

**The Pennsylvania State University
Department of Food Science
Undergraduate Program Handbook**

Prepared by the Undergraduate Program Coordinator and Department of
Food Science for undergraduates considering a major in food science.
Revised: August 2016

*Program Year
2016*

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**Not a Penn State student but thinking about majoring in
Food Science? Visit Us!**

Schedule a visit at: <http://agsci.psu.edu/futurestudents/visit>

What Is Food Science?

Food is a necessity of life, and people who produce foods and keep them safe are important to society. Food Science is the study of food and food production (from farm to fork) through a scientific lens. The field combines multiple disciplines in order to provide safe, healthy, and enjoyable food to a growing worldwide population. Food Science is a unique field that allows students to apply the basic sciences (chemistry, biology, physics, etc.) to real-world problems and make connections between what they learn and the food they eat. A Food Scientist understands how chemistry, microbiology, animal science, nutrition, engineering, and numerous other fields apply to food production and food handling. Food science plays a key role in the health, welfare, and economic status of nations and can serve society by assuring food availability, affordability, wholesomeness, and safety. Food Science also has an international professional society, *The Institute of Food Technologists* (<http://www.ift.org>), which is a great resource to learn more about Food Science.

Career Opportunities in Food Science

Penn State food scientists have found employment throughout the United States and around the world. Because of the constant need for qualified food scientists, salaries are generally equal to or higher than salaries of other professions requiring equivalent levels of education. The following listing provides insight into the types of positions available.

Product Developers: involved in developing new food products or improving the quality, performance, and/or safety of existing products. These positions require creativity, awareness of other practical concerns of food businesses (e.g. marketing), and the ability to work well in teams.

Research and Development Scientists: using microbiology, chemistry, engineering, and/or nutrition skills to investigate technical characteristics of specific food components, food products, or food processes.

Technical Support: possess deep technical knowledge of raw food materials and ingredients for various applications. Often work closely with product developers in the manufacture of food products.

Managers: involved in the organization, operation, and development of food companies. Their key role is to oversee employees and operations in the processing of specific foods. Often requires additional education, e.g. business, finance, or accounting courses or additional degrees, e.g. M.B.A.

Quality Assurance Specialists: analyze food products and monitor for conformity to company and government standards.

Regulators: state or federal government agencies such as the Pennsylvania Department of Health, the Pennsylvania Department of Agriculture, USDA, or FDA. Positions include policy development, enforcing food regulations, or ensuring the safety of the U.S. food supply.

Extension Educators: specialize in food safety, food processing, or human nutrition and use a variety of educational methods, including group meetings, workshops, mass media, and electronic methods, to deliver educational information.

Academics: requires an advanced degree and research specialization in a particular area, such as food chemistry, microbiology, toxicology, engineering or nutrition to become a professor in a food science department at a university, usually involving a combination of teaching and research.

Course Requirements for Food Science

The following page displays the recommended four year plan for Food Science students. But first, here is an introduction to how Food Science is different from other related majors, like nutrition or animal science. Food Science courses focus heavily on the basic sciences, in order to give students the best range of knowledge to take into the future. Courses focus on the chemical and biological components of food, the way foods react with each other, how foods are kept safe from spoilage and pathogens, and food processing techniques. The prerequisite courses required for the major give a background in the information to be learned in upper level classes. Courses get more specific as they progress, so that by the third and fourth year, the focus of classes switch from general understandings of scientific fields and focus more on how these concepts are uniquely related to food and the food industry. Unlike plant, animal, or nutrition sciences, food science focuses more on how foods can be safely processed, and less on how the raw materials are grown, raised, or how they affect the body. However, Food Scientists do require some knowledge of other fields and take nutrition, meat, dairy, and plant focused classes in order to gain a well-rounded education of how food is made, processed, and affects human health. For example: A plant/animal science class may focus on the best conditions and practices to grow wheat or raise cattle, respectively. A food science class would focus on what may cause beef to spoil and how wheat can be processed to produce whole grain and white flour. Meanwhile, a nutrition class might focus on how beef or flour are digested.

Recommended Academic Plan for Food Science (FDSC) at University Park

Effective Date: Fall 2016

SEMESTER 1 (Fall)

COURSE DETAILS	CREDITS
CHEM 110 Chemical Principles I †	3
CHEM 111 Experimental Chemistry I †	1
BIOL 110 Biology: Basic Concepts and Biodiversity †	4
ENGL 015 Rhetoric and Composition or ENGL 030 Honors	3
First-Year Seminar	2
Social and Behavioral Sciences (GS) ¹	3
TOTAL CREDITS	16

SEMESTER 2 (Spring)

COURSE DETAILS	CREDITS
MATH 110 Techniques of Calculus I or MATH 140 Calculus	4
CHEM 112 Chemical Principles II †	3
CHEM 113 Experimental Chemistry II	1
Social and Behavioral Sciences (GS) ¹	3
Health and Physical Activity (GHA) ²	3
TOTAL CREDITS	14

SEMESTER 3

COURSE DETAILS	CREDITS
CHEM 202 Fundamentals of Organic Chemistry I* or CHEM 210	3
FDSC 200 Introductory Food Science*	3
FDSC 201 Introductory Food Science Practicum*	1
MICRB 201 Introductory Microbiology	3
MICRB 202 Introductory Microbiology Laboratory*	2
Humanities (GH) ¹ (IL) ³	3
TOTAL CREDITS	15

SEMESTER 4

COURSE DETAILS	CREDITS
CHEM 203 Fundamentals of Organic Chemistry II or CHEM 213 Laboratory in Organic Chemistry	3 or 5
B M B 211 Elementary Biochemistry	3
PHYS 250 Introductory Physics I	4
Arts (GA) ¹	3
STAT 250 Introduction to Biostatistics or STAT 240	3
TOTAL CREDITS	16 or 18

SEMESTER 5

COURSE DETAILS	CREDITS
FDSC 400 Food Chemistry	4
FDSC 408 Food Microbiology	3
FDSC 409 Laboratory in Food Microbiology	2
B M B 212 Elementary Biochemistry Laboratory	1
Arts (GA) ¹	3
CAS100A Effective Speech †	3
TOTAL CREDITS	16

SEMESTER 6

COURSE DETAILS	CREDITS
FDSC 405 Food Engineering Principles*	3
FDSC 410 Chemical Methods of Food Analysis	3
FDSC 406 Physiology of Nutrition (Writing intensive)	3
Humanities (GH) ¹ (US) ³	3
Career Interest Course (see page 10)	0 or 2
TOTAL CREDITS	12 or 14

SEMESTER 7

COURSE DETAILS	CREDITS
FDSC 413 Science and Technology of Plant Foods	3
FDSC 411 Managing Food Quality	3
Career Interest Course (see page 10)	3
Career Interest Course (see page 10)	3
ENGL 202C Effective Writing: Technical Writing or ENGL 202D	3
TOTAL CREDITS	15

SEMESTER 8

COURSE DETAILS	CREDITS
FDSC 414 Science and Technology of Dairy Foods	3
FDSC 415 Science and Technology of Muscle Foods	3
FDSC 430 Unit Operations in Food Processing	3
Career Interest Course (see page 10)	3
Career Interest Course (see page 10)	3
TOTAL CREDITS	15

*Course requires a grade of C or better

†Course satisfies General Education and degree requirements

16 credits, minimum, in each of the following general education categories Humanities (GH), Arts (GA), and Social and Behavioral Sciences (GS). These courses may be taken in any semester and in any order, but they must each have a total of 6 credits.

² The GHA general education category requires a total of 3 credits but many courses are offered in increments of 1, 1.5, or 2 credits. We strongly encourage students to take NUTR 251 or FD SC 105 for their 3 cr. of GHA.

³Three credits of each of United States Cultures (US) and International Cultures (IL) are needed for graduation. Can be taken in combination with any GH, GS, or GA class.

Note: Be wary of adjusting the sequence of FDSC courses! FDSC courses are generally only offered in the semester (fall or spring) in which they appear above!

Courses Offered by the Department of Food Science

Course titled followed by (*) indicate a required grade of C or higher. *Pay particular attention to the pre-requisites for the required courses and plan your schedule accordingly!*

Required Food Science Courses for Graduation:

FDSC 200. Introductory Food Science* (3 cr.)

Prerequisite: CHEM 110 *(Fall only)*

General overview and principles; food constituents and properties; quality and safety; preservation methods; processing animal and plant products.

FDSC 201. Introductory Food Science Practicum* (1 cr.)

Prerequisite or concurrent: FDSC 200. *(Fall only)*

Demonstrations to illustrate actual chemical reactions in food systems and visits to campus and area food production and processing operations.

FDSC 400. Food Chemistry (4 cr.)

Prerequisite: CHEM 202

Prerequisite or concurrent: FDSC 200 & 201, BMB 211 & 212 *(Fall only)*

Chemical properties of food constituents as influenced by processing and storage. Selected experiments and demonstrations to illustrate chemical reactions of importance in foods.

FDSC 405. Food Engineering Principles* (3 cr.)

Prerequisites: MATH 110, PHYS 250 *(Spring Only)*

Prerequisite or concurrent: FDSC 200 & 201

Engineering principles of importance to food manufacturing, including units, dimensions, mass and energy balance, fluid flow, rheology, heat transfer, and psychrometrics.

FDSC 406W. Physiology of Nutrition (3 cr.)

Prerequisite: B M B 211

Prerequisite or concurrent: FDSC 200 & 201 *(Spring only)*

Writing intensive course that covers physiological mechanisms involved in thirst and appetite, digestion, absorption, utilization of nutrients, respiration, and body temperature regulation.

FDSC 408. Food Microbiology (3 cr.)

Prerequisite: MICRB 201 *(Fall only)*

Prerequisite or concurrent: FDSC 200 & 201

Significance of microorganisms in food commodities, microbial spoilage, food-borne infections, and intoxications; methods of preservation, processing, and control.

FDSC 409. Food Microbiology Laboratory (2 cr.)

Prerequisite: MICRB 202

Prerequisite or concurrent: FDSC 200, 201, & 408 *(Fall and Spring)*

Course that covers methods of isolation and detection of spoilage and pathogenic microorganisms in foods; effects of processing and preservation on survival of food microorganisms.

FDSC 410. Chemical Methods of Food Analysis (3 cr.)

Prerequisite: BMB 212, FDSC 400

(Spring only)

Prerequisite or concurrent: FDSC 200, 201

Qualitative and quantitative determination of food constituents.

FDSC 411. Managing Food Quality (3 cr.)

Prerequisite: FDSC 408, STAT 250

(Fall only)

Prerequisite or concurrent: FDSC 200, 201

Principles and applications of Hazard Analysis Critical Control Points. Statistical tools for the control and improvement of food quality.

FDSC 413. Science and Technology of Plant Foods (3 cr.)

Prerequisite: FDSC 200 & 201, And at least 2 of the following: FDSC 400, 405, 408, or 410

(Fall only)

Physical and chemical behavior of plant-based raw materials and ingredients, with emphasis on parameters influencing finished product quality.

FDSC 414. Science and Technology of Dairy Foods (3 cr.)

Prerequisite: FDSC 200 & 201, And at least 2 of the following: FDSC 400, 405, 408, or 410

(Spring only)

Physical and chemical behavior of dairy-based raw materials and ingredients, with emphasis on parameters influencing finished product specifications.

FDSC 415. Science and Technology of Muscle Foods (3 cr.)

Prerequisite: FDSC 200 & 201, And at least 2 of the following: FDSC 400, 405, 408, or 410

(Spring only)

Physical and chemical behavior of muscle food commodities, with emphasis on muscle-based ingredients in formulated foods.

FDSC 430. Unit Operations in Food Processing (3 cr.)

Prerequisite: FDSC 400, 405, 408.

(Spring only)

Thermal processing, refrigeration, freezing, dehydration, and concentration in the food industry, including effects on food quality, food packaging and waste management.

Electives and Career Interest Food Science Courses:

FDSC 105 Food Facts and Fads (GHA, 3 cr.)

Impact of society and the individual on modern food technology, food laws, additives, etc.; historical, current, futuristic aspects. *(Fall, Spring and Summer)*

FDSC 207. (AN SC 207) Animal Products Technology

Composition, safety, palatability, preservation, and processing of foods from animals; impact of animal production and handling practices on product properties. *(Fall only)*

FDSC 208. (AN SC 208) Animal Products Technology Laboratory

Harvesting and processing of foods from animals; demonstrations and hands-on exercises; industry procedures for processing meat, milk, and egg products.

Prerequisite or concurrent: AN SC 207 *(Fall only)*

FDSC 233 (HORT 233) The Science of Winemaking (3 cr.)

Introduction to the principles of wine production emphasizing basic wine grape biology, fermentation science, wine chemistry, and wine perception.

Prerequisite: CHEM 110 or BIOL 110 *(Spring only)*

FDSC 402 Supervised Experience in Food Science Teaching (maximum 3 cr.)

Theories and experiences of teaching and learning relevant to food science and to the work of a teaching assistant. *(Fall and Spring)*

Prerequisite: Junior or senior standing. Permission of program required.

FDSC 404. Sensory Evaluation of Foods (3 cr.)

Sensory evaluation of food, methods of test analysis, panel selection and training, taste sensation theory, consumer testing methods.

Prerequisite: STAT 250 or STAT 240. *(Fall only)*

FDSC 407. Food Toxins (2 cr.)

Microbiological and chemical aspects of food poisoning; toxicological principles; case histories and prevention of problems.

Prerequisite: senior standing in food science or related majors *(Fall only)*

FDSC 495. Internship

Supervised off-campus, non-group instruction including field experiences, practical, or internships. Written and oral critique of activity required.

Prerequisite: PRIOR APPROVAL REQUIRED *(All Semesters)*

FDSC 496. Independent Studies

Creative projects, including research and design, which are supervised on an individual basis and which fall outside the scope of formal courses. Interested students should discuss with their advisor or another faculty member. *(All semesters)*

FDSC 497. Special Topics *(Semester varies)*

Courses offered sporadically which may explore many different interests. Several different Special Topics courses may be taught in one year or semester. Examples of past courses include Foods for Gut Health, Careers in Food Science, and Food Safety Research.

FDSC 499 (IL) Foreign Studies (maximum of 12cr.)

(Semester varies)

Courses offered in foreign countries by individual or group instruction. Past courses have traveled to Italy and India.

Other Career Interest Courses

Career Interest courses are chosen according to a student's career goals. These courses allow the student to individualize his or her academic experience. Any course that will help prepare students for their specific career goal can be considered a career interest course, *as long as it has been discussed with their advisor*. **Common Career Interest courses are listed below, but you should talk to your advisor for other options specific to your career goals.** The number of career interest course credits required is 12-14 credits (see p. 5). Please refer to the University Bulletin for the most up to date listings of all Penn State courses.

<http://bulletins.psu.edu/bulletins/bluebook/>

FDSC Career Interest Courses

See page 7

Interest in Business

AG 400	Biometry/statistics in the life sciences
ACCTG 211	Financial and managerial accounting for decision making
AG BM 102	Economics of the food system
AG BM 106	Agribusiness problem solving
AG BM 200	Introduction to agricultural business management
AG BM 302	Food product marketing
AG BM 320	Markets and prices: analysis and forecasting
AG BM (IL) 338	Agribusiness in the global economy
AG BM 440	Food product innovation management
AG BM 460	Managing the food system
B A 250	Small business management
B LAW 243	Legal environment of business
I B 403	International business and national policies
FIN 100	Introduction to finance
MGMT 100	Survey of management
MKTG220	Introduction to selling techniques
MKTG221	Contemporary American marketing
MKTG301	Principles of marketing
MKTG342	Marketing research

Interest in Plant Science and the Environment

AGECO 134	Sustainable agriculture science and policy
BIOTC (AGRO) 460	Advances and applications of plant biotechnology
E R M 210	Environmental factors and their effect on your food supply
E R M 431	Environmental toxicology
HIST (NUTR) 230	American food system: history/technology and culture
HORT 101	Horticultural science
HORT 412W	Post-harvest physiology

Interest in Animal Science

AN SC 100	Introduction to Animal Industries
AN SC 201	Animal Science
AN SC 211	Introduction to Avian Biology
AN SC 213	Introduction to Animal Biotechnology
AN SC 225	Introduction to Dairy Judging
AN SC 226	Meat Selection and Grading

Interest in Microbiology, Cell Biology

B M B (MICRB) 251	Molecular and cell biology I
B M B (MICRB) 252	Molecular and cell biology II
B M B 401	General biochemistry
B M B 402	General biochemistry
B M B (VB SC) 433	Molecular and cellular toxicology
BIOTC (MICRB) 416	Microbial biotechnology
BIOTC 479	Methods in biofermentations
CHEM450	Physical chemistry - thermodynamics
CHEM452	Physical chemistry – quantum chemistry
MICRB 401	Microbial physiology and structure
MICRB 410	Principles of immunology
MICRB 412	Medical microbiology
MICRB 413	Microbial diversity
MICRB 415	General virology: bacterial and animal viruses
MICRB 421W	Laboratory of general and applied microbiology
VB SC 303	Principles of animal disease
VB SC 430	Principles of toxicology
BIOL 141	Introductory Physiology
BIOL 142	Physiology laboratory

Interest in Nutrition & Public Policy

NUTR 120	Food preparation
NUTR (HIST) 230	American food system: history/technology and culture
NUTR (US, IL) 421	Food culture and health trends
NUTR (IL) 430	Global food strategies; problems and prospects for reducing world hunger
NUTR 451	Nutrition throughout the life cycle
NUTR 452	Nutritional aspects of disease
PL SC 460	Science, technology, and public policy
R SOC (AGECO) 134	Sustainable agriculture science and policy

Interest in Technology and Computing

CMPSC 101	Introduction to C++ programming
IST 210	Organization of data
MATH111	Techniques of calculus II
MATH141	Calculus with analytic geometry II

Interest in Sensory and Psychology

PSYCH 100	Introduction to Psychology
PSYCH 221	Introduction to Social Psychology
PSYCH 253	Introduction to the Psychology of Perception
PSYCH 260	Neurological Bases of Human Behavior

Department Faculty and Staff

Department Head:



Robert F. Roberts, Ph.D. (University of Minnesota) Department Head and Professor of Food Science. Technology of dairy products processing.
E-mail address: rfr3@psu.edu

Undergraduate Program Coordinator:



Rania Agil, Ph.D. (Carleton University) Undergraduate Program Coordinator and Instructor of Food Science. Analytical and free radical chemistry of foods.
Email address: rx231@psu.edu

Undergraduate Teaching Faculty:



Ramaswamy C. Anantheswaran, Ph.D. (Cornell University) Professor of Food Science. Microwave processing of foods; Dielectric properties of food materials; Ingredient interactions during microwave heating of foods; Moisture and fat migration in confectionery products; Modified atmosphere and modified humidity packaging of fresh produce; Rapid cooling of shell eggs. E-mail address: rca3@psu.edu



C. Daniel Azzara, Ph.D. (Pennsylvania State University) Alan R. Warehime Professor of Agribusiness. Email address: cxa22@psu.edu



John N. Coupland, Ph.D. (University of Leeds) Professor of Food Science. Physical chemistry of foods. Food emulsions and biopolymers and their behavior during processing. Ultrasonic sensors. E-mail address: jnc3@psu.edu



Stephanie Doores, Ph.D. (University of Maryland) Associate Professor of Food Science. Growth and survival of *Listeria monocytogenes* in food, particularly dairy and meat products; predicting the thermal kinetics and destructive force of microwave heating on food-borne pathogens; characterization of *Sporolactobacillus* and other *Bacillus-Lactobacillus* intermediates. E-mail address: sxd11@psu.edu



Edward G. Dudley, Ph.D. (University of Wisconsin) Associate Professor of Food Science. Molecular biology and genomics of foodborne pathogens. Mechanisms of environmental survival and pathogenicity of *Escherichia coli* O157:H7 and enteroaggregative *Escherichia coli*. Molecular biology methods of detecting and characterizing bacteria in food. Email address: egd100@psu.edu



Ryan J. Elias, Ph.D. (University of Massachusetts) Frederik Sr. and Faith E. Rasmussen Professor of Food Science, Associate Professor of Food Science. Free radical chemistry of foods: Metal-catalyzed lipid and protein oxidation in complex foods; development and evaluation of novel antioxidants; oxidative stability of wine and beer. E-mail address: rje12@psu.edu



Hassan Gourama, Ph.D. (University of Nebraska) Associate Professor of Food Science (Berks Campus). Significance of molds and mycotoxins in foods: Identification of molds, mold growth and mycotoxin production, control of mold contaminants and development of rapid detection methods for molds. Occurrence and control of bacterial pathogens in foods. E-mail address: hxg7@psu.edu



Federico Harte, Ph.D. (Washington State University) Associate Professor of Food Science. Research focuses on: the structure-function properties of milk proteins, with a strong emphasis on casein proteins and nonthermal technologies for fluid foods: valve homogenization. Email address: fmh14@psu.edu



John Hayes, Ph.D. (University of Connecticut) Associate Professor of Food Science. Flavor perception, behavioral genetics and food choice; impact of genetic variation on sensation and reward; understanding factors that influence consumption of food or beverages with potential health impact; acquisition of preference for initially aversive stimuli (chiles, coffee, alcohol). E-mail address: jeh40@psu.edu



Kathleen L. Keller, Ph.D. (Rutgers University) Assistant Professor, Nutritional Sciences and Food Science. Eating behaviors in children; neural mechanisms of taste preference and eating behaviors in children; food marketing and childhood obesity; genetic and neural influences in taste in children. Email address: klk37@psu.edu



Joshua D. Lambert, Ph.D. (University of Arizona) Associate Professor of Food Science. Prevention of obesity, fatty liver disease, and cancer by dietary phytochemicals. Potential toxicities of high dose dietary polyphenols. Bioavailability and biotransformation of dietary phytochemicals. Email address: jdl134@psu.edu



Edward Mills, Ph.D. (Purdue University) Associate Professor of Meat Science. Meat composition and processing with emphasis on prerigor processing techniques. E-mail address: ewm3@psu.edu



Sara R. Milillo, Ph.D. (Cornell University) Instructor of Food Science.

Understanding how the bacterial foodborne pathogens *Listeria monocytogenes* and *Salmonella* Typhimurium survive within the food system and subsequently cause disease; using elements of microbiology, genetics, molecular biology, and ecology to study their pathogenicity and transmission.

Email address: srm226@psu.edu



Jairam Vanamala, Ph.D. (Texas A&M University) Associate Professor of Food Science. Food processing effects on anti-inflammatory/anti-cancer properties of foods; obesity and cancer prevention; extraction of health-benefiting extracts/compounds from agricultural/green energy industry byproducts. Email address: juv4@psu.edu



Gregory R. Ziegler, Ph.D. (Cornell University) Professor of Food Science. Graduate Program Coordinator. Foods as composite materials. Physical properties and processing of polymeric and particulate foods, with an emphasis on chocolate and confectionery products. E-mail address: grz1@psu.edu

Graduate Teaching and Extension Faculty in the Department:



Catherine N. Cutter, Ph.D. (Clemson University) Professor of Food Science.

Processing and manufacturing of muscle foods with an emphasis on food safety; pathogen reduction, application of antimicrobials or interventions to muscle foods; understanding the mechanisms of bacterial attachment to muscle foods.

E-mail address: cnc3@psu.edu



Kerry E. Kaylegian Ph.D. (Cornell University) Dairy Research & Extension Associate.

Provides technical support and outreach programs to improve the safety and quality of value-added dairy products. International cheese and dairy product judge, and coach of the Penn State Collegiate Dairy Products Evaluation Team.

Email address: kek14@psu.edu



Stephen J. Knabel, Ph.D. (Iowa State University) Professor of Food Science.

Recovery and detection of injured foodborne pathogens; heat resistance of *Listeria monocytogenes*; control of food-borne pathogens; biological function of heat-shock proteins and their role in thermotolerance; microbiology of poultry, eggs, dairy products, fish, red meats and mushrooms. E-mail address: sjk9@psu.edu



Luke LaBorde, Ph.D. (University of Wisconsin) Associate Professor of Food Science.

Quality and safety of minimally processed and shelf-stable fruits and vegetables. Development of food safety extension programs for fruit, vegetable, and mushroom producers. E-mail address: lf15@psu.edu

Staff Members who work with Undergraduate Students:



Juanita Wolfe, Undergraduate Program Assistant

Juanita Wolfe is the main support person for the undergraduate program. She is a great person to contact with any questions that you have when you do not know who else to ask! She also handles administrative paperwork, such as change of major forms, academic petition forms, and independent study forms. Jmw5@psu.edu



Jared Smith, Instructional Laboratory Support Specialist

Jared Smith is a graduate of the Penn State Food Science program and a good resource for questions, as well as our teaching lab/pilot plant guru. If you have questions about lab equipment or questions regarding the pilot plant (including scheduling time to use it), he is a great person to ask! Jcs5324@psu.edu



Alyssa Bakke, Sensory Coordinator & Staff Sensory Scientist

Jen runs the Sensory Evaluation Center (SEC), helping with student sensory projects, as well as hiring undergraduate students to help in the Sensory Evaluation Center. She supervises, trains, and oversees all students in the program who work or research in the sensory evaluation center, and is a great resource for getting involved in the SEC. abc18@psu.edu



Richard Rateau, Ph.D. Coordinator of Experiential Learning and Career Services, College of Agricultural Sciences.

In addition to speaking with your adviser, Dr. Rateau is a resource to turn to with any questions regarding professional development. If you are looking to get help constructing your resume or need to brush up on your interview skills, Dr. Rateau is a valuable resource. Furthermore, he has contacts with many agriculture and food related companies. He also coordinates the Ag Career Day event. Rjr20@psu.edu



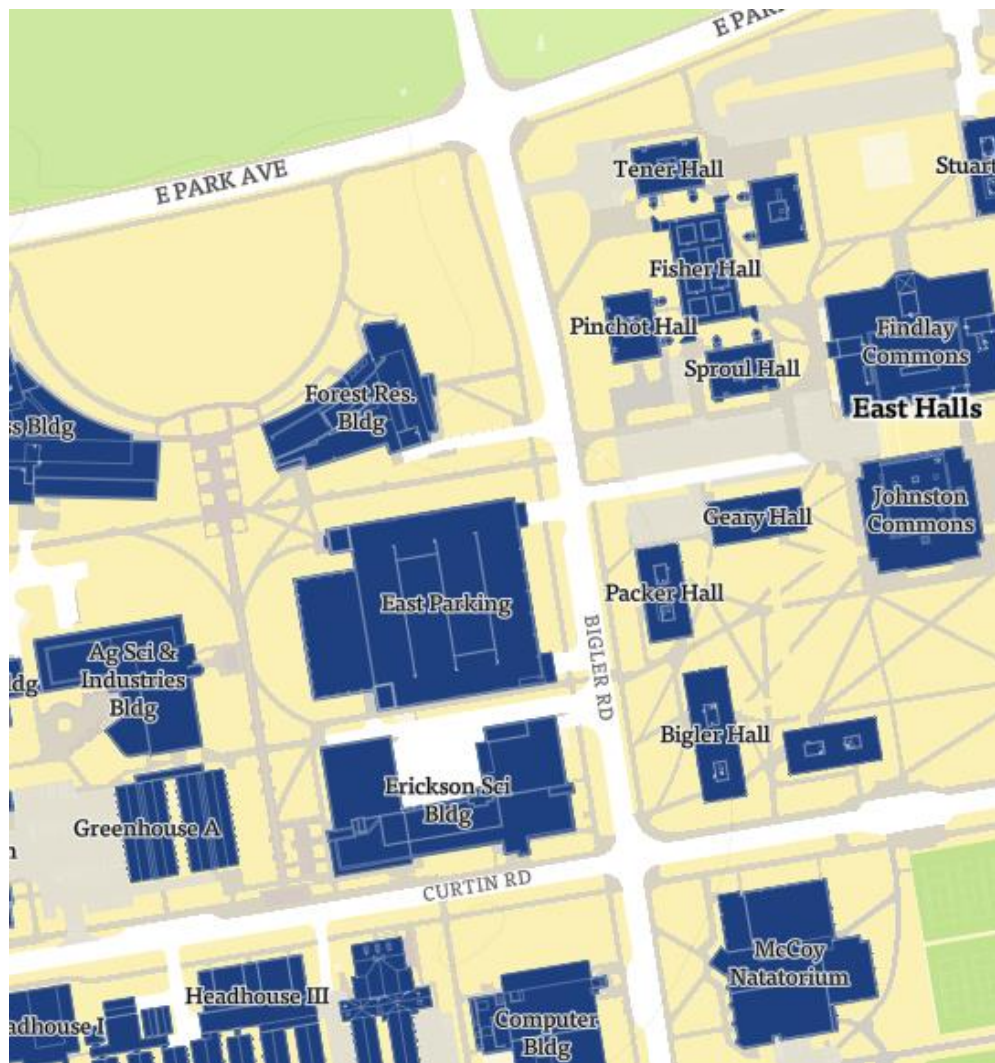
Alyssa Bumbaugh, Ph.D. Senior Undergraduate Programs Coordinator for the College of Agricultural Sciences.

Dr. Bumbaugh is the person to turn to for a better understanding the College of Agricultural Sciences and if you are interested in other majors in the College. She is also very knowledgeable about the programs available for freshmen. acb134@psu.edu

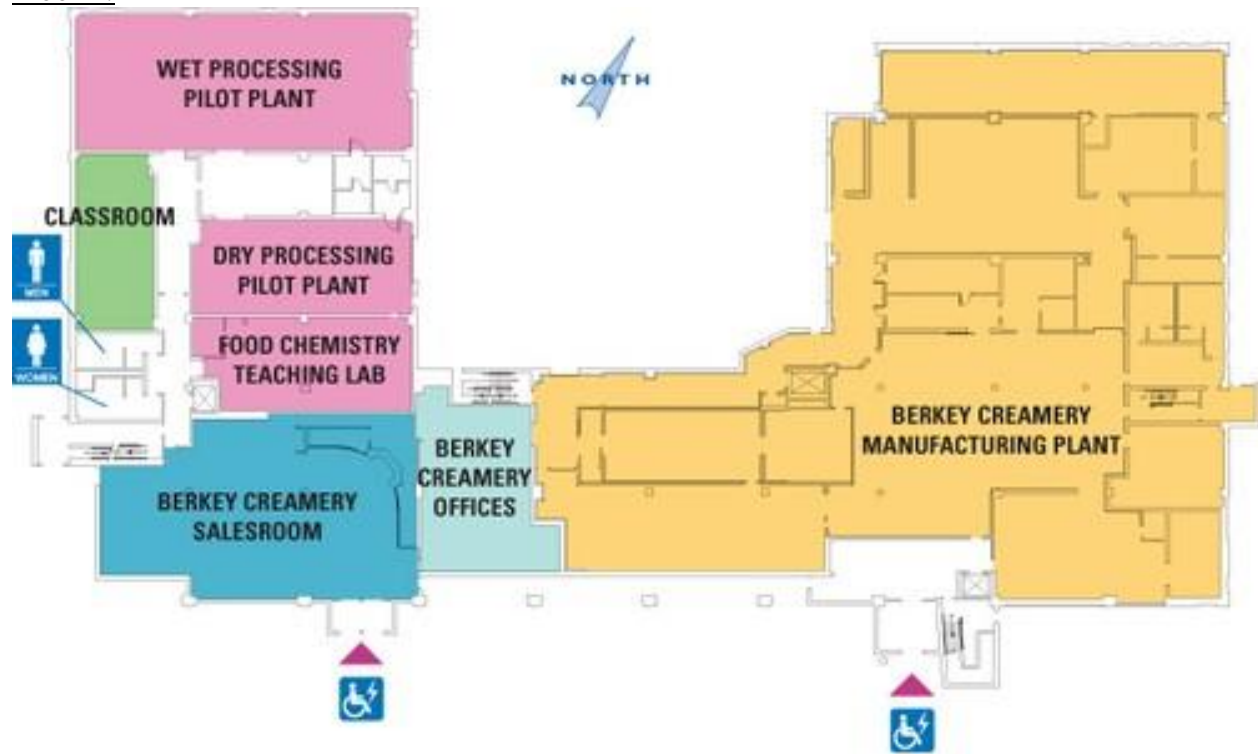
Food Science Building

The Rodney A. Erickson Food Science Building, on the corner of Curtin and Bigler Rd., is also home to the Berkey Creamery. It is conveniently located next to the East Parking Deck.

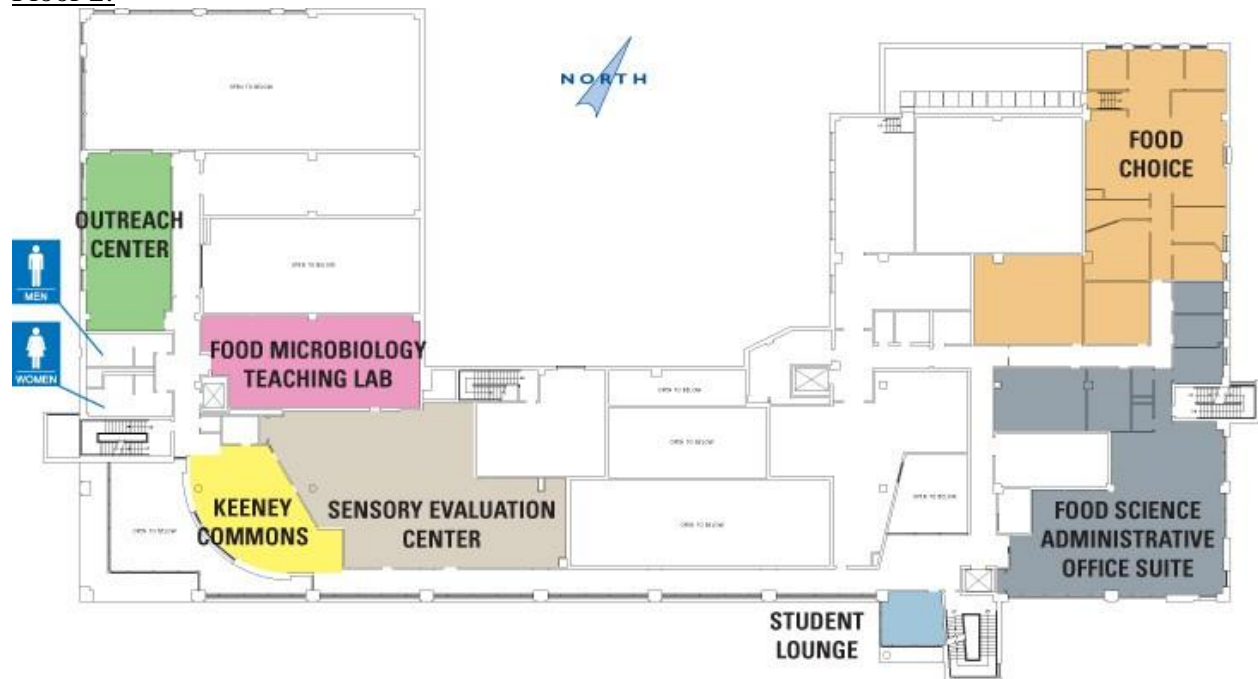
The Food Science Building is the food scientist major's home-base. With the Creamery downstairs, as well as chairs, tables, and the undergraduate study lounge on the second floor, it is a great place to study. Undergraduate research happens on the 3rd and 4th floors of this building. The floor-plan of each floor is below. *Note: the undergraduate lounge near the main office on the second floor!* The Keeney Commons (Floor 2) also has open seating (chairs and tables) available. On Floors 3 and 4, various tables are available outside of offices for studying as well.



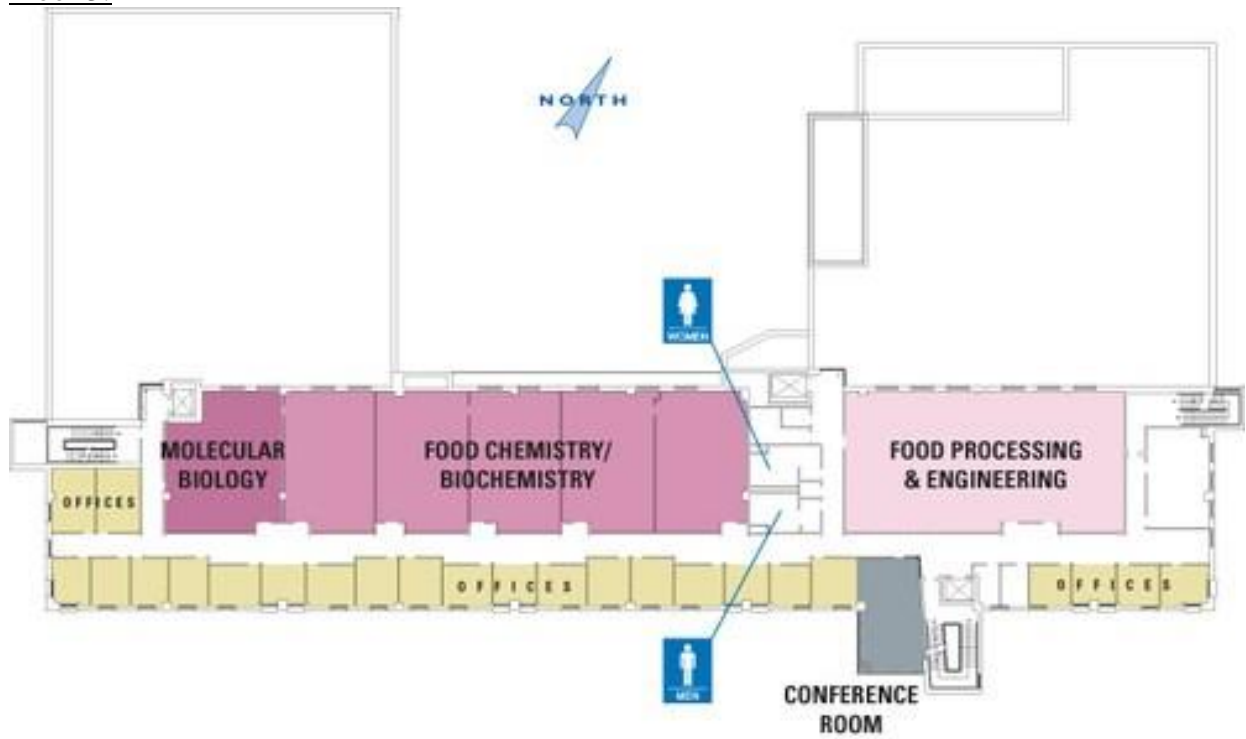
Floor 1:



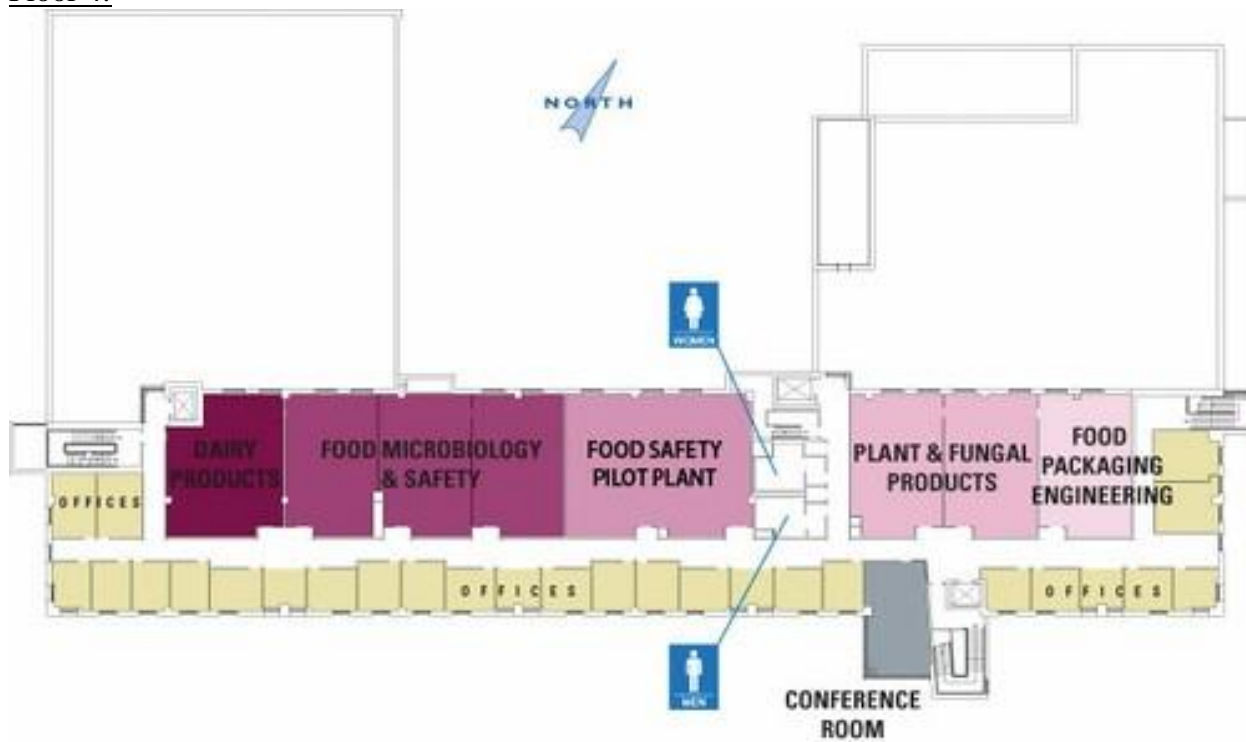
Floor 2:



Floor 3:



Floor 4:



Food Science Extra-Curricular Activities

There are many clubs and activities at Penn State related to the Food Science major. While we strongly encourage that you get involved with the Food Science club, there are many other ways to get involved on campus!

Food Science Club

The Food Science Club is a great way to meet other Food Science students on campus! The Food Science Club hosts many companies, who come visit to talk about their industries, and to recruit students for both internships and full-time jobs. When the Food Science Club isn't hosting companies, they have many other activities, including Pumpkin Carving, Gingerbread House Competitions, a Chopped-Style cooking competitions, Pizza-making days, and Baking for THON. If interested, please contact the current president of the Food Science Club, Natalie Keller at nrk5131@psu.edu

Other groups that may interest you:

Food Science College Bowl Team

International Ag Club

Horticulture Club

Dairy Science Club

Cheese Club

Dairy Products Evaluation Team

Poultry Science Club

Livestock Judging Team

Block and Bridle Club

Gamma Sigma Delta

Alpha Zeta

Sigma Alpha

Sustainable Ag Club

EARTH house

Collegiate FFA/4-H

Financial Aid

Various sources of financial aid are available to Penn State students, whether they are enrolled at University Park or at a commonwealth campus. This financial aid includes federally funded grants, loans and work-study support, such as Pell Grants, National Defense Student Loans and the College Work Study Program. In addition, state-funded grants and loans can be obtained through the Pennsylvania Higher Education Assistance Agency (PHEAA), as well as through the University. Detailed information on financial aid can be found in the Office of Student Aid, 314 Shields Building, or on the Office of Student Aid website: <http://studentaid.psu.edu>.

Financial assistance information for students in the College of Agricultural Sciences can be accessed at the College's website, <http://agsci.psu.edu/students/scholarships>. Note, there is just one application for both College and Department level scholarships. To be eligible for need-based sources of College and Departmental financial support, a FAFSA (Free Application for Federal Student Aid) form **must be on file** with the University (you do not need to file a copy of your FAFSA with the College).

In addition, a number of competitive national scholarships sponsored by the Institute of Food Technologists and other national groups are awarded annually, including entering students, pursuing a Bachelor of Science degree in Food Science. For example, information can be accessed at www.ift.org/scholarships.

Ways to Individualize your Major

Food Science is a great degree but it may not already include everything you find interesting. Career Interest courses are the easiest way to individualize your Food Science degree! If you are looking for additional ways to enhance your degree, look into some of these other opportunities!

Summer work experience (internships, not necessarily for academic credit) – Students are strongly encouraged to gain experience during at least one summer working for a food-related business, laboratory, or regulatory agency. Such experiences offer insight into typical jobs a student might encounter in the field. Many food science students take a summer work experience job between their third and fourth year.

Study Abroad – Students are often interested in spending a semester abroad. For the Food Science major, it is difficult to study abroad and graduate in the four expected years. **If interested in this option, consider going abroad sophomore year (while still taking mostly general education courses) and plan accordingly.** In addition, shorter length international programs are available during spring break, thanksgiving break, and summers. Anyone interested in a study abroad experience should speak with his or her advisor and Ms. Ketja Lingenfelter, Education Abroad Advisor, 122 Agricultural Administration Building, kmw209@psu.edu

Spanish for the Agricultural Sciences - is a three-course sequence developed for students whose future involves working in management positions in agricultural industries such as mushroom production, dairy, animal sciences, and poultry, to name a few. Interested students should begin researching this program early so that they can plan their travel around their major required classes <http://agsci.psu.edu/international/study-abroad/study-abroad/embedded-courses/spanish-in-agriculture-courses-and-immersion-experience>

Multiple Degrees (Concurrent Major) – A second major. Depending on the other major, the credits required for graduation could necessitate additional time before graduation. The following degrees may be of interest to Food Science Students:

- Agribusiness Management
- Agricultural Education
- Animal Science
- Biological Engineering
- Environmental Resource Management
- Nutrition (College of Health and Human Development)
- Biological Engineering (College of Engineering)

Other combinations are possible – if you find another major interesting, talk to your advisor to see how it might work with our program!

Minors – Students should explore the requirements of the proposed minor, then meet with an advisor from the prospective minor. The following minor programs may be of interest to Food Science students:

College of Agricultural Sciences

- Agribusiness Management
- Agricultural Communications
- Agricultural Economics and Rural Sociology
- Agricultural Systems Management
- Agronomy
- Animal Sciences
- Arboriculture
- Biological Engineering
- Entrepreneurship and Innovation
- Environmental and Renewable Resource Economics
- Environmental Resource Management
- Environmental Soil Science
- Horticulture
- International Agriculture
- Leadership Development
- Mushroom Science and Technology
- Plant Pathology
- Poultry and Avian Science
- Youth and Family Education

College of Earth and Mineral Sciences

- Polymer Science

College of Engineering

- Biological Engineering
- Biomedical Engineering
- Engineering Leadership Development

College of Health and Human Development

- Nutritional Sciences

Eberly College of Science

- Biochemistry and Molecular Biology
- Biology
- Chemistry
- Microbiology

For more information, contact us!

For further information about the Food Science Major contact:

Dr. Rania Agil
Undergraduate Program Coordinator
217 Rodney A. Erickson Food Science Building
University Park, PA 16802
E-mail: rx231@psu.edu

Or visit the Food Science Department at: <http://www.foodscience.psu.edu>

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