Science of Food Preparation	3
FS 352	Introduction to Microbiological Food Safety Hazards	3
FS 354	Food Sanitation	3
FS 401	Advanced Nutrition and Metabolism	3
FS 416	Quality Control in Food and Bioprocessing	3
FS 435	Food Safety Management Systems	3
FS 453	Food Laws and Regulations	3
FS 462	Postharvest Physiology	3
FS 471	Professionalism & Project Preparation in Food & Bioprocessing Science	1
FS 481	Research Experience in Food and Bioprocessing Sciences	3
FS 501	Advanced Nutrition and Metabolism	3
FS 516	Quality Control in Food and Bioprocessing	3
FS 520	Pre-Harvest Food Safety	3
FS 522	Food Packaging	3
FS 530	Post-Harvest Food Safety	3
FS 535	Food Safety Management Systems	3
FS 540	Food Safety and Public Health	3
FS 550	Food Industry Study Tour	2
FS 553	Food Laws and Regulations	3
FS 554	Lactation, Milk, and Nutrition	3
FS 555	Exercise Nutrition	3

FS 557	Nutraceuticals and Functional Foods	3
FS 562	Postharvest Physiology	3
FS 567	Sensory Analysis of Foods	3
FS 580	Professional Development and Ethics in Food Safety	1
FSA 520	Pre-Harvest Food Safety	3
FSA 530	Post-Harvest Food Safety	3
FSA 540	Food Safety and Public Health	3
FSA 580	Professional Development and Ethics in Food Safety	1

## Semester Sequence

This is a sample.

### First Year

Fall Semester	Hours
ALS 103 Freshman Transitions and Diversity in Agriculture & Life Sciences	1
BIO 183 Introductory Biology: Cellular and Molecular Biology	4
ENG 101 Academic Writing and Research	4
MA 107 Precalculus I	3
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	1
<b>Hours</b>	<b>16</b>

### Spring Semester

CH 101 Chemistry - A Molecular Science	3
CH 102 General Chemistry Laboratory	1
FS 201 Introduction to Food Science	3
MA 131 Calculus for Life and Management Sciences A	3
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	3
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	1
<b>Hours</b>	<b>14</b>

### Second Year

Fall Semester	Hours
CH 221 Organic Chemistry I	3
CH 222 Organic Chemistry I Lab	1

FS 290 Careers in Food and Bioprocessing Sciences	1
MA 231 Calculus for Life and Management Sciences B	3
MA 132 Computational Mathematics for Life and Management Sciences	1
PY 211 College Physics I	4
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	3

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**Hours 16**

### Spring Semester

CH 223 Organic Chemistry II	3
CH 224 Organic Chemistry II Lab	1
FS 231 Principles of Food and Bioprocess Engineering	4
PY 212 College Physics II	4
COM 110 Public Speaking or COM 112 or Interpersonal Communication	3

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**Hours 15**

### Third Year

#### Fall Semester

CH 201 Chemistry - A Quantitative Science	3
CH 202 Quantitative Chemistry Laboratory	1
FS 402 Chemistry of Food and Bioprocessed Materials	4
MB 351 General Microbiology	3
MB 352 General Microbiology Laboratory	1
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	3

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**Hours 15**

#### Spring Semester

BCH 351 General Biochemistry	3
FS 403 Analytical Techniques in Food & Bioprocessing Science	4
FS 405 Food Microbiology	3
FS 406 Food Microbiology Lab	1
GEP US Diversity, Equity, and Inclusion ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/</a> )	3

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**Hours 14**

### Fourth Year

#### Fall Semester

FS 421 Food Preservation	3
NTR 301 Introduction to Human Nutrition	3
Food Science Electives (p. 2)	3
GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	3
ST 311 Introduction to Statistics	3

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**Hours 15**

#### Spring Semester

FS 475 Problems and Design in Food and Bioprocessing Science	3
Food Science Electives (p. 2)	3

Free/Minor Elective	3
Free/Minor Elective	3
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> )	3
<b>Hours</b>	<b>15</b>
<b>Total Hours</b>	<b>120</b>

## Career Opportunities

Consumer demand for safe, high quality, nutritious foods and biopharmaceutical products, as well as for educational programs designed to promote healthy eating, creates a variety of career opportunities in the food, pharmaceutical and the allied health industries. Industrial opportunities include management, research and development, process supervision, quality control and assurance, procurement, distribution, and sales. Public health opportunities include educational program development, delivery, and assessment. In addition, graduates hold positions with government agencies and many with advanced degrees have teaching and/or research positions in colleges and universities.

## Food Science

Many career opportunities exist in the food and beverage industry, the world's largest manufacturing sector, for graduates with a Food Science degree. Food science professionals are involved in the discovery of new food sources, new methods of food preservation, advances in food chemistry and sensory science and even product development. Positions are found worldwide, providing technical support to the food, beverage, and pharmaceutical industries and also government agencies. Food scientists work to ensure the safety and quality of foods through the application of basic scientific principles. The demand for food scientists continues to increase as the food industry expands.

The undergraduate Food Science major has two emphasis tracks. One is **Science** and the other is **Technology**. The B.S. in Food Science with a **Science** emphasis is designed for students who want more rigorous science courses to prepare them for graduate school or careers in the food, pharmaceutical, and or bioprocessing industries. The B.S. in Food Science with a **Technology** emphasis is designed for students more interested in business opportunities for technically trained individuals. It offers greater flexibility in complementing Food Science coursework with business, agricultural commodity, and computer science courses.

## Scholarships

The department provides both merit and financial need scholarships to encourage and assist students preparing for careers in Food, Bioprocessing, or Nutrition Science.