Food Science (BS): Technology 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
Orientation			
ALS 103	Freshman Transitions and Diversity in Agriculture & Life Sciences	1	
or ALS 303	Transfer Transitions and Diversity in Agriculture & Life Sciences		
Communication			
COM 110	Public Speaking	3	
or COM 112	Interpersonal Communication		
Mathematical Sciences			
MA 107	Precalculus I	3	
Select one of the following:		6	
MA 131 & MA 231	Calculus for Life and Management Sciences A and Calculus for Life and Management Sciences B		
MA 114 & MA 121	Introduction to Finite Mathematics with Applications and Elements of Calculus		
MA 132	Computational Mathematics for Life and Management Sciences	1	
ST 311	Introduction to Statistics	3	
Sciences			
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	
Select one of the following:		4	
CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab		
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab		
MB 351 & MB 352	General Microbiology and General Microbiology Laboratory	4	
PY 211	College Physics I	4	
Major Requirements			
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 & FS 406	Food Microbiology and Food Microbiology Lab	4	

FS 416	Quality Control in Food and Bioprocessing	3
FS 421	Food Preservation	3
FS 475	Problems and Design in Food and Bioprocessing Science	3
Food Science Electives (p. 2)		6
Business & Economics/Minor Requirements		
Nine credits of Business or Economics must be included or the student must complete a minor in any field of their choosing. If a minor is chosen, restricted electives and free electives may be used to fulfill the minor requirements. Most minors require 15 to 21 credits. Note: 300 level BUS/MIE courses are restricted to students in the BUS minor or major; 400 level BUS courses restricted to students in BUS major.		
Select one of the following:		3
ARE 201	Introduction to Agricultural & Resource Economics	
ARE 201A	Introduction to Agricultural & Resource Economics	
EC 201	Principles of Microeconomics	
EC 205	Fundamentals of Economics	
Business/Economics Electives (p. 3)		6
GEP Courses		
ENG 101	Academic Writing and Research [1]	4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		6
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		5
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/) (verify requirement)		
Free Electives		
Free Electives (12 Hr S/U Lmt)		9
Total Hours		**120**

1 A grade of C- or higher is required.

2 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
HS 462	Postharvest Physiology	3
HS 562	Postharvest Physiology	3

Business/Economics Electives

Code	Title	Hours	Counts towards
ARE 301	Intermediate Microeconomics	3	
ARE 306	Agricultural Law	3	
ARE 311	Agricultural Markets	3	
ARE 312	Agribusiness Marketing	3	
ARE 336	Introduction to Resource and Environmental Economics	3	
ARE 433	U.S. Agricultural Policy	3	
BUS 320	Financial Management	3	
BUS 360	Marketing Methods	3	
BUS 420	Financial Management of Corporations	3	
BUS 449	Information Technology Capstone	3	
BUS 462	Marketing Research	3	
BUS 464	International Marketing	3	
BUS 465	Traditional and Digital Brand Promotion	3	
EC 202	Principles of Macroeconomics	3	
EC 301	Intermediate Microeconomics	3	
EC 302	Intermediate Macroeconomics	3	
EC 336	Introduction to Resource and Environmental Economics	3	
EC 404	Money, Financial Markets, and the Economy	3	
EC 431	Labor Economics	3	
EC 449	International Finance	3	

MIE 305	Legal and Regulatory Environment	3
MIE 310	Introduction to Entrepreneurship	3
MIE 330	Human Resource Management	3

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 (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
	Hours	**16**
Spring Semester		
CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1
FS 201	Introduction to Food Science	3
MA 114 or MA 131	Introduction to Finite Mathematics with Applications or Calculus for Life and Management Sciences A	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
	Hours	**14**
Second Year		
Fall Semester		
Select one of the following:		4
CH 220 & CH 222	Introductory Organic Chemistry and Organic Chemistry I Lab	
CH 221 & CH 222	Organic Chemistry I and Organic Chemistry I Lab	
FS 290	Careers in Food and Bioprocessing Sciences	1
MA 121 or MA 231	Elements of Calculus or 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 (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		2
	Hours	**15**
Spring Semester		
CH 201	Chemistry - A Quantitative Science	3
CH 202	Quantitative Chemistry Laboratory	1
FS 231	Principles of Food and Bioprocess Engineering	4
BUS/EC/Minor Elective (p. 3)		3
COM 110 or COM 112	Public Speaking or Interpersonal Communication	3
	Hours	**14**
Third Year		
Fall Semester		
FS 402	Chemistry of Food and Bioprocessed Materials	4
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		3
Food Science Elective (p. 2)		3
BUS/EC/Minor Elective (p. 3)		3
MB 351	General Microbiology	3
MB 352	General Microbiology Laboratory	1
	Hours	**17**
Spring Semester		
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 (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
BUS/EC/Minor Elective (p. 3)		3
	Hours	**14**
Fourth Year		
Fall Semester		
ST 311	Introduction to Statistics	3
FS 421	Food Preservation	3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
Free/Minor Elective		3
Free/Minor Elective		3
	Hours	**15**
Spring Semester		
FS 475	Problems and Design in Food and Bioprocessing Science	3
FS 416	Quality Control in Food and Bioprocessing	3
Food Science Elective (p. 2)		3
Free/Minor Elective		3
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
	Hours	**15**
	Total Hours	**120**

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.