FOOD SCIENCE, B.S.

Begin Campus: Any Penn State Campus
End Campus: University Park

Program Description
Food science involves the application of science and technology to food product manufacture, storage, and distribution to consumers. Food scientists are especially concerned with food safety, nutritional values, managing food quality, food plant management, and development of new products and processes. They are employed by manufacturers and distributors of food products; by chemical, packaging, and other industries that supply goods and services; by colleges and universities in teaching and research; and by government agencies concerned with food regulations and the health and well-being of the general public.

What is Food Science?
Food science is the application of chemistry, microbiology, nutrition, and engineering to the manufacture of safe, nutritious, and tasty food. The major has a strong basis in the sciences, especially chemistry, and applies that knowledge to solving practical problems in food processing. The hands-on major has students working in labs and small-scale processing facilities to put their learning into action.

You Might Like this Program If...
• You are interested in science and looking for a hands-on, applied field with good job prospects

MORE INFORMATION (http://foodscience.psu.edu/majors/why)

Entrance to Major
In order to be eligible for entrance to this major, a student must:
1. attain at least a C (2.00) cumulative grade-point average for all courses taken at the University; and
2. have third-semester classification (http://www.registrar.psu.edu/registration/semester_classification.cfm).

READ SENATE POLICY 37-30: ENTRANCE TO AND CHANGES IN MAJOR PROGRAMS OF STUDY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/37-00-entrance-to-a-college-or-major)

Degree Requirements
For the Bachelor of Science degree in Food Science, a minimum of 120 credits is required:

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Education</td>
<td>45</td>
</tr>
<tr>
<td>Electives</td>
<td>4</td>
</tr>
<tr>
<td>Requirements for the Major</td>
<td>89</td>
</tr>
</tbody>
</table>

General Education
Connecting career and curiosity, the General Education curriculum provides the opportunity for students to acquire transferable skills necessary to be successful in the future and to thrive while living in interconnected contexts. General Education aids students in developing intellectual curiosity, a strengthened ability to think, and a deeper sense of aesthetic appreciation. These are requirements for all baccalaureate students and are often partially incorporated into the requirements of a program. For additional information, see the General Education Requirements (http://bulletins.psu.edu/undergraduate/general-education/baccalaureate-degree-general-education-program) section of the Bulletin and consult your academic adviser.

The keystone symbol appears next to the title of any course that is designated as a General Education course. Program requirements may also satisfy General Education requirements and vary for each program.

Foundations (grade of C or better is required.)
• Quantification (GQ): 6 credits
• Writing and Speaking (GWS): 9 credits

Knowledge Domains
• Arts (GA): 6 credits
• Health and Wellness (GHW): 3 credits
• Humanities (GH): 6 credits
• Social and Behavioral Sciences (GS): 6 credits
• Natural Sciences (GN): 9 credits

Integrative Studies (may also complete a Knowledge Domain requirement)
• Inter-Domain or Approved Linked Courses: 6 credits

18 of these 45 credits are included in the Requirements for the Major.

University Degree Requirements
First Year Engagement
All students enrolled in a college or the Division of Undergraduate Studies at University Park, and the World Campus are required to take 1 to 3 credits of the First-Year Seminar, as specified by their college First-Year Engagement Plan.

Other Penn State colleges and campuses may require the First-Year Seminar; colleges and campuses that do not require a First-Year Seminar provide students with a first-year engagement experience.

First-year baccalaureate students entering Penn State should consult their academic adviser for these requirements.

Cultures Requirement
6 credits are required and may satisfy other requirements
• United States Cultures: 3 credits
• International Cultures: 3 credits

Writing Across the Curriculum
3 credits required from the college of graduation and likely prescribed as part of major requirements.

Total Minimum Credits
A minimum of 120 degree credits must be earned for a baccalaureate degree. The requirements for some programs may exceed 120 credits. Students should consult with their college or department adviser for information on specific credit requirements.

Quality of Work
Candidates must complete the degree requirements for their major and earn at least a 2.00 grade-point average for all courses completed within their degree program.
Limitations on Source and Time for Credit Acquisition

The college dean or campus chancellor and program faculty may require up to 24 credits of course work in the major to be taken at the location or in the college or program where the degree is earned. Credit used toward degree programs may need to be earned from a particular source or within time constraints (see Senate Policy 83-80). For more information, check the Suggested Academic Plan for your intended program.

Requirements for the Major

This includes 18 credits of General Education courses: 9 credits of GN courses; 6 credits of GQ courses; 3 credits of GWS courses.

To graduate, a student enrolled in the major must earn a grade of C or better in each course designated by the major as a C-required course, as specified by Senate Policy 82-44 (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/82-00-and-83-00-degree-requirements/#82-44).

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL 110</td>
<td>Biology: Basic Concepts and Biodiversity</td>
<td>4</td>
</tr>
<tr>
<td>BMB 211</td>
<td>Elementary Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>BMB 212</td>
<td>Elementary Biochemistry Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 110</td>
<td>Chemical Principles I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 111</td>
<td>Experimental Chemistry I</td>
<td>1</td>
</tr>
<tr>
<td>CHEM 113</td>
<td>Experimental Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>FDSC 400</td>
<td>Food Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>FDSC 405</td>
<td>Food Engineering Principles</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 406</td>
<td>Physiology of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 408</td>
<td>Food Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 409</td>
<td>Laboratory in Food Microbiology</td>
<td>2</td>
</tr>
<tr>
<td>FDSC 410</td>
<td>Chemical Methods of Food Analysis</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 411</td>
<td>Managing Food Quality</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 413</td>
<td>Science and Technology of Plant Foods</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 414</td>
<td>Science and Technology of Dairy Foods</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 415</td>
<td>Science and Technology of Muscle Foods</td>
<td>3</td>
</tr>
<tr>
<td>MICRB 201</td>
<td>Introductory Microbiology</td>
<td>3</td>
</tr>
<tr>
<td>STAT 250</td>
<td>Introduction to Biostatistics</td>
<td>3</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 112</td>
<td>Chemical Principles II</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 200</td>
<td>Introductory Food Science</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 201</td>
<td>Introductory Food Science Practicum</td>
<td>1</td>
</tr>
<tr>
<td>MICRB 202</td>
<td>Introductory Microbiology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>PHYS 250</td>
<td>Introductory Physics I</td>
<td>4</td>
</tr>
</tbody>
</table>

Prescribed Courses: Require a grade of C or better

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110</td>
<td>Organic Chemistry I</td>
<td>3</td>
</tr>
<tr>
<td>&amp; CHEM 112</td>
<td>and Organic Chemistry II</td>
<td>1</td>
</tr>
<tr>
<td>&amp; CHEM 213</td>
<td>and Laboratory in Organic Chemistry</td>
<td>3</td>
</tr>
</tbody>
</table>

Supporting Courses and Related Areas

To reflect the student’s career interests, select 12-14 credits (depending on the organic chem series that they took, a total of 6 credits or 8 credits) from department list or in consultation with adviser.

1. CHEM 202 and CHEM 210 require a grade of C or better.

Academic Advising

The objectives of the university's academic advising program are to help advisees identify and achieve their academic goals, to promote their intellectual discovery, and to encourage students to take advantage of both in-and out-of-class educational opportunities in order that they become self-directed learners and decision makers.

Both advisers and advisees share responsibility for making the advising relationship succeed. By encouraging their advisees to become engaged in their education, to meet their educational goals, and to develop the habit of learning, advisers assume a significant educational role. The advisee’s unit of enrollment will provide each advisee with a primary academic adviser, the information need to plan the chosen program of study, and referrals to other specialized resources.

READ SENATE POLICY 32-00: ADVISING POLICY (http://senate.psu.edu/policies-and-rules-for-undergraduate-students/32-00-advising-policy)

University Park

Christopher Sigler
Instructor/Academic Adviser
203 Rodney A. Erickson Food Science Building
University Park, PA 16802
814-863-6358
cms578@psu.edu

Suggested Academic Plan

University Park Campus

The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEM 110†</td>
<td>3</td>
<td>CHEM 112‡</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
<td>CHEM 113‡</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>3</td>
<td>MATH 110 or 140‡</td>
<td>4</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>2</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>BIOL 110†</td>
<td>4</td>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
in the spring semester. These courses carry the GWS designation and replace both ENGL 30 and CAS 100. Each course is 3 credits.

Advising Notes:
- Students should work with an academic adviser in the development of their plan as some courses are not taught every semester.
- If completing CHEM 212, CHEM 213 must also be completed.
- Students should consult with an academic adviser to select appropriate career interest courses.

Commonwealth Campuses
The course series listed below provides only one of the many possible ways to move through this curriculum. The University may make changes in policies, procedures, educational offerings, and requirements at any time. This plan should be used in conjunction with your degree audit (accessible in LionPATH as either an Academic Requirements or What If report). Please consult with a Penn State academic adviser on a regular basis to develop and refine an academic plan that is appropriate for you.

<table>
<thead>
<tr>
<th>Academic Requirements</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Year</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>CHEM 110†</td>
<td>3</td>
</tr>
<tr>
<td>CHEM 111†</td>
<td>1</td>
</tr>
<tr>
<td>ENGL 15, 30, or ESL 15†</td>
<td>4</td>
</tr>
<tr>
<td>First Year Seminar</td>
<td>1-3</td>
</tr>
<tr>
<td>BIOL 110†</td>
<td>4</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>15-17</td>
</tr>
<tr>
<td>Second Year</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>CHEM 202 or 210†</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 200†</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 201†</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C or 202D†</td>
<td>3</td>
</tr>
<tr>
<td>Career Interest Course</td>
<td>3</td>
</tr>
<tr>
<td>Career Interest Course</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>15</td>
</tr>
<tr>
<td>Third Year</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>FDSC 400</td>
<td>4</td>
</tr>
<tr>
<td>FDSC 408</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 409</td>
<td>2</td>
</tr>
<tr>
<td>BMB 212</td>
<td>1</td>
</tr>
<tr>
<td>CAS 100A†‡‡</td>
<td>3</td>
</tr>
<tr>
<td>General Education Course</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td>16-18</td>
</tr>
<tr>
<td>Fourth Year</td>
<td></td>
</tr>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>FDSC 413</td>
<td>3</td>
</tr>
<tr>
<td>FDSC 411</td>
<td>3</td>
</tr>
<tr>
<td>ENGL 202C or 202D†‡‡</td>
<td>3</td>
</tr>
<tr>
<td>Career Interest Course</td>
<td>3</td>
</tr>
<tr>
<td>Career Interest Course</td>
<td>3</td>
</tr>
<tr>
<td>Elective</td>
<td>4</td>
</tr>
<tr>
<td>Total Credits</td>
<td>16-18</td>
</tr>
</tbody>
</table>

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).

W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.

GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

All incoming Schreyer Honors College first-year students at University Park will take ENGL/CAS 137 in the fall semester and ENGL/CAS 138
Career Interest Course 3 Elective 4

Total Credits 127-131

* Course requires a grade of C or better for the major
‡ Course requires a grade of C or better for General Education
# Course is an Entrance to Major requirement
† Course satisfies General Education and degree requirement

University Requirements and General Education Notes:
US and IL are abbreviations used to designate courses that satisfy University Requirements (United States and International Cultures).
W, M, X, and Y are the suffixes at the end of a course number used to designate courses that satisfy University Writing Across the Curriculum requirement.
GWS, GQ, GHW, GN, GA, GH, and GS are abbreviations used to identify General Education program courses. General Education includes Foundations (GWS and GQ) and Knowledge Domains (GHW, GN, GA, GH, GS, and Integrative Studies). Foundations courses (GWS and GQ) require a grade of ‘C’ or better.

Integrative Studies courses are required for the General Education program. N is the suffix at the end of a course number used to designate an Inter-Domain course and Z is the suffix at the end of a course number used to designate a Linked course.

Advising Notes:
• Students should work with an academic adviser in the development of their plan as some courses are not taught every semester.
• If completing CHEM 212, CHEM 213 must also be completed.
• Students should consult with an academic adviser to select appropriate career interest courses.

Career Paths
Because of the heavy demand for food scientists in industry, government agencies, and research institutions, many Penn State Food Science graduates have job offers before graduation with excellent starting salaries.

Careers
Most of our graduates go on to careers in the food industry where they develop new products, supervise manufacturing operations, and work to ensure food quality and safety. Other graduates work in government agencies to enforce the regulations that keep our food supply safe.

Opportunities for Graduate Studies
A graduate degree in food can open doors to career in research and development in the food industry or academia.

Professional Resources
Institute of Food Technologists (http://www.ift.org)