Department of Biochemistry, Nutrition, and Health Promotion

Department Head: Daniel Peterson (Interim)
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Biochemistry and Molecular Biology Program

The Biochemistry and Molecular Biology program within the Department of Biochemistry, Nutrition and Health Promotion (BCHNHP) involves disciplines at the cutting edge of a revolution in biology. Molecular methods and the use of genetic engineering have given scientists unprecedented power to explore the chemistry of life processes. The Department of BCHNHP prepares students at Mississippi State for this exciting area. In addition to the undergraduate curriculum in biochemistry and molecular biology, the department provides opportunities for an M.S. degree in Agricultural Life Sciences with a concentration in Biochemistry and a Ph.D. in Molecular Biology (See the Graduate Bulletin for description of programs and requirements for advanced degrees).

For the Bachelor of Science degree in biochemistry, the objective of this curriculum is to provide the student with a strong background in science, and to prepare the student for entry into professional schools, graduate study and/or highly technical scientific careers after graduation. The program is accredited by the American Society for Biochemistry and Molecular Biology (ASBMB), located at 900 7th Street, NW, Suite 550, Washington, DC 20001; telephone 202-783-1783; www.asbmb.org (https://www.asbmb.org/). This accreditation ensures that graduates are well-equipped for advanced studies and professional opportunities in biochemistry and molecular biology, and that the curriculum aligns with national standards in biochemistry and molecular biology. There are sufficient individual choices in the curriculum to allow students to tailor their programs to any of several areas of specialization by appropriate use of elective hours.

Biochemistry Minor

The Biochemistry minor is offered to allow undergraduate students in other majors to develop specific skills needed by graduates entering the science-related workforce. Students will enhance their written and oral communication skills and develop problem-solving/application skills. Students must complete 19 to 20 hours of approved coursework.

Graduate Studies Track

Students aiming for a career requiring graduate education should take Genetics and Cell Biology as technical electives. Since many graduate programs require some form of physical chemistry, it is strongly suggested that students take CH 4413 (https://catalog.msstate.edu/search/?P=CH%204413)/CH 4423 (https://catalog.msstate.edu/search/?P=CH%204423) Quantum Mechanics and Spectroscopy or CH 4403 (https://catalog.msstate.edu/search/?P=CH%204403) Biophysical Chemistry as technical electives.

Preparation for entry into an accelerated Master's Program (THESIS) in Biochemistry and Molecular Biology

This program requires careful planning by the student in order to complete the requirements for the B.S. while beginning a research program that should result in successful completion of a Master's thesis at the end of the second summer after the B.S. Only exceptional and motivated students should attempt this program. It is critical that BCH 4603 (https://catalog.msstate.edu/search/?P=BCH%204603) General Biochemistry I be scheduled in the spring of the sophomore year. The student will be expected to begin a research project in the senior year by taking up to nine hours of Directed Individual Study courses (BCH 4000 (https://catalog.msstate.edu/search/?P=BCH%204000)). Research will continue during the summer after completion of the B.S. degree. The student must register for BCH 8000 (3 hours) Thesis Research during the summer. In addition, the student should schedule a graduate level BCH course and ST 8114 (https://catalog.msstate.edu/search/?P=ST%208114) in the spring of the senior year.

The student interested in the five-year program should apply early in the undergraduate program to facilitate the scheduling of courses to conform to time constraints. The student must complete the courses required for completion of the BS degree with no more than 10 hours remaining in the semester of expected graduation.

Preparation for entry into an accelerated Master's Program (NON-THESIS) in Biochemistry and Molecular Biology

This program requires careful planning by the student to complete the requirements for the B.S. while initiating graduate work that should result in completion of courses leading to a Master's Degree, non-thesis concentration. This curriculum allows completion of the two degrees in a minimum of five years. Required courses and electives must be scheduled so that the student has only eight hours of undergraduate course work remaining in the spring of the senior year. The student should then schedule ST 8114 (https://catalog.msstate.edu/search/?P=ST%208114) Statistical Methods and an 8000 level BCH course in that same semester. Graduate work must include BCH 8654 (https://catalog.msstate.edu/search/?P=BCH%208654) Intermediary Metabolism or BCH 8633 (https://catalog.msstate.edu/search/?P=BCH%208633) Enzymes and BCH 7000 (https://catalog.msstate.edu/search/?P=BCH%207000) (3 hrs) Directed Individual Study (to allow completion of an independent research paper).

The student interested in the five-year program should apply early in the undergraduate program to facilitate the scheduling of courses to conform to time constraints. The student must complete the courses required for completion of the B.S. Degree with no more than 10 hours remaining in the semester of expected graduation.

Preparation for entry into an accelerated Ph.D. Program in Molecular Biology

This program requires careful planning by the student in order to complete the requirements for the B.S. while beginning a research program that should meaningfully accelerate progress towards early completion of the Ph.D. degree in Molecular Biology. By initiating a research program in the senior year, a student should reduce the time to completion of the Ph.D. by a year. Only exceptional and motivated students should attempt this program. It is critical that BCH 4603 (https://catalog.msstate.edu/search/?P=BCH%204603) General Biochemistry I be scheduled in the spring of the sophomore year.

The student will be expected to begin a research project in the senior year by taking the Directed Individual Study Courses. Research will continue during the summer after completion of the B.S. degree. The student must register for BCH 9000 (https://catalog.msstate.edu/search/?P=BCH%209000) Research in Biochemistry, Nutrition and Health Promotion during the summer.

The student should plan his/her complete graduate program of study in conjunction with research Director and Graduate Committee. Since the Ph.D. is primarily a research degree, ultimate time to completion will be dependent upon the period necessary to satisfy the research requirements of the Graduate Committee. This concentration allows the student to begin that research substantially earlier than usual.

Preparation for entry into Pharm.D. Program University of Tennessee Health Science Center (UTHSC) College of Pharmacy.

This program requires careful planning by the student to complete the requirements for the B.S. while initiating professional studies that should result in completion of courses leading to a Doctor of Pharmacy (Pharm.D.) degree. It allows students to finish their general education requirements and at least 30 hours of upper-level coursework for a Bachelor of Science in Biochemistry at Mississippi State University within three years. After successfully applying to and completing the first year of professional studies at the University of Tennessee Health Science Center (UTHSC) College of Pharmacy, students must request that their UTHSC transcript be sent to Mississippi State University's Office of the Registrar. Once reviewed, the transcript will be applied to the student's academic record, and the appropriate Bachelor of Science degree will be awarded upon application for graduation.

Guaranteed Interview Agreement Eligibility and Process: Students at Mississippi State University who meet the following minimum requirements are eligible for a Guaranteed Interview Agreement (GIA) with the UTHSC College of Pharmacy, regardless of their degree path or participation in the 3 + 1 program:

1. **Cumulative Science GPA:** A cumulative science GPA of 2.75 or higher must be maintained at the time of application.
2. **Application Process:** GIA applicants must apply for admission through PharmCAS using the Early Decision designation.

For further details, please contact the undergraduate coordinator for the Biochemistry program.

Preparation for entry into Pharm.D. Program University of Mississippi School of Pharmacy.

This program requires careful planning by the student in order to complete the requirements for the B.S. while initiating professional studies that should result in completion of courses leading to a Doctor of Pharmacy (Pharm.D.) degree. It allows students to finish their general education requirements and at least 30 hours of upper-level coursework for a Bachelor of Science in Biochemistry at Mississippi State University (MSU) within three years. After successfully applying to and completing the first year of professional studies at the University of Mississippi School of Pharmacy, students must request that their transcript from the University of Mississippi be sent to MSU's Office of the Registrar. Once reviewed, the transcript will be applied to the student’s academic record, and the appropriate Bachelor of Science degree will be awarded upon application for graduation.

Additional Requirements:

- Continuous Enrollment: Students must maintain continuous enrollment at MSU throughout the program.
- Pre-Pharmacy Courses: All required pre-pharmacy courses must be completed at Mississippi State University. The only exception is if a course is not available at MSU and is taken at the University of Mississippi or another four-year institution approved by the University of Mississippi.
- GPA Requirement: A cumulative science GPA of 2.75 or higher must be maintained at the time of application.
- Course Grades: Students must earn a grade of C or higher in all required courses.
- Transfer Option: Students will have the option to transfer courses completed during their first year at the University of Mississippi School of Pharmacy back to MSU to fulfill the requirements for their Bachelor's degree.

Food Science, Nutrition, and Health Promotion

The Food Science, Nutrition and Health Promotion major offers the opportunity to gain a broad education in food science, nutrition, and health, as well as the specific academic background to pursue careers as food scientists and dietitians/nutritionists. It involves the integration of new knowledge and advances in technology and the physical and biological sciences with psychological, sociological, and behavioral sciences in the provision of a safe, nutritious food supply. Research, teaching, and outreach extend the continuum from the processing of food to its marketing, consumption, and impact on public health and community.

Food scientists integrate knowledge from engineering, biological, and physical sciences to study the nature of foods, the causes of deterioration, the principles underlying food processing, and the improvement of foods for the consuming public. Food technology is the application of food science to the selection, preservation, processing, packaging, distribution, and use of safe, nutritious, and wholesome foods (*http://www.ift.org/knowledge-enter/learnabout-food-science.aspx, 2013*).

The Department offers a degree in Culinology®. This is a dual degree program in which students take courses at Mississippi State University and the Mississippi University for Women in Columbus, MS. The Culinology® curriculum includes courses that combine the disciplines of food science and culinary arts. Culinologists work in diverse areas within the food industries - from experimental chefs to food manufacturing and product development.

The Pre-Health Professions concentration is designed to develop students who have a thorough understanding of the principles of food science and have also fulfilled the prerequisites for medical school or other health-related professional or graduate school programs (examples include but are not limited to: medicine, nursing, physician's assistant, physical therapy, pharmacy, occupational therapy, public health, optometry, podiatry, and others).

Dietitians are food and nutrition experts studying the relationship of nutrition and diet in promoting health and treating disease. Studies include nutritional science, medical nutrition therapy, community nutrition, food service, food production and management of food service operations, chemistry, physiology, plus a variety of supporting coursework in related disciplines. The Food and Nutrition concentration is an accredited Didactic Program in Dietetics (DPD) through the Accreditation Council for Education in Nutrition and Dietetics, providing the required course work needed to apply for a supervised practice program required for Registered Dietitian Nutritionist (RDN) eligibility. (The terms Registered Dietitian (RD) and Registered Dietitian Nutritionist (RDN) are used interchangeably.)

Students in Food Science, Nutrition and Health Promotion have many exciting and diverse career opportunities. Food Science, Nutrition and Health Promotion careers include Research Scientist (Industrial, Government, Academic); Food Engineer; Food Microbiologist; Research and Development; Product Development Technologist; Research Chef; Food Manufacturing Operations Manager; Quality Control Technician; Regulatory Affairs; Food Packaging Specialist; Processing Engineer; Technical Sales in the Food Industry; Technical Services; Public Health/Community Nutritionist; Clinical Nutrition Educator; Nutrition Educator; Registered Dietitian (Pediatric, Cardiovascular, Renal, Private Practice, Sports/Wellness, Weight Management, Business and Industry, and Journalism and Communications); Healthcare/School Food Service Director; Pharmaceutical Sales Representative; and Public Relations and Marketing Specialists.

A major in Food Science, Nutrition and Health Promotion is also an excellent choice for students interested in pursuing pre-professional career paths like Veterinary School, Medical School, Pharmacy, Physical Therapy, Nursing School, and Dental School.

The following concentrations are offered in the Department of Food Science, Nutrition and Health Promotion:

- Food Processing/Business
- Food Science
- Food Safety (pre-vet)
- Food and Nutrition
- Pre-Health Professions

Food and Nutrition Concentration

The Food and Nutrition concentration prepares students for a wide variety of careers. For students interested in becoming a Registered Dietitian, the Didactic Program in Dietetics (DPD) at Mississippi State University is accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics, 120 South Riverside Plaza, Suite 2190, Chicago, IL, 60606-6995; telephone 800-877-1600 or 312-899-0040, http://www.eatright.org/ACEND. Upon completion of the DPD program, graduates may pursue participation in a supervised practice program/dietetic internship.

Didactic Program in Dietetics:

1. To enter the Didactic Program in Nutrition and Dietetics (DPD) Food and Nutrition concentration, students must have a 3.0 GPA and have completed the following courses with a grade of "C" or better: CH 1213 Chemistry I, CH 1211 Investigations in Chemistry I, CH 1223 Chemistry II, CH 1221 Investigations in Chemistry II, CH 2503 Elementary Organic Chemistry, CH 2501 Elementary Organic Chemistry Laboratory, BIO 1134 Biology I, FNH 2293 Individual and Family Nutrition, ST 2113 Introduction to Statistics.
2. A grade of "C" or better is required in all DPD courses. A course with a final grade lower than a "C" must be repeated.
3. Students who wish to receive a Letter of Intent and/or verification statement from the MSU Didactic Program in Dietetics (DPD) must have a minimum of a 3.0 GPA and a minimum grade of "C" or better in all of the required DPD courses.
4. Six (6) hours are available for electives, and students are encouraged to consider an academic minor.
5. Transfer credits with a grade of "C" or better will be considered toward fulfilling degree requirements. After completion of the DPD undergraduate degree, successful completion of the supervised practice program/dietetic internship, followed by passing the Registration Exam, a student fulfills the requirements to become a Registered Dietitian. Beginning in January 2024, a minimum of a Master's degree will be an eligibility requirement to take the Registration Exam.

BS in Biochemistry & Molecular Biology

General Education Requirements

English Composition		
EN 1103	English Composition I	3
or EN 1104	Expanded English Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	
Creative Discovery		
Select from General Education courses		3
Humanities		
Select from General Education courses		6
Social/Behavioral Sciences (vary by concentration)		**6**
Required for Pre-Dental concentration:		
PSY 1013	General Psychology	
Select from General Education courses		
Required for Pre-Pharmacy & Pre-MBA concentrations:		
EC 2113	Principles of Macroeconomics	
EC 2123	Principles of Microeconomics	
Required for Forensic Sciences concentration:		
PSY 1013	General Psychology	
SO 1003	Introduction to Sociology	
All other concentrations		
Select from General Education courses		
Quantitative Reasoning		
MA 1713	Calculus I	3
MA 1723	Calculus II	3
Natural Sciences		
CH 1213 & CH 1211	Chemistry I and Investigations in Chemistry I	4
CH 1223 & CH 1221	Chemistry II and Investigations in Chemistry II	4

Degree Requirements

Major Core		
CH 1213	Chemistry I	3
CH 1211	Investigations in Chemistry I	1
CH 1223	Chemistry II	3
CH 1221	Investigations in Chemistry II	1
CH 4513	Organic Chemistry I	3
CH 4511	Organic Chemistry Laboratory I	1
CH 4523	Organic Chemistry II	3
CH 4521	Organic Chemistry Laboratory II	1
BCH 1001	Introduction to Biochemistry	1
BCH 3901	Senior Seminar	1
BCH 4414	Protein Methods	4
BCH 4503	Scientific Communication Skills	3
BCH 4603	General Biochemistry I	3
BCH 4613	General Biochemistry II	3
BCH 4623	Integrative Metabolic and Medical Biochemistry	3
BCH 4713	Molecular Biology	3
BCH 4804	Molecular Biology Methods	4

BIO 1134	Biology I	4
BIO 1144	Biology II	4
BIO 3304	General Microbiology	4
PH 1113	General Physics I [1]	3
or PH 2213	Physics I	
PH 1123	General Physics II [1]	3
or PH 2223	Physics II	
Technical Electives (concentration dependent) [2]		21-32
General Electives (concentration dependent)		0-10
Oral Communication Requirement		
CO 1003	Fundamentals of Public Speaking	3
Writing Requirement		
BCH 4414	Protein Methods	4
BCH 4804	Molecular Biology Methods	4
Computer Literacy		
BCH 4414	Protein Methods	4
BCH 4713	Molecular Biology	3
BCH 4804	Molecular Biology Methods	4

Pre-Medicine Concentration (MED)

Biochemistry is an excellent preparation for medical school. In order to be better prepared for the Medical College Admissions Test (MCAT), medical school classes, and to meet medical school entrance requirements, the following courses are required in lieu of technical or general electives. These courses are also appropriate for students interested in dental school.

Social Sciences (See General Education list)		6
BIO 2103	Cell Biology	3
or BIO 4114	Cellular Physiology	
Choose one of the following:		4
BIO 3004	Human Anatomy	
BIO 3014	Human Physiology	
VS 3014	Anatomy and Physiology	
BIO 4514	Animal Physiology	
BIO 3103	Genetics I	3
or BIO 4133	Human Genetics	
Choose one of the following:		3
PH 1133	General Physics III	
PH 2233	Physics III (OR a technical elective if transferring 8 hours of Physics to the program)	
Choose one of the following:		3
PHI 1123	Introduction to Ethics	
PHI 3323	Medical Ethics	
Science Elective		
Technical electives		6
General or Free electives		8-9
Total hours		**120**

Pre-Dental Concentration (DENT)

Biochemistry is an excellent preparation for dental school. This concentration prepares students for the Dental Admissions Test, dental school classes, and to meet dental school requirements. The following courses are required as either Social Science core courses or in lieu of technical or general electives.

PSY 1013	General Psychology	3
Social Science (See General Education courses)		3
BIO 2103	Cell Biology	3
or BIO 4114	Cellular Physiology	

BIO 3014	Human Physiology	4
or BIO 4514	Animal Physiology	
ST 2113	Introduction to Statistics	3
Choose one of the following:		3
PHI 1123	Introduction to Ethics [1]	
PHI 3323	Medical Ethics	
Science Elective		
PH 1133	General Physics III (OR Science elective if transferring 8 hours of Physics to the program)	3
Science electives		6
General or Free electives		8-9
Total hours		**120**

Pre-Pharmacy Concentration (PPHR)

Pharmacy school typically requires only two to three years of college work for entry. However, four-year undergraduate programs can be of benefit to students and Biochemistry graduates have been very successful in Pharmacy School and perform well on the Pharmacy College Admissions Test. The following courses are required as either Social Science core courses or in lieu of technical or general electives.

PSY 1013	General Psychology	3
or SO 1003	Introduction to Sociology	
EC 2113	Principles of Macroeconomics	3
EC 2123	Principles of Microeconomics	3
ST 2113	Introduction to Statistics	3
BIO 3103	Genetics I	3
or BIO 4113	Evolution	
BIO 4405	Pathogenic Microbiology	5
BIO 4413	Immunology	3
BIO 4514	Animal Physiology	4
PHI 3323	Medical Ethics	3
PH 1133	General Physics III (OR Science elective if transferring 8 hours of Physics to the program)	3
General or Free electives		4
Total hours		**120**

Pre-Optometry Concentration (OPT)

Biochemistry is an excellent preparation for optometry school. This concentration prepares students for the Optometry Admissions Test, optometry school classes, and to meet optometry school requirements. The following courses are required as either Social Science core courses or in lieu of technical or general electives.

Biochemistry is an excellent preparation for optometry school. This concentration prepares students for the Optometry Admissions Test, optometry school classes, and to meet optometry school requirements. The following courses are required as either Social Science core courses or in lieu of technical or general electives.

[1] PHI 1123 Introduction to Ethics may be used to fulfill three of the six hours of General Education Humanities requirements. Students taking this course can apply this as a humanities elective (if they so choose) and then can take either PHI 3323 Medical Ethics or any other approved science elective to fulfill this technical elective requirement.

Science Concentration (SCI)

The Science concentration provides students with core classes towards a degree in biochemistry coupled with undergraduate research and/or internship requirements. Additional coursework as technical electives concentrate on cell biology, anatomy and/or physiology, with much of the coursework remaining flexible to allow students to explore specialized subject matter or broad areas of interest in the sciences. This concentration is intended for students that may pursue graduate research after their undergraduate degree, or those seeking to tailor a specialization to their interest or intended career track. The following courses are required in lieu of technical or general electives.

Social Sciences (see General Education list)		6
BCH 4100	Biochemistry and Molecular Biology Internship	1-6
or BCH 4000	Directed Individual Study in Biochemistry, Molecular Biology, Entomology, and Plant Pathology	
Choose one of the following:		4

BIO 3014	Human Physiology	
VS 3014	Anatomy and Physiology	
BIO 4514	Animal Physiology	
BIO 2103	Cell Biology	3
or BIO 4114	Cellular Physiology	
Science or business technical electives		12
General/free electives		8-9
Total hours		**120**

Bioinformatics Concentration (BINF) [1]

This concentration provides the student with a B.S. in Biochemistry and Molecular Biology incorporating a strong background in the biochemical sciences along with a rigorous preparation in the field of computer science. The graduate will be able to either enter graduate school or directly enter a career requiring knowledge of bioinformatics. This exciting field applies computational and database skills to molecular biological problems. Practitioners routinely mine genomic databases for information relating to basic understanding of life processes as well as information providing clues for medical and agricultural advances. This program also constitutes a minor in computer science. Students MUST take the following courses in lieu of technical and general electives.

Social Sciences (See General Education courses)		6
CSE 1284	Introduction to Computer Programming	4
CSE 1384	Intermediate Computer Programming	4
CSE 2383	Data Structures and Analysis of Algorithms	3
CSE 2813	Discrete Structures	3
CSE 3813	Introduction to Formal Languages and Automata	3
CSE 4613	Bio-computing	3
CSE 4633	Artificial Intelligence	3
CSE 4623	Computational Biology	3
CSE 4833	Introduction to Analysis of Algorithms	3
ST 3123	Introduction to Statistical Inference (OR Computer Science Elective)	3
Total hours		**121**

[1] Completion of the Bioinformatics program also constitutes a minor in Computer Science from the Department of Computer Science and Engineering, and students receive a Certificate in Computational Biology from the Institute of Digital Biology. Note that students must declare to the appropriate program and/or departmental advisor to receive credit for a degree minor and/or to receive a Certificate.

Pre-MBA Concentration (PMBA)

This concentration provides the student with a B.S. in Biochemistry incorporating a strong background in science while preparing the student for immediate entry into a graduate program leading to an advanced business degree (either the Master of Business Administration or the Master of Agribusiness Management). Either program can be completed in a minimum of three semesters. Students thus educated may enter into management level positions in the biotech or agribusiness industry. The following courses are required as either Social Science core courses or in lieu of technical or general electives.

ACC 2013	Principles of Financial Accounting	3
ACC 2023	Principles of Managerial Accounting	3
EC 2113	Principles of Macroeconomics	3
EC 2123	Principles of Microeconomics	3
BQA 2113	Business Statistical Methods I	3
BQA 3123	Business Statistical Methods II	3
MGT 3114		4
MKT 3013	Principles of Marketing	3
FIN 3123	Financial Management	3
Computer elective		3
General/Free electives		6
Total hours		**120**

Forensic Sciences Concentration (FOSC)

This concentration provides the student with a B.S. in Biochemistry incorporating a strong background in the biochemical sciences along with a rigorous preparation in the general area of criminology and forensics. Because of the ever increasing use of molecular sciences in forensics, graduates with this specialization should be employable by crime labs or by industry using DNA profiling or other biometric techniques. Internships are encouraged. The following courses are required as either Social Science core courses or in lieu of technical or general electives.

PSY 1013	General Psychology	3
SO 1003	Introduction to Sociology	3
Choose one of the following:		3
CH 2313		
ST 2113	Introduction to Statistics	
PSY 3104	Introductory Psychological Statistics	
SO 3603	Criminological Theory	3
CRM 3103	Contemporary Issues in Criminal Justice	3
SO 3313	Deviant Behavior	3
or PSY 3213	Psychology of Abnormal Behavior	
Choose one of the following:		3
PSY 4373	Forensic Psychology	
AN 4313	Human Osteology	
CSE 4273	Introduction to Computer Forensics	
BIO 3103	Genetics I	
BIO 2103	Cell Biology	3
or BIO 4114	Cellular Physiology	
BCH 2013	Introduction to Forensic Science	3
BCH 4333	Advanced Forensic Science	3
SO 4513	Correctional Systems (OR Science elective)	3
General/free electives		3-4
Total hours		**120**

Entomology Concentration (ENT)

This concentration provides a student with a B.S. in Biochemistry but incorporates a focal area in entomology. Students receive excellent training in the biochemical sciences, coupled with general and specific entomology subject areas from which the student can choose subject matter in their areas of interest. The following courses are required in lieu of technical or general electives.

Social Sciences (see General Education courses)		6
EPP 4154	General Entomology	4
EPP 4164	Insect Taxonomy	4
EPP 4263	Principles of Insect Pest Management	3
EPP 4335		5
Choose three of the following:		6-8
EPP 3124	Forest Pest Management	
EPP 3423	Ornamental and Turfgrass Insects	
EPP 4173	Medical and Veterinary Entomology	
EPP 4234	Field Crop Insects	
EPP 4244	Aquatic Entomology	
EPP 4543	Toxicology and Insecticide Chemistry	
General/free electives		
Total hours		**120**

Plant Pathology Concentration (PPTH)

This concentration provides a student with a B.S. in Biochemistry but incorporates a focal area in plant pathology. Students receive excellent training in the biochemical sciences, coupled with general and specific plant pathology subject areas in plant disease epidemiology, pathology and disease identification/diagnostics. The following courses are required in lieu of technical or general electives.

Social Sciences (see General Education courses)		6
EPP 3124	Forest Pest Management	4
EPP 4113	Principles of Plant Pathology	3
EPP 4163	Plant Disease Management	3
EPP 4214	Diseases of Crops	4
EPP 4254	Introduction to Mycology	4
EPP 4523	Turfgrass Diseases	3
BIO 2113	Plant Biology	3
or PSS 1313	Plant Science	
Choose one of the following:		3-4
PSS 4553	Plant Growth and Development	
BIO 4214	General Plant Physiology	
General/free electives		3-4
Total hours needed for major		**120**

Pre-Veterinary Medicine Concentration (PVBC)

Biochemistry is an excellent preparation for veterinary medical school. In order to be better prepared for the Graduate Record Examination (GRE) or Veterinary College Admissions Test, veterinary medical school classes, and to meet veterinary medical school entrance requirements, the following courses are required in lieu of technical or general electives.

BIO 3103	Genetics I	3
or BIO 4133	Human Genetics	
VS 3014	Anatomy and Physiology	4
or BIO 4514	Animal Physiology	
BIO 2103	Cell Biology	3
or BIO 4114	Cellular Physiology	
Science or business technical electives		12
Social Sciences (See General Education courses)		6
General/free electives		8-9
Total hours		**120**

Three year program (3+1) for early admission into the College of Veterinary Medicine

The aim of this curriculum is to allow a student to matriculate through the Department of Biochemistry and Molecular Biology for three years and then proceed into the College of Veterinary Medicine under their early admissions policy. Successful completion of the courses taken during the first year in Veterinary Medicine will satisfy the Department's requirements for technical electives and allow the University to grant the student a B.S. in Biochemistry and Molecular Biology after this period.

General Education requirements		30
CH 1213	Chemistry I	3
CH 1211	Investigations in Chemistry I	1
CH 1223	Chemistry II	3
CH 1221	Investigations in Chemistry II	1
CH 4513	Organic Chemistry I	3
CH 4511	Organic Chemistry Laboratory I	1
CH 4523	Organic Chemistry II	3
CH 4521	Organic Chemistry Laboratory II	1
BCH 1001	Introduction to Biochemistry	1
BCH 4503	Scientific Communication Skills	3
BCH 4603	General Biochemistry I	3
BCH 4414	Protein Methods	4
BCH 4613	General Biochemistry II	3
BCH 4623	Integrative Metabolic and Medical Biochemistry	3
BCH 4713	Molecular Biology	3
BCH 3901	Senior Seminar	1

BCH 4804	Molecular Biology Methods	4
BIO 1134	Biology I	4
BIO 1144	Biology II	4
BIO 3304	General Microbiology	4
PH 1113	General Physics I	3
PH 1123	General Physics II	3
VS 3014	Anatomy and Physiology	4
or BIO 4514	Animal Physiology	
BIO 3103	Genetics I	3
or BIO 4133	Human Genetics	

95 hours required plus successful completion of the first year curriculum of the College of Veterinary Medicine

Mississippi State requires a minimum of 120 hours for the undergraduate degree. Therefore, the first year in the College of Veterinary Medicine will contribute 25 hours of technical electives to this program.

BS in Food Science, Nutrition, and Health Promotion

General Education Requirements

English Composition		**6**
EN 1103	English Composition I	
or EN 1104	Expanded English Composition I	
EN 1113	English Composition II	
or EN 1173	Accelerated Composition II	
Creative Discovery		**3**
Select from University Gen Ed Core		
Humanities		**6**
Select from University Gen Ed Core		
Social/Behavioral Sciences (varies by concentration)		**6**
Required for FSTP & FSSC Concentrations		
AEC 2713	Introduction to Food and Resource Economics	
Select from University Gen Ed Core		
Required for FN Concentration		
PSY 1013	General Psychology	
SO 1003	Introduction to Sociology	
or SO 1103	Contemporary Social Problems	
or SO 1203	Sociology of Families	
Recommended for PHP Concentration		
PSY 1013	General Psychology	
SO 1003	Introduction to Sociology	
FDS Concentration		
Choose from Gen Ed Core		
Quantitative Reasoning (varies by concentration)		**3**
Required for FSD Concentration		
MA 1323	Trigonometry	
or MA 1713	Calculus I	
Required for All Other Concentrations		
ST 2113	Introduction to Statistics	
or ST 3123	Introduction to Statistical Inference	
Natural Sciences		**8**
CH 1213	Chemistry I	
CH 1211	Investigations in Chemistry I	

CH 1223	Chemistry II
CH 1221	Investigations in Chemistry II

Major Core

Major Core Courses		**17**
CH 2503	Elementary Organic Chemistry	
or CH 4513	Organic Chemistry I	
CH 2501	Elementary Organic Chemistry Laboratory	
or CH 4511	Organic Chemistry Laboratory I	
MGT 3513	Introduction to Human Resource Management	
FNH 2293	Individual and Family Nutrition	
FNH 3111	Food Science, Nutrition and Health Promotion Seminar	
FNH 4243	Composition and Chemical Reactions of Foods	
CO 1003	Fundamentals of Public Speaking	
or CO 1013	Introduction to Communication	
or CO 3213	Small Group Communication	

Choose a concentration:

Food Processing/Business Concentration (FSTP)

Major Advisors: Wes Schilling, Professor, and Shecoya White, Assistant Professor

FSTP combines food science and business courses to prepare students for careers in the food industry, government, or private business.

BIO 1134	Biology I	4
MA 1313	College Algebra	3
Food Processing/Business Concentration		**68**
BIO 3304	General Microbiology	
MA 1323	Trigonometry	
PH 1113	General Physics I	
or PH 2213	Physics I	
AEC 3413	Introduction to Food Marketing	
or MKT 3013	Principles of Marketing	
AELC 3203	Professional Writing in Agriculture, Natural Resources, and Human Sciences [1]	
AELC 4203	Applications of Computer Tech to Agricultural Education, Leadership, and Communications [2]	
FNH 2011	Career Planning and Success Skills in Food Science	
FNH 2112	Food Products Evaluation	
FNH 4114	Analysis of Food Products	
FNH 4241	Applied Food Chemistry	
FNH 4333	Food Law	
FNH 4414	Microbiology of Foods	
FNH 4480	Food Science Internship (6 hours)	
FNH 4573	Food Engineering Fundamentals	
or FNH 4583	Food Preservation Technology	
FNH 4593	New Food Product Development	
Business Electives (12 hours) [5]		
Processing Electives (6-8 hours) [3]		
FNH Electives (3 hours) [4]		
Free Electives (0-1 hours)		
Total Hours		**124**

1 Fulfills Jr/Sr Writing Requirement
2 Fulfills Computer Lit Requirement

[3] Choose 2 courses (6-8 hours) from the Food Processing Electives: FNH 3314 , FNH 4143 Dairy Foods Processing, FNH 4514 Poultry Processing, or FNH 4613 Seafood Processing

[4] Choose one additional FNH 3000-4000 level course from all Food Science, Nutrition, and Health Promotion classes

[5] A minor in AgEcon, Marketing, Finance, Management or Business Administration will satisfy the requirement for 12 credits of business electives. In lieu of a minor, students should select 12 credit hours from the following: ACC 2013 Principles of Financial Accounting, MKT 3013 Principles of Marketing, AEC 3133 Introductory Agribusiness Management, AEC 3213 International Trade in Agriculture, AEC 3413 Introduction to Food Marketing, AEC 4113 Agribusiness Firm Management, AEC 4123 Financial and Commodity Futures Marketing, AEC 4133 Analysis of Food Markets and Prices, AEC 4343 Advanced Farm Management; all classes listed under the minors for Marketing, Finance, Business Administration, and Management are also acceptable business electives.

Food Science Concentration (FSSC)

Major Advisors: Wes Schilling, Professor, and Shecoya White, Assistant Professor

FSSC is designed for students who wish to explore a career in research, pursue graduate studies, work for the government, or work in the food industry.

BIO 1134	Biology I	4
MA 1713	Calculus I	3
Food Science Concentration		**68**
BIO 1144	Biology II	
BIO 3304	General Microbiology	
BCH 4013	Principles of Biochemistry	
MA 1723	Calculus II	
PH 1113	General Physics I	
or PH 2213	Physics I	
PH 1123	General Physics II	
or PH 2223	Physics II	
ACC 2013	Principles of Financial Accounting	
MKT 3013	Principles of Marketing	
AELC 3203	Professional Writing in Agriculture, Natural Resources, and Human Sciences [1]	
AELC 4203	Applications of Computer Tech to Agricultural Education, Leadership, and Communications [2]	
FNH 2011	Career Planning and Success Skills in Food Science	
FNH 2112	Food Products Evaluation	
FNH 4114	Analysis of Food Products	
FNH 4164	Quality Assurance of Food Products	
FNH 4241	Applied Food Chemistry	
FNH 4333	Food Law	
FNH 4414	Microbiology of Foods	
FNH 4573	Food Engineering Fundamentals	
or FNH 4583	Food Preservation Technology	
FNH 4593	New Food Product Development	
FNH 4480	Food Science Internship (6 hours)	
Processing Electives (3-4 hours) [3]		
FNH Electives (3-4 hours) [4]		
Free Electives (0-2 hours)		
Total Hours		**124**

[1] Fulfills Jr/Sr Writing Requirement

[2] Fulfills Computer Lit Requirement

[3] Choose 1 course (3-4 hours) from the Food Processing Electives: FNH 3314 , FNH 4143 Dairy Foods Processing, FNH 4514 Poultry Processing, or FNH 4613 Seafood Processing

[4] Choose an additional 3-4 hours from all 3000-4000 level Food Science, Nutrition and Health Promotion classes.

Food Safety Concentration (FDS)

Major Advisors: Wes Schilling, Professor, and Shecoya White, Assistant Professor

FDS is designed as a Pre-Veterinary option that focuses on factors affecting food safety and all coursework essential for acceptance in the College of Veterinary Medicine.

BIO 1134	Biology I	4
MA 1313	College Algebra	3
Food Safety Concentration [1]		**48**
CH 4523	Organic Chemistry II	
CH 4521	Organic Chemistry Laboratory II	
BIO 1144	Biology II	
BIO 3304	General Microbiology	
BCH 4013	Principles of Biochemistry	
PH 1113	General Physics I	
or PH 2213	Physics I	
PH 1123	General Physics II	
or PH 2223	Physics II	
AELC 3203	Professional Writing in Agriculture, Natural Resources, and Human Sciences [2]	
AELC 4203	Applications of Computer Tech to Agricultural Education, Leadership, and Communications [3]	
ADS 4114	Animal Nutrition	
FNH 2011	Career Planning and Success Skills in Food Science	
FNH 4241	Applied Food Chemistry	
FNH 3314		
FNH 4414	Microbiology of Foods	
FNH 4514	Poultry Processing	
FNH 4583	Food Preservation Technology	
Electives (Select 3-6 credits from the following list)		**3-6**
ACC 2013	Principles of Financial Accounting	
FNH 3142	Meats Judging I	
FNH 4114	Analysis of Food Products	
FNH 4143	Dairy Foods Processing	
FNH 4164	Quality Assurance of Food Products	
FNH 4593	New Food Product Development	
ADS 1113	Animal Science	
ADS 1121	Animal Science Laboratory	
ADS 3214	Livestock Growth and Development	
ADS 3312	Livestock Management Practices	
ADS 4113	Swine Science	
ADS 4124	Animal Breeding	
ADS 4323	Beef Cattle Science	
ADS 4613	Physiology of Reproduction	
ADS 4611	Practices in Physiology of Reproduction	
BIO 2103	Cell Biology	
BIO 4413	Immunology	
BIO 4503	Vertebrate Histology	
BIO 4514	Animal Physiology	
VS 3014	Anatomy and Physiology	
PO 4033	Diseases of Poultry	
PO 4324	Avian Reproduction	
PO 4334	Broiler Production	
PO 4413	Poultry Nutrition	

PO 4844	Avian Anatomy and Physiology	
Total Hours needed for major through Junior Year		**104-107**
Students will receive a B.S. in Food Science, Nutrition and Health Promotion upon successful completion of their first year in the College of Veterinary Medicine at Mississippi State University.		
If students do not obtain admittance into the School of Veterinary Medicine after their junior year, an optional 4th year that is listed below will allow these students to graduate with a B.S. in Food Science, Nutrition and Health Promotion (Food Safety Concentration) after their fourth year of studies as well as allow these students another year to attempt to earn admittance into the School of Veterinary Medicine.		
Optional Senior Year		**17**
FNH 4114	Analysis of Food Products	
FNH 4164	Quality Assurance of Food Products	
FNH 4593	New Food Product Development	
6 hours of electives for 3000-4000 level FNH classes		
Electives from the Electives list above to reach a minimum of 124 hours		
Total Hours		**124**

1 45 hours is equal to 48-3 hours to account for the substitution for FNH 2293 in the major core.
2 Fulfills Jr/Sr Writing Requirement
3 Fulfills Computer Lit Requirement

Food and Nutrition Concentration (FN)

Major Advisors: Amanda Conrad, Didactic Program in Nutrition and Dietetics Director and Instructor; Rahel Mathews, Assistant Professor; and Renee Matich, Instructor

BIO 3304	General Microbiology	4
Food and Nutrition Concentration		**62**
BCH 4013	Principles of Biochemistry	
BIO 1134	Biology I	
BIO 3004	Human Anatomy	
BIO 3014	Human Physiology	
MGT 3113	Principles of Management	
KI 2603	Medical Terminology	
FNH 2201	Nutrition and Dietetics Career Planning	
FNH 2203	Science of Food Preparation	
FNH 3283	The Food Service System	
FNH 3723	Community Nutrition	
FNH 4013	Nutrition Assessment	
FNH 4123	Medical Nutrition Therapy I	
FNH 4233	Medical Nutrition Therapy II	
FNH 4253	Macronutrients: Human Metabolism	
FNH 4284	Quantity Food Production and Service	
FNH 4293	Micronutrients: Human Metabolism [3]	
FNH 4323	Professional Skills for Nutrition and Dietetics	
FNH 4353	Nutrition Throughout the Life Cycle	
FNH 4363	Research Methods in Food and Nutrition [2]	
FNH 4373	Nutrition Education and Counseling Skills	
Free Electives		9
Total Hours		**124**

1 Fulfills Oral Communication Requirement
2 Fulfills Jr/Sr Writing Requirement
3 Fulfills Computer Literacy Requirement

Pre-Health Professions Concentration (PHP)

Major Advisors: Wes Schilling, Professor; Shecoya White, Assistant Professor; and Antonio Gardner, Assistant Professor

PHP is designed to develop students who have a thorough understanding of principles of food science and have also fulfilled the prerequisites for medical school or other health-related professional or graduate school programs.

BIO 1134	Biology I	4
MA 1313	College Algebra	3
MA 1713	Calculus I	3
Pre-Health Professions Concentration		**57**
AELC 3203	Professional Writing in Agriculture, Natural Resources, and Human Sciences [1]	
AELC 4203	Applications of Computer Tech to Agricultural Education, Leadership, and Communications [2]	
BCH 4013	Principles of Biochemistry	
BIO 1144	Biology II	
BIO 3014	Human Physiology	
BIO 3304	General Microbiology	
CH 4521	Organic Chemistry Laboratory II	
CH 4523	Organic Chemistry II	
FNH 3103	Introduction to Health Professions	
FNH 3163	Basic Principles of Health Promotion	
FNH 4123	Medical Nutrition Therapy I	
FNH 4241	Applied Food Chemistry	
FNH 4393	Prevention and Control of Disease	
FNH 4414	Microbiology of Foods	
FNH 4583	Food Preservation Technology	
MA 1723	Calculus II	
PH 1113	General Physics I	
or PH 2213	Physics I	
PH 1123	General Physics II	
or PH 2223	Physics II	
PHI 3323	Medical Ethics	
Electives (Choose 2-3 classes based on requirements for specific health professional school; see advisor for options)		8
Total Hours		**124**

1 Fulfills Jr/Sr Writing Requirement
2 Fulfills Computer Literacy Requirement

B.S. in Culinology ®

Major Advisors: Wes Schilling, Professor and Shecoya White, Assistant Professor

The Culinology® degree program offers the opportunity to gain a broad education in Food Science and Culinary Arts. It involves the integration of Food Science and Culinary Arts so that students are prepared to work in diverse areas within the food industries -- from experimental research chefs and menu planners to food manufacturing, fine dining, and product development.

Culinology® is an approach to food that blends culinary arts and food technology. Through the blending of these two disciplines, Culinology® seeks to make food taste better -- whether purchased in a supermarket or eaten in a restaurant. Culinology® also seeks to make food more consistent and safer. A primary application of Culinology® is to logically translate sophisticated food concepts, such as those applied in fine dining or in a traditional ethnic cuisine, to items that are on the menus of chain restaurants or those processed for retail sale. Such chain-menu or retail product development is only possible through the astute combination of culinary arts and food science and technology.

According to Jeff Cousminer in Food Product Design Magazine, the word *Culinology*® was coined by the first president and founder of the Research Chefs Association, Winston Riley. The original meaning of the word was quite different than what it has come to mean today. Originally the word was designed to be a combination of two words, culinary and technology. So the first meaning of the word was the convergence of culinary arts and all technology, which includes communications, chemistry, physiology, economics and many others.

Accredited Culinology® educational programs are offered by many institutions. The curriculum included courses that combine the disciplines of cooking and food science. According to industry professionals, like Kraft's Harry Crane, Culinology® should "help jump-start product development."

General Education Requirements

English Composition		
EN 1103	English Composition I	3
or EN 1104	Expanded English Composition I	
EN 1113	English Composition II	3
or EN 1173	Accelerated Composition II	
Creative Discovery		
Select from General Education courses		3
Humanities		
Select from General Education courses		6
Social/Behavioral Sciences		
Select from General Education courses		6
Quantitative Reasoning		
ST 3123	Introduction to Statistical Inference	3
Natural Sciences		
CH 1213 & CH 1211	Chemistry I and Investigations in Chemistry I	4
CH 1223 & CH 1221	Chemistry II and Investigations in Chemistry II	4

Degree Requirements

Major Requirements		
MA 1313	College Algebra	
CH 2503	Elementary Organic Chemistry	
CH 2501	Elementary Organic Chemistry Laboratory	
BIO 1134	Biology I	
BIO 3304	General Microbiology	
FNH 1103	Introduction to Food Science, Nutrition and Health Promotion	
FNH 2203	Science of Food Preparation	
FNH 2112	Food Products Evaluation	
FNH 2293	Individual and Family Nutrition	
FNH 4164	Quality Assurance of Food Products	
FNH 4333	Food Law	
FNH 4583	Food Preservation Technology	
FNH 4593	New Food Product Development	
FNH 4243	Composition and Chemical Reactions of Foods	
FNH 4241	Applied Food Chemistry	
FNH 4414	Microbiology of Foods	
CA 1251	ServSafe [MUW]	
CA 2003	Introduction to Culinary Arts [MUW]	
CA 3005	Food Prep I [MUW]	
CA 3015	Food Prep II [MUW]	
CA 3023	Menu and Recipe Development [MUW]	
CA 3500	CA Internship [2]	
or FNH 4480	Food Science Internship	
CA 4005	Food Preparation III [MUW]	
CA 4013	World Cuisines [MUW]	
CA 4103	Business Skills in Culinary Arts [MUW]	
CA/FNH Electives		**5-6**
Choose from list of approved electives [1]		

Oral Communication Requirement		**3**
CO 1003	Fundamentals of Public Speaking	
or CO 3213	Small Group Communication	
Writing Requirement		**3**
AELC 3203	Professional Writing in Agriculture, Natural Resources, and Human Sciences	
Total Hours		**124**

MUW CA courses offered by Mississippi University for Women in Columbus, Mississippi

[1] At least 3 hours must be FNH or business (ACC, MKT, MGT) electives and at least 3 hours must be Culinary Arts (CA) electives: FNH 4363 Research Methods in Food and Nutrition, FNH 4114 Analysis of Food Products, FNH 4143 Dairy Foods Processing, FNH 3314 , FNH 4514 Poultry Processing, FNH 4573 Food Engineering Fundamentals, FNH 3283 The Food Service System, FNH 4283 Purchasing Food and Equipment for Food Service Systems, ACC 2013 Principles of Financial Accounting, MKT 3013 Principles of Marketing, MGT 3513 Introduction to Human Resource Management, CA 3103 Dining Room Service, CA 3153 Demonstration Techniques, CA 3753 Advancing Baking, CA 4153 Food Styling, CA 2603 CA Entrepreneurship, CA 3623 Business Law for CA, CA 3633 Service Design and Management, CA 3643 CA Venture Marketing, CA 3653 HR Management of Culinary Business, CA 4603 Culinary Arts Entrepreneurship

[2] To be completed after the Junior or Senior Year.

Biochemistry Minor

The Biochemistry minor is offered to allow undergraduate students in other majors to develop specific skills needed by graduates entering the science-related workforce. Students will enhance their written and oral communication skills and develop problem-solving/application skills. Students must complete 19 to 20 hours of approved coursework.

BCH 4603	General Biochemistry I	3
BCH 4613	General Biochemistry II	3
BCH 4414	Protein Methods	4
or BCH 4804	Molecular Biology Methods	
BCH 4713	Molecular Biology	3
Select a minimum of 6 hours (any two courses) from the following:		**6-7**
BCH 2013	Introduction to Forensic Science	
BCH 4000	Directed Individual Study in Biochemistry, Molecular Biology, Entomology, and Plant Pathology	
BCH 4100	Biochemistry and Molecular Biology Internship	
BCH 4253	Macronutrients: Human Metabolism	
BCH 4333	Advanced Forensic Science	
BCH 4414	Protein Methods	
or BCH 4804	Molecular Biology Methods	
BCH 4623	Integrative Metabolic and Medical Biochemistry	
BCH 4990	Special Topics in Biochemistry, Molecular Biology, Entomology and Plant Pathology	
Total Hours		**19-20**

Food Science Minor

Students will be required to complete the following courses to receive a minor in Food Science:

FNH 4241	Applied Food Chemistry	1
FNH 4243	Composition and Chemical Reactions of Foods	3
FNH 4414	Microbiology of Foods	4
FNH 4583	Food Preservation Technology	3
Choose 7 or more credits from the following electives:		7
FNH 4593	New Food Product Development	
FNH 1103	Introduction to Food Science, Nutrition and Health Promotion	
FNH 3314		
FNH 4164	Quality Assurance of Food Products	
FNH 4143	Dairy Foods Processing	
FNH 4514	Poultry Processing	

FNH 4114	Analysis of Food Products	
Total Hours		**18**

Meat Science Endorsement

Major Advisor: Wes Schilling

The Department of Food Science, Nutrition, and Health Promotion and the Department of Animal and Diary Sciences offer a Meat Science endorsement for students who wish to specialize in the meat processing industry. Students must complete a total of 24 credit hours as described below to be eligible for the endorsement. Nineteen credit hours are in required courses, with the remaining 5 hours to be selected from several electives. Students must also complete 300 hours of hands- on experiential learning in meat processing, research, and extension activities. With this approach, students will be career ready professionals equipped with a comprehensive understanding of industry and a skill set designed for them to make an immediate impact in meat science government, academic, or industry positions upon graduation.

Endorsement Requirements

Required Courses		
ADS 3314		
or FNH 3314		
FNH 4333	Food Law	3
FNH 4414	Microbiology of Foods	4
or BIO 4414	Microbiology of Foods	
FNH 4514	Poultry Processing	4
or PO 4514	Poultry Processing	
FNH 4480	Food Science Internship (3 credits must be at meat processing or related facility)	1-6
or ADS 4420	Animal and Dairy Science Internship	
HACCP Training (as a Directed Individual Study)		1
Electives		
Choose a minimum of 5 credit hours from the following:		
ADS 3142	Meats Judging I	
or FNH 3142	Meats Judging I	
ADS 3214	Livestock Growth and Development	
ADS 4243	Composition and Chemical Reactions of Foods	
or FNH 4243	Composition and Chemical Reactions of Foods	
ADS 4313	Advanced Science of Muscle Foods	
or FNH 4313	Advanced Science of Muscle Foods	
FNH 4114	Analysis of Food Products	
FNH 4164	Quality Assurance of Food Products	
FNH 4241	Applied Food Chemistry	
FNH 4512	Poultry Products Safety and Sanitation	
or PO 4512	Poultry Products Safety and Sanitation	
Total Hours (minimum)		**24**