



**Faculty:**

Richard M. Dommel, Interim Chairperson

Robert Pierson

The curriculum in Food Science and Management is designed to prepare students for careers in the food production and food service industries. Science and business are emphasized to different extents in the three specializations within the major. Communications skills and a broad background in liberal arts are important components of the programs. An important objective for our program is the education of students to meet the career needs of the industry which will employ them. Industry advisors review our programs periodically to help us accomplish this.

The food and allied industries employs large numbers of people with widely varying skills and talents. The graduate from this department may enter a position in quality assurance, production management, product development, research, technical sales, restaurant or foodservice management, sales representative, or market development coordinator. Placement of graduates is excellent.

The curriculum is designed to permit the student to pursue an interest in either food science and technology or in restaurant and foodservice management. The total number of credits required for graduation with a degree in Food Science and Management is 128 plus 4 credits earned for successful completion of the Employment Program.

**RECOMMENDED COURSE SEQUENCE**

***Food Science & Food Technology Specializations***

The food science specialization contains the courses specified by the Institute of Food Technologists and is recommended for students interested in research.

The food technology specialization is similar to food science, but is less oriented to science and mathematics and more to management. Graduates of these specializations are prepared to enter food ingredient or food processing industries such as baking, confections, dairy products, meats, flavors, convenience foods, and packaging. They may also be employed in government regulations, commercial testing laboratories, or in technical sales for companies which supply the food industry. University and government laboratories also employ food scientists and technologists. Close association with area food processors and government laboratories enables our students to gain first-hand knowledge of the industry through field trips and summer employment.

***Freshman Year***

***First Semester***

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
MP 1102	College Algebra or		
MP 1203	Elementary Functions	3	(3-0)
CH 1103	General Chemistry I	4	(3-3)
BY 1116	Biological Science I	3	(2-3)
EN 1101	English I or		
EN 1111	Advanced English I	3	(3-0)
FS 1130	Food, Culture and Cuisine	3	(2-3)
PE 1109	Physical Education I	1	(0-2)
		17	

***Second Semester***

MP 1203	Elementary Functions or		
MP 1204	Calculus I (required for Food Science)	3-4	(3 or 4-0)
CH 1203	General Chemistry II	4	(3-3)
BY 1217	Biological Science II	3	(2-3)
EN 1201	English II or		
EN 1211	Advanced English II	3	(3-0)
FS 1203	Technology and Food Systems	3	(2-3)
PE 1209	Physical Education II	1	(0-2)
		17-18	

***Employment Program***

FS 2370	Employment Program	1-2	
---------	--------------------	-----	--

***Sophomore***

***First Semester***

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
CH 2003	Principles of Organic Chemistry	4	(3-3)
FS 2212	Sanitation Management	3	(2-3)
MP 2119	Physics I (Food Science)	4	(3-3)
MP 2121	Calculus II (Food Science)	4	(4-0)
IT 1011	Information Technology Concepts	1.5	(1.5-0)
IT 1012	Computer Applications (Food Technology)	1.5	(1.5-0)
LA 2005	Speech (Food Technology)	3	(3-0)
	Elective (Food Technology)*	3	
		15-16	

**Second Semester**

CH 2203	Biochemistry	4	(3-3)
FS 2116	Physical Science and Food	3	(2-3)
EN 2028	Introduction to Literature	3	(3-0)
IT 1011	Information Technology Concepts	1.5	(1.5-0)
IT 1012	Computer Applications (Food Science)	1.5	(1.5-0)
LA 2005	Speech (Food Science)	3	(3-0)
BA 2028	Macroeconomics (Food Technology)	3	(3-0)
	Elective (Food Technology)	3	
16			

**Employment Program**

FS 2370	Employment Program	1-2	
---------	--------------------	-----	--

\*Restricted elective, to be taken from the following courses: FS 3000, FS 3223, FS 4004, FS 4015, FS 4041, FS 4042, FS 4419, FS 4212, FS 4228 or others with approval of the department chair.

**Junior Year**

**First Semester**

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
BY 3002	General Microbiology	4	(3-3)
FS 3120	Introduction to Nutrition	3	(3-0)
FS 3122	Food Engineering I	3	(2-3)
FS 3211	Food Chemistry	4	(3-3)
	Elective	3	
17			

**Second Semester**

FS 3218	Food Microbiology	4	(3-3)
FS 3224	Food Engineering II	3	(2-3)
FS 4126	Food Analysis	3	(2-3)
LA 2040	Modern History of Western Societies	3	(3-0)
	Elective	3	
16			

**Employment Program**

FS 2370	Employment Program	1-2	
---------	--------------------	-----	--

**Senior Year**

**First Semester**

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
FS 4112	Food Preservation	3	(3-0)
FS 4149	Quality Assurance and Regulation (Food Technology)	3	(2-3)
BA 2028	Macroeconomics (Food Science)	3	(3-0)
LA 1060	Introduction to the Arts	3	(3-0)
LA 3032	American History and Government Since 1933	3	(3-0)
LA 4038	Cultural Enrichment	1	
	Elective	3	
16			

**Second Semester**

FS 4224	Food Product Development	3	(2-3)
MP 3231	Statistics for Research (Food Science)	3	(3-0)
FS 4223	Seminar	1	(1-0)
LA 4037	Non-Western Societies Philosophy/Psychology/Sociology Area	3	(3-0) or
	Elective (Food Technology)	3	(3-0)
13			

**Restaurant & Foodservice Management Major**

The restaurant and foodservice management major prepares the graduate to assume a management position in the rapidly growing foodservice industry. Restaurants, hotels, health care facilities, schools, airlines, institutional dining rooms, and catering operations are among the employers of graduates in this field. This program provides a background in food purchasing, quantity food preparation, business law, human resource management, marketing and finance. Only 1 hour from Philadelphia and 2 hours from New York City, Delaware Valley College is easily accessible to all major components of the hospitality industry. Opportunities for internships and practical work experience are readily available as part of the program.

**Freshman Year**

**First Semester**

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
MP 1102	College Algebra or		
MP 1203	Elementary Functions	3	(3-0)
CH 1001	Chemistry Fundamentals	4	(3-3)
EN 1101	English I or		
EN 1111	Advanced English I	3	(3-0)
FS 1123	Introduction to Foodservice Systems	3	(3-0)
FS 1130	Food, Culture and Cuisine	3	(2-3)
PE 1109	Physical Education I	1	(0-2)
17			

**Second Semester**

MP 1203	Elementary Functions or		
MP 1204	Calculus I	3-4	(3 or 4-0)
EN 1201	English II or		
EN 1211	Advanced English II	3	(3-0)
BA 1005	Introduction to Business	3	(3-0)
FS 1208	Principles of Professional Cooking	3	(2-3)
IT 1011	Information Technology Concepts	1.5	(1.5-0)
IT 1012	Computer Applications	1.5	(1.5-0)
PE 1209	Physical Education II	1	(0-2)
16-17			

**Employment Program**

FS 2370 Employment Program 1-2

**Sophomore Year**

**First Semester**

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
BY 1115	Natural Science I	3	(3-0)
BA 2008	Macroeconomics	3	(3-0)
FS 2212	Sanitation Management	3	(2-3)
BA 2161	Business Law I	3	(3-0)
BA 2225	Accounting Fundamentals or		
BA 2123	Principles of Accounting I	3	(3-0)
		15	

**Second Semester**

IT 1031	Intermediate Computer Applications	3	(3-0)
BA 2210	Microeconomics	3	(3-0)
EN 2226	Business Communications	3	(3-0)
BA 2017	Principles of Marketing	3	(3-0)
EN 2028	Introduction to Literature	3	(3-0)
		15	

**Employment Program**

FS 2370 Employment Program 1-2

**Junior Year**

**First Semester**

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
FS 3120	Introduction to Nutrition	3	(3-0)
FS 4119	Food Distribution Systems**	3	(2-3)
FS 3227	Foodservice Accounting & Cost Control*	3	(3-0)
LA 3032	American History and Government Since 1933	3	(3-0)
LA 2005	Speech	3	(3-0)
	Elective	3	(3-0)
		18	

**Second Semester**

FS 4229	Foodservice Marketing Strategy**	3	(3-0)
FS 3226	Service Systems Mgt.*	3	(3-0)
LA 2040	Modern History of Western Societies	3	(3-0)
	Philosophy/Psychology/Sociology Area	3	(3-0)
	Elective	3	
		15	

**Senior Year**

**First Semester**

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
BA 3208	Supervision & Management or		
BA 3027	Human Resource Mgt.	3	(3-0)
FS 4131	Foodservice Facilities and Equipment*	3	(3-0)
FS 3225	Purchasing, Storage, & Handling of Foods**	3	(3-0)
LA 1060	Introduction to the Arts	3	(3-0)
LA 4038	Cultural Enrichment Elective	1	
		3	
		16	

**Second Semester**

FS 4222	Quantity Food Production	3	(2-3)
FS 4223	Seminar	1	(1-0)
FS 4232	Legal Aspects of Foodservice Management**	3	(3-0)
LA 4037	Non-Western Societies Electives	3	(3-0)
		6	
		16	

\*Offered in even numbered years only. \*\*Offered in odd numbered years only.

**Biotechnology Minor**

**(for Food Science / Technology Majors)**

A biotechnology minor is available for students in the food science and technology specializations. It consists of the following courses:

<u>Course No.</u>	<u>Course Title</u>	<u>Credits</u>	<u>Hours</u>
BY 2003	Genetics*	3	(2-1)
BT 3000	Introduction to Biotechnology*	3	(3-0)
FS 3000	Selected Topics I <u>and</u>	1	(1-0)
FS 4000	Selected Topics II <u>or</u>	1	(1-0)
CH 3001	Introductory Biomedical Instrumental Methods*	3	(2-3)
FS 4004	Industrial Fermentations*	3	(2-3)
BY 4155	Molecular Biology*	4	(3-3)
		15-16	

\*Requires prerequisite.

## Biotechnology

### *BT 3000 Introduction to Biotechnology*

An interdisciplinary course designed to provide increased familiarity with the concepts, objectives, techniques, ethical and regulatory considerations in the developing areas of biotechnology. Topics include molecular genetics, bacteria, viruses, and applications in biological, medical, food, plant and animal sciences. Prerequisites: Biology II, or Biological Science II, and Biochemistry. Meets the requirements for certification in Education, General Science and Biology minors. Does not substitute for Molecular Biology. Offered in Fall Semester. 3 hours Lecture and Discussion—3 credits

## Course Descriptions

### *FS 1123 Introduction to Foodservice Systems*

An introduction to the field of restaurant and foodservice management. Included will be a discussion of the history of foodservice, the different types of foodservice operations, career opportunities available, future trends, and management. 3 hours Lecture—3 credits

### *FS 1130 Food, Culture and Cuisine*

A study of foods from cultures of a diverse range of countries by examining the foods they produce and their culinary traditions and practices. Lecture includes the respective geography, crop production, religion, history and sociology of each region. Preparation of ethnic meals in the laboratory is part of the ethnographic study of each region. The student will develop a sophisticated understanding of the values and ways of life of peoples around the globe and how that has relate to the development of various foods.

There is a fee for ingredients used in the course.

2 hours Lecture and 3 hours Laboratory – 3 credits

### *FS 1203 Technology and Food Systems*

This course surveys the principles and practices of food science. The economic, culinary performance, nutritional and food safety issues that relate to the processing and marketing of foods are considered. Students are introduced to methods of food preservation including thermal processes, low-temperature processes, concentration and dehydration, controlled water activity methods, and radiation processes. Types and applications of food additives, including fermentation products, are covered along with the issues of control and regulation of these ingredients. 2 hours Lecture and 3 hours Laboratory—3 credits

### *FS 1205 Principles of Professional Cooking*

This course will provide a foundation of fundamental knowledge of standards, principles, and techniques required for food production. The physical characteristics of food components are introduced as students learn their selection, care, and preparation. Emphasis is placed on foodservice terminology and quantity production. 2 hours Lecture and 3 hours Laboratory—3 credits

### *FS 2116 Physical Sciences and Food*

The objective of this course is to illustrate to the student how the physical sciences are applied to the evaluation and processing of foods. Students will also work with computational methods which are applied in technical work and develop skills in writing technical reports. Prerequisite: Elementary Functions. 2 hours Lecture and 3 hours Laboratory—3 credits

### *FS 2212 Sanitation Management*

Topics covered in this course include the microbiology of sanitation; communicable diseases associated with foods; insect and rodent control; chemistry of detergents and sanitizers; water and wastewater treatment; plant and equipment design; HACCP systems in food processing and foodservice; personnel training and motivation. Required for all Food Science and Management sophomores. 2 hours Lecture and 3 hours Laboratory—3 credits

### *FS 3000, 4000 Selected Topics I and II*

Special projects designed to meet individual needs of students in the specialized fields of food and agriculture. Projects will be arranged on a one-to-one basis with a department faculty member and with the approval of the Department Chairperson. 3 hours of student/faculty instruction per week—1 credit each

### *FS 3120 Introduction to Nutrition*

Chemical composition of nutrients, their digestion, transport and metabolism, and their occurrence in foods are introduced. Nutrition throughout the life cycle is discussed, as well as topics of current interest such as sports nutrition and relationship of diet and behavior. 3 hours Lecture—3 credits

### *FS 3122 Food Engineering I*

This course introduces the student to mass and energy balances, and the concept of unit operations. Emphasis is placed on the solution of problems using data from different sources. Topics covered include fluid mechanics, heat transfer, and mass transfer. Prerequisite: Physics II or Physical Sciences and Food. 2 hours Lecture and 2 hours Practicum—3 credits

### *FS 3211 Food Chemistry*

The objective of this course is to increase the student's knowledge of the chemical and physical-chemical properties of foods. Topics covered include the nature and stability of colloidal systems; emulsions, gels and foams; crystallization and its effects on the texture of foods; polysaccharides, their structure and properties; proteins; lipids and their reactions; browning reactions in food; colors and flavors. Prerequisite: Biochemistry. 3 hours Lecture and 3 hours Laboratory—4 credits

***FS 3218 Food Microbiology***

This course deals with characteristics of microorganisms found in foods, their enumeration by cultural and rapid methods, and control by preservation methods. Spoilage, traditional food fermentations, and production of ingredients by fermentation are discussed. Skills in sterile laboratory technique are developed. Prerequisite: General Microbiology. 3 hours Lecture & 3 hours Laboratory—4 credits

***FS 3223 Dairy Products Processing***

The chemical composition, physical properties and microbiology of milk are introduced. Manufacture of milk into cultured products, cheese, butter, dried and concentrated milks, and ice cream is discussed. Students learn laboratory techniques used in quality control and carry out processing procedures in the pilot laboratory. Offered in Spring Semester of odd numbered years. 2 hours Lecture and 3 hours Laboratory—3 credits

***FS 3224 Food Engineering II***

A continuation of Food Engineering I. Topics include unit operations such as aseptic processing, drying, evaporation, filtration, membrane separation, size reduction, extrusion, particle size analysis, and refrigeration; consideration of electricity and its uses will be included. Prerequisite: Food Engineering I. 2 hours Lecture and 3 hours Laboratory—3 credits

***FS 3225 Purchasing, Storage, and Handling of Foods***

The fundamentals of food service purchasing are introduced in this course. The functions of forecasting, ordering, purchasing, delivery, receiving, storage, inventory control, and legal responsibilities are discussed. Specifications, quality control and storage are discussed for individual food and nonfood products. Prerequisite: Introduction to Food Service Systems or Permission of Instructor. Offered in Fall Semester of odd numbered years. 3 hours Lecture—3 credits

***FS 3226 Service Systems Management***

This course covers typical “front of the house” operations of the dining room: organization of the dining room, service styles, beverage and alcohol service, cashiering and payment management, and supervision and staff training. Prerequisite: Introduction to Food Service Systems or Permission of Instructor. Offered in Spring Semester of even numbered years. 3 hours Lecture—3 credits

***FS 3227 Foodservice Accounting and Cost Control***

This course builds on the introductory management and accounting courses so that the student will be able to interpret, plan, and activate food, beverage, and labor cost control systems. Prerequisite: Accounting I or Accounting Fundamentals. Offered in Fall Semester of even numbered years. 3 hours Lecture—3 credits

***FS 4004 Industrial Fermentations***

This course introduces the student to the principles involved in bioreactor design and the separation and concentration steps which are used to purify the product. Applications such as biomass, alcohol, organic acids, enzymes, and antibiotics are considered. Prerequisite: Biochemistry or Permission of Instructor. Offered in Fall Semester of even numbered years. 3 hours Lecture—3 credits

***FS 4010 Introduction to Winemaking***

This course introduces the student to wine grape varieties, their growth, factors which affect quality and the basic steps in winemaking. Prerequisite: Age 21. 2 hours Laboratory—1 credit

***FS 4015 Waste Treatment and Control***

This course surveys techniques for evaluating, modifying and disposing of industrial wastes. Emphasis is on the handling of solid and liquid wastes produced by agricultural and food processing activities. Offered in Fall Semester of odd numbered years. 2 hours Lecture—2 credits

***FS 4041 Senior Research***

Selected seniors engage in supervised investigations involving library work and laboratory or field experiments related to the food industry. Requirement: Permission of Department Chairperson. 1-3 credits

***FS 4042 Sensory Evaluation of Foods***

This course covers the physiology, psychology and chemistry of sensory response; the principles and application of discriminative, descriptive and preference testing; objective methods of food evaluation related to sensory properties of foods; selection and training of panelists; data analysis and interpretation. Offered in Spring Semester of even numbered years. 1 hour Lecture and 3 hours Laboratory—2 credits

***FS 4112 Food Preservation***

This course covers the preparation and preservation of perishable foods by modified atmosphere, low temperature, thermal processes, dehydration and other processes. Topics included are control of microbiological, chemical and physical deterioration; physical, chemical and nutritional changes in food; and the equipment and packaging used in food preservation. 3 hours Lecture—3 credits

***FS 4119 Food Distribution Systems***

This course emphasizes the methods used to channel fresh and processed foods from producer to consumer. The areas discussed include assembling, transportation, warehousing and distribution to the retail level. Offered in Fall Semester of odd numbered years. 3 hours Lecture—3 credits

**FS 4126 Food Analysis**

This course introduces the student to common methods of analysis used in the food industry. The properties of food components and reasons for testing are discussed as related to the tests used. Instrumental and “wet” methods will be covered. Emphasis is placed on the basic principles involved in the analytical procedure. Prerequisite: Food Chemistry or Permission of Instructor. 2 hours Lecture and 3 hours Laboratory—3 credits

**FS 4131 Foodservice Facilities and Equipment**

A discussion of the selection and use of foodservice equipment. Features and special uses of the equipment will be discussed along with basic operation, cleaning and maintenance. Also included will be purchasing of new and used equipment, equipment design, and basic kitchen design. Prerequisite: Introduction to Food Service Systems or Permission of Instructor. Offered in Spring Semester of even numbered years. 3 hours Lecture—3 credits

**FS 4149 Quality Assurance and Regulation**

This course focuses on an examination of statistical tests, interpretations and sample plans as applied to the control of food production systems and product evaluations. The requirements placed on quality assurance systems to insure compliance with regulatory mandates are covered. Particular attention is given to documents for the Food and Drug Administration, the Food Safety and Inspection Service and the Agriculture Marketing Service. Other regulatory laws that impact on the food industry are examined. 2 hours Lecture and 2 hours Laboratory—3 credits

**FS 4212 Refined Foods and Food Ingredients**

Food ingredients derived from plant materials and food products manufactured from those ingredients are the topics of this course. Starches and sweeteners, fats and oils, spices, as well as the manufacture of snack foods, confections, baked products, and nonalcoholic beverages will be discussed. Offered in the Spring Semester of even numbered years. 2 hours Lecture and 3 hours Laboratory—3 credits

**FS 4213 Introduction to Brewing Science**

This course introduces the student to the basic methods of producing a malt beverage and the factors which influence beverage quality. Prerequisite: Age 21 and senior standing. 2 hours Laboratory and Discussion—1 credit

**FS 4222 Quantity Food Production**

In this course, the student is introduced to the principles and practices of production management. Students perform all aspects of meals, including planning, ordering, preparing and presenting. Quality control is stressed. Prerequisite: Principles of Professional Cooking. 2 hours Lecture and 3 hours Laboratory—3 credits.

**FS 4223 Seminar**

A review and discussion of the literature concerned with advancements in the food industry are features in this course. Prerequisite: Senior Standing or Permission of Instructor. 1 hour Lecture and Discussion—1 credit

**FS 4224 Food Product Development**

Criteria considered in the development and production of a food product are the topics of this course. The format of the course is designed to draw upon and expand by application material from the Food Science areas of chemistry, nutrition, microbiology, statistics, and engineering. Sensory evaluation, packaging, and engineering economics will also be introduced. Prerequisite: Senior standing in Food Science and Food Technology Specialization or Permission of Instructor. 2 hours Lecture and 3 hours Laboratory—3 credits

**FS 4228 Meat and Meat Products**

A study of slaughtering, post mortem handling, meat fabrication, and further process and package systems. The microstructure and microbiology of meats is covered in conjunction with meat inspection, safety systems and quality evaluation. 2 hours Lecture and 3 hours Laboratory—3 credits

**FS 4229 Foodservice Marketing Strategy**

This course takes the traditional marketing concepts and applies them directly to the restaurant and foodservice industry. Current trends and consumer behavior are discussed along with the importance of menu design and pricing, advertising, and promotions. Prerequisite: Principles of Marketing or Permission of Instructor. Offered in Spring Semester of odd numbered years. 3 hours Lecture—3 credits

**FS 4232 Legal Aspects of Foodservice Management**

This course is designed to help food service managers and owners prevent legal problems, or minimize the harmful effects of legal situations. Federal, state, and local laws and regulations will be discussed on topics including liability, patron civil rights, employee relation, contracts, and security. How to choose and work with an attorney will also be discussed. Offered in Spring Semester of odd numbered years. 3 hours Lecture—3 credits

**Employment Program****FS 2370 Employment Program**

Each student in Food Science and Management is required to spend 24 weeks (960 hours) in approved jobs related to the student's major. Registration for each Employment Program must occur prior to the beginning of a relevant experience. Registration materials are available from Career Services, located in Segal Hall. 24 weeks of On-the-Job Training—4 credits