FOOD SCIENCE AND HUMAN NUTRITION

The Department of Food Science and Human Nutrition is jointly administered by the College of Agriculture and Life Sciences and the College of Human Sciences. All curricula offered by the department are available to students in either college. These majors include:

- Culinary food science
- Dietetics
- Diet and exercise
- Food science
- Nutritional science
- Nursing

Visit the department web site at: www.fshn.hs.iastate.edu (http://www.fshn.hs.iastate.edu).

Undergraduate Study

Culinary Food Science

Culinary food science is an interdisciplinary degree combining a strong food science foundation with acquisition of culinary skills. The program includes chemistry, organic chemistry, biology, microbiology, and biochemistry as well as quantity food production, fine dining management, and food safety and sanitation. Internship experience in the food industry or culinary business is required. Culinary food science graduates are qualified to work as managers and specialists in food research, product development, culinary applications, and food marketing and sales. For more information: https://fshn.hs.iastate.edu/find-your-major/culinary-food-science/

Dietetics

The Didactic Program in Dietetics (DPD) is accredited by the Accreditation Council for Education in Nutrition and Dietetics, the accrediting agency of the Academy of Nutrition and Dietetics. The dietetics undergraduate curriculum meets the academic requirements as the DPD. Additionally, the curriculum for concurrent bachelor's and master's degrees in diet and exercise meets the academic requirements of the DPD. Graduates of the program are eligible to apply for admission to accredited dietetics internships/supervised practice programs. Upon successful completion of the experience program and a master's degree, graduates are eligible to take the national examination administered by the Commission on Dietetic Registration to become a Registered Dietitian Nutritionist (RDN) and to practice in the field of dietetics. There is a $30 fee for a statement of verification of completion of the DPD. For information about verification statements policies, see the dietetics program website: https://fshn.hs.iastate.edu/find-your-major/dietetics/.

The dietetics program includes study in basic sciences, nutrition, and food science with applications to medical dietetics, nutrition counseling and education, and community nutrition. Foodservice management is also an important aspect of the program. Graduates work in clinical settings, consulting, food companies, food services, sports or athletic programs, corporate wellness programs, care facilities for patients from neonatal to geriatric, and community or school health programs.

Diet and Exercise

A program for concurrent Bachelor of Science and Master of Science (B.S./M.S.) degrees in diet and exercise (https://fshn.hs.iastate.edu/find-your-major/diet-and-exercise/) is available. The program is jointly administered by the Department of Food Science and Human Nutrition (FSHN), within the College of Agriculture and Life Sciences and College of Human Sciences, and the Department of Kinesiology within the College of Human Sciences. Students interested in this program enroll as pre-diet and exercise students. In the fall of the third year, students apply for admission to the BS/MS program. Students not accepted into the program can continue toward completion of the BS degree in dietetics or kinesiology and health. Coursework has been designed to facilitate a 4-year graduation date for those students not accepted into the program and electing to complete a single undergraduate degree. Students accepted into the program will progress toward completion of B.S./M.S. degrees in diet and exercise.

Food Science

Food science is a discipline in which the principles of biological and physical sciences are used to study the nature of foods, the causes of their deterioration, and the principles underlying the processing and preparation of food. It is the application of science and technology to the provision of a safe, wholesome, and nutritious food supply. Biotechnology and toxicology interrelate with food science in the area of food safety. In the food industry, food scientists work in research and development of products or processes, production supervision, quality control, marketing and sales, test kitchens and recipe development, product promotion and communication. Food scientists also work in government regulatory agencies and academic institutions.

The food science major is approved by the Institute of Food Technologists, the national professional organization of food science. Career options include quality control/assurance; production supervision; management and sales; research careers in the food industry, government, or academia; business; journalism; food product formulation and recipe development; food promotion and communication; and consumer services in government and industry. For more information: https://fshn.hs.iastate.edu/find-your-major/food-science/

Students in food science have the opportunity to pursue a Master of Business Administration (http://www.fshn.hs.iastate.edu/undergraduate-programs/food-science/) (MBA) concurrently with the Bachelor of

Science (B.S.) degree in food science. The program is designed so students can earn both the B.S. in food science and MBA in five years, to meet the needs of students who are interested in management careers in the food industry. Students apply for admission to the MBA program in the spring of the third year. The program for concurrent B.S. in food science/MBA degrees is a rigorous 5-year program, and admission is very selective.

Nutritional Science

Nutritional science looks at the connection between diet and health. Students learn how diet can play a crucial role in the cause, treatment, and prevention of many diseases. There are degree program focuses within nutritional science. The pre-health and research coursework prepares students for work in research laboratories, graduate study in nutrition or biological sciences, or entrance into health professional programs, such as medical, dental, physician assistant, and pharmacy schools. Students gain a strong science education along with human nutrition expertise. The health coach and nutrition and wellness coursework prepare students for work positions in program planning and evaluation for community, public health, non-profit, and corporate wellness programs addressing the growing public interest in nutrition, wellness, and preventative health. Students learn about the role of nutrition and healthy eating for disease prevention and wellness. For more information: https://fshn.hs.iastate.edu/find-your-major/nutritional-science/

Nursing

The Bachelor of Science in Nursing (BSN) program at Iowa State University is a RN-to-BSN program, designed for those who are already a Registered Nurse (RN), and desire to further their nursing career and education to the next level. Iowa State's RN-to-BSN program provides interactive learning opportunities where students can apply their real-world experiences and education to inspire innovation in their places of care. RN-to-BSN students will be challenged to enhance health promotion and disease prevention, apply nursing science and evidenced-based patient-centered care, focus on the culture of health for nurses, individuals, and communities, and demonstrate the continuum of care, from a nurse's self-care to patient care to community and population health.

The baccalaureate nursing program at Iowa State University of Science and Technology located in Ames, Iowa is approved by the:

Iowa Board of Nursing (IBON)
Riverpoint Business Park
400 SW 8th St., Suite B
Des Moines, IA 50309
(515) 281-3255

The baccalaureate nursing program at Iowa State University of Science and Technology located in Ames, Iowa is accredited by the:

Accreditation Commission for Education in Nursing (ACEN)
3390 Peachtree Road NE, Suite 1400
Atlanta, GA 30326
(404) 975-5000

The most recent accreditation decision made by the ACEN Board of Commissioners for the baccalaureate nursing program is initial accreditation.

View the public information disclosed by the ACEN regarding this program at http://www.acenursing.com/accreditedprograms/programSearch.htm. (http://www.acenursing.com/accreditedprograms/programSearch.htm)

For more information and RN-to-BSN learning outcomes: https://fshn.hs.iastate.edu/find-your-major/nursing/

FSHN Departmental Learning Outcomes

Upon graduation, students should be able to:

- Communicate effectively in their field of study using written, oral, visual and/or electronic forms.
- Demonstrate proficiency in ethical data collection and interpretation, literature review and citation, critical thinking and problem solving.
- Participate effectively in a group or team.
- Integrate creativity, innovation, or entrepreneurship in ways that produce value.
- Describe sociocultural competence relative to diversity, equity and/or inclusion.
- Explain how human activities impact the natural environment and how societies are affected.
- Meet program specific learning outcomes.

For more information: https://fshn.hs.iastate.edu/staff-and-faculty/resources/outcomes-assessment/learning-outcomes/.

Communication Proficiency is certified by a grade of C or better in 6 credits of coursework in composition (ENGL 1500 Critical Thinking and Communication and ENGL 2500 Written, Oral, Visual, and Electronic Composition or other communication-intensive courses) and a grade of C or better in 3 credits of coursework in oral communication.

Minors - Undergraduate

The department offers minors in:

- culinary food science
- food and society
- food safety (interdepartmental minor)

- food science
- nutrition

All minors require at least 15 credits, including at least 6 credits in courses numbered 3000 or above taken at Iowa State University. The minor must include at least 9 credits that are not used to meet any other department, college, or university requirement.

Prerequisites: Students must complete prerequisite requirements for courses included in the minor.

Minor in Culinary Food Science

FSHN 1010	Food and the Consumer	3
FSHN 1150	Food Preparation Laboratory	1-2
or FSHN 2150	Advanced Food Preparation Laboratory	
FSHN 2140	Scientific Study of Food	3
Select additional credits from the following list for a minimum of 15 credits for the minor:		
FSHN 2200	American Food and Culture	3
FSHN 3050	Food Quality Management and Control	2
FSHN 3110 & 3110L	Food Chemistry and Food Chemistry Laboratory	4
FSHN 4030	Food Laws and Regulations	2
FSHN 4110	Food Ingredient Interactions and Formulations	2
FSHN 4910D	Supervised Work Experience: Culinary Science	1-4
ANS 2700 & 2700L	Foods of Animal Origin and Foods of Animal Origin Laboratory	3
ANS 4600	Science and Technology of Value Added Meat Products	3
HSPM 1330	Food Safety Certification	1
HSPM 3800 & 3800L	Food Production Management and Food Production Management Experience	6
HSPM 3830	Wine and Spirits in Hospitality Management	2
or FSHN 5090	Sensory Evaluation of Wines	
HSPM 4870	Fine Dining Management	3

Minor in Food and Society (16-17 credits required)

FSHN 1010	Food and the Consumer	3
FSHN 1670	Introductory Human Nutrition and Health	3
FSHN 2420	The US Food System	3
FSHN 3420	World Food Issues: Past and Present	3
FSHN 4420	Issues in Food and Society	2
Select 2-3 additional credits from:		2-3
AGRON 4500	Issues in Sustainable Agriculture	
FSHN 2200	American Food and Culture	
FSHN 3640	Nutrition and Prevention of Chronic Disease	
FSHN 3650	Obesity and Health	
FSHN 4030	Food Laws and Regulations	
FSHN 4600	Global Nutrition, Health and Sustainability	
FSHN 4630	Community Nutrition and Health	
FSHN 4960A	Food Science and Human Nutrition Travel Course: International travel	
MATE 2200	Globalization and Sustainability	
SOC 3450	Population and Society	
SOC 3480	Global Poverty, Resources and Sustainable Development	
SOC 4440	Sociology of Food and Agricultural Systems	

Interdepartmental Minor in Food Safety

FSHN 1010	Food and the Consumer	3
or HSPM 2330	Hospitality Sanitation and Safety	
FSHN 4030	Food Laws and Regulations	2
FSHN 4200	Food Microbiology	3
FSHN 4890	Issues in Food Safety	1
Select 3 credits from the Food Microbiology area		
FSHN/MICRO 4070	Microbiological Safety of Foods of Animal Origins	
FSHN/MICRO 4210	Food Microbiology Laboratory	
MICRO 3100	Medical Microbiology	
Select 3 credits from the Food Processing area:		
FSHN 2070	Processing of Foods: Basic Principles and Applications	
FSHN 3050	Food Quality Management and Control	
ANS 2700 & 2700L	Foods of Animal Origin and Foods of Animal Origin Laboratory	
ANS 3600	Fresh Meat Science and Applied Muscle Biology	
FSHN 4710	Food Processing	
FSHN 4720	Food Processing Laboratory	

Minor in Food Science:

FSHN 1010	Food and the Consumer	3
FSHN 2070	Processing of Foods: Basic Principles and Applications	3
Select 9 additional credits:		
Food chemistry:		
FSHN 3110	Food Chemistry (lab optional: FSHN 3110L)	3
FSHN 4100	Food Analysis	3

FSHN 4110	Food Ingredient Interactions and Formulations	2
Food microbiology:		
FSHN 4070	Microbiological Safety of Foods of Animal Origins	3
FSHN 4190	Foodborne Hazards	3
FSHN 4200	Food Microbiology	3
FSHN 4210	Food Microbiology Laboratory	3
Food processing/engineering:		
FSHN 3510	Introduction to Food Engineering Concepts	3
FSHN 4710	Food Processing	3
FSHN 4720	Food Processing Laboratory	2
General food science:		
FSHN 3050	Food Quality Management and Control	2
FSHN 4030	Food Laws and Regulations	2
FSHN 4060	Sensory Evaluation of Food	3
Select additional credits from the following list to meet a minimum of 15 credits for the minor:		
FSHN 3140	Professional Development for Culinary Food Science and Food Science Majors	1
FSHN 3150	Professional Skills for Culinary Food Science and Food Science Majors	1

Minor in Nutrition: For students from outside the FSHN department

FSHN 1670	Introductory Human Nutrition and Health	3
FSHN 2650	Nutrition for Active and Healthy Lifestyles	3
FSHN 3600	Advanced Nutrition and the Regulation of Metabolism in Health and Disease	3
Select at least 6 credits from:		
FSHN 3610	Nutrition and Health Assessment	2
FSHN 3620	Nutrition and Health Throughout the Lifecycle	3
FSHN 3640	Nutrition and Prevention of Chronic Disease	3
FSHN 3650	Obesity and Health	3
FSHN 4630	Community Nutrition and Health	3
FSHN 4670	Molecular Basis of Nutrition in Disease Etiology and Health Promotion	3
FSHN 4920	Research Concepts in Human Nutrition	2
NUTRS 5010	Biochemical and Physiological Basis of Nutrition: Macronutrients and Micronutrients	4

Minor in Nutrition: For students majoring in culinary food science or food science

FSHN 2650	Nutrition for Active and Healthy Lifestyles	3
FSHN 3600	Advanced Nutrition and the Regulation of Metabolism in Health and Disease	3
Select at least 9 credits from:		
FSHN 3610	Nutrition and Health Assessment	2
FSHN 3620	Nutrition and Health Throughout the Lifecycle	3
FSHN 3640	Nutrition and Prevention of Chronic Disease	3
FSHN 3650	Obesity and Health	3
FSHN 4630	Community Nutrition and Health	3
FSHN 4670	Molecular Basis of Nutrition in Disease Etiology and Health Promotion	3
FSHN 4920	Research Concepts in Human Nutrition	2
NUTRS 5010	Biochemical and Physiological Basis of Nutrition: Macronutrients and Micronutrients	4

Graduate Study

The Food Science and Human Nutrition (FSHN) Department offers coursework for the degrees master of science and doctor of philosophy with majors in food science and technology and in nutritional sciences, and minors in food science and technology and in nutrition. Graduate work in meat science is offered as a co-major in animal science and food science and technology.

Prerequisite to major work is a baccalaureate degree in food science, nutrition, or other physical or biological sciences or engineering that is substantially equivalent to those at Iowa State University.

Students taking major work for the degree doctor of philosophy either in food science and technology or in nutritional sciences may choose minors from other fields including anthropology, biorenewable resources and technology, chemistry, biochemistry, economics, education, journalism, microbiology, psychology, physiology, statistics, toxicology, or other related fields.

The Food Science and Technology (FST) graduate program offers MS and PhD degrees in the general areas of Food Chemistry and Functionality, Food Safety and Microbiology, and Food Processing. The FST core curriculum and interdisciplinary faculty team provides holistic graduate student training. Individuals with an undergraduate or graduate degree from a variety of academic training backgrounds, such as food sciences and the various disciplines of biology, chemistry, and agricultural sciences, may enter the FST program.

The interdepartmental graduate program in nutritional sciences, administered through the Graduate College, under the auspices of the Chairs of FSHN and Animal Science, will provide the structure for coordinating and enhancing interdisciplinary nutrition research and graduate education. Graduate students will be able to select from three specializations: animal nutrition, human nutrition, or molecular/biochemical nutrition. The three main departments are FSHN, Animal Science, and Kinesiology, whereas other departments (such as; Biochemistry, Biophysics, and Molecular Biology; Agronomy;

and Statistics) may also be involved. (See Nutritional Sciences interdepartmental graduate major).

The Master of Professional Practice in Dietetics program is an online, course-work only, 12-month long, integrated graduate program that combines didactic coursework and on-site supervised experiential learning to train future Registered Dietitian Nutritionists. In addition to the required didactic coursework, students complete a minimum of 1000 hours of supervised experiential learning to meet the eligibility requirements to take the national credentialing exam for Registered Dietitian Nutritionists. Prerequisite for the program is graduation from a Didactic Program in Dietetics.

The department also offers an online 12-13 credit Graduate Certificate in Food Safety and Defense, in conjunction with the University of Nebraska, Lincoln, Kansas State University and the University of Missouri through the Great Plains Interactive Distance Education Alliance. Course topics include food microbiology, food defense, food toxicology, HACCP, and additional topics related to food safety. Students may be admitted if qualified for admission to the food science master's degree program.

The department offers work for concurrent B.S. and M.S. degree programs that allow students to obtain both the B.S. and M.S. degrees in 5 years. The programs are available to students majoring in nutritional science or pre-diet and exercise, and students progress toward M.S. degrees in nutritional sciences or diet and exercise, respectively. Students interested in these programs should contact the department for details. Application for admission to the Graduate College should be made during the junior year. Students begin research for the M.S. thesis or creative component during the summer after their junior year and are eligible for research assistantships.

Students graduating with advanced degrees in nutritional sciences and in food science and technology will demonstrate competency in their chosen discipline. Measurable outcomes will include the ability to:

- Apply scientific thinking to the analysis, synthesis and evaluation of knowledge within the discipline of food science, nutritional sciences, or dietetics
- Apply ethical reasoning within the discipline of food science, nutritional sciences or dietetics
- Effectively communicate discipline-specific information in written and oral forms to scientific audiences
- Effectively interact within scientific teams
- Facilitate learning within FSHN courses

Minors - Graduate

The department offers coursework for graduate minors in:

- food science/technology (https://fshn.hs.iastate.edu/graduate-students/graduate-programs/food-science-and-technology/)
- nutritional sciences (https://fshn.hs.iastate.edu/graduate-students/graduate-programs/interdepartmental-graduate-program-in-nutritional-sciences/)

Food Science and Technology Graduate Minor students must complete the following:

- 9 to 12 credits. Students without a background in food chemistry, food engineering/processing, and/or food microbiology are required to take FSHN 5110 and two 6000-level courses in two different competency areas.
- 9 credits of graduate level food science coursework as approved by the POS committee.
- Maximum of 3 credits at the 4000 level.

Nutritional Sciences Graduate Minor students must complete the following:

- 9 to 12 credits are required. Students who have not taken FSHN 3600 or its equivalent (advanced nutrition with a biochemistry perquisite) will need to take FSHN 3600, in which case the Nutrition Graduate minor will constitute 12 credits.
- 9 credits of graduate level nutrition courses as approved by the POS Committee.
- NUTRS 5010

Certificate - Undergraduate

Health Coach (https://kin.hs.iastate.edu/current-students/academics/health-coach-certificate/)

The undergraduate health coach certificate provides a rigorous academic and theoretical background in three components of health (nutrition, exercise and motivational coaching) required to prepare workers for the challenges of being a health coach.

Certificates - Graduate

Food Safety and Defense (http://www.fshn.hs.iastate.edu/graduate-program/food-safety-defense/)

The department offers an online 12-13 credit Graduate Certificate in Food Safety and Defense, in conjunction with the University of Nebraska, Lincoln, Kansas State University and the University of Missouri through the Great Plains Interactive Distance Education Alliance. Students may be admitted if qualified for admission to the food science master's degree program.

Courses primarily for undergraduates:

FSHN 1010: Food and the Consumer
Credits: 3. Contact Hours: Lecture 3.
The food system from point of harvest to the consumption of the food by the consumer. Properties of food constituents. Protection of food against deterioration and microbial contamination. Introduction of foods into the marketplace. Processes for making various foods. Government regulations. Use of food additives. Current and controversial topics. High school biology and chemistry or 3 credits of college level biology and chemistry recommended. (Typically Offered: Fall, Spring, Summer)

FSHN 1020: Nutrition for Sport Performance
Credits: 1. Contact Hours: Lecture 1.
A scientific evaluation of dietary needs, dietary supplementation, and pop-culture claims relative to physical/sport performance. Discussion of safe and effective practices to enhance physical/sport performance. (Typically Offered: Fall, Spring)

FSHN 1040: Introduction to Professional Skills in Culinary Science
Credits: 1. Contact Hours: Laboratory 6.
Prereq: Major in CUFSA or CUFSH or Culinary Science minor
Introduction to culinary science. Students will develop fundamental culinary skills by arranged on-campus work experience (100 hours). Sessions with instructor arranged. (Typically Offered: Spring)

FSHN 1100: Professional and Educational Preparation
Credits: 1. Contact Hours: Lecture 1.
Introduction to professional and educational development within the food science and human nutrition disciplines. Focus is on university and career acclimation as well as enhancement of communication skills. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

FSHN 1110: Fundamentals of Food Preparation
Credits: 2. Contact Hours: Lecture 2.
*Prereq: (*FSHN 1010 *or* FSHN 1670*); concurrent enrollment in* FSHN 1150
Principles involved in preparation of food products of standard quality. Influence of composition and techniques on properties of food products. (Typically Offered: Spring)

FSHN 1150: Food Preparation Laboratory
Credits: 1. Contact Hours: Laboratory 3.
*Prereq: (*FSHN 1010 *OR* FSHN 2140*) AND Major in NUTRS, DIET, FCEDS, HSPM*
Practice standard methods of food preparation with emphasis on quality, nutrient retention, and safety. (Typically Offered: Fall, Spring)

FSHN 1200: The Biochemistry of Beer
(Cross-listed with BBMB 1200).
Credits: 2. Contact Hours: Lecture 2.
An introduction to the major classes of biomolecules, basic biochemical concepts, enzymology, metabolism and genetic engineering as they apply to the production and flavor of beer. All aspects of the biochemistry of beer will be covered, including the malting of barley, starch conversion, yeast fermentation and the chemical changes that occur during the aging of beer. Intended for non-majors. (Typically Offered: Fall)

FSHN 1200L: Biochemistry of Beer Laboratory
(Cross-listed with BBMB 1200L).
Credits: 1. Contact Hours: Laboratory 3.
Prereq: Credit or enrollment in BBMB 1200
An introduction to biochemical methods related to the production of beer. Laboratory exercises related to water chemistry, mash enzymology, hop compound extraction and analysis, and yeast biology will be performed. Closely follows the material being taught in BBMB 1200. Graduation Restriction: Natural science majors are limited to elective credit only.

FSHN 1670: Introductory Human Nutrition and Health
Credits: 3. Contact Hours: Lecture 3.
Understanding and implementing present day knowledge of nutrition. The role of nutrition in the health and well being of the individual and family. High school biology or 3 credits of biology recommended. (Typically Offered: Fall, Spring, Summer)

FSHN 2020X: Food Literacy through Film
Credits: 1. Contact Hours: Lecture 1.
An introduction to food literacy using systems thinking. Exploration of movies and documentaries to identify how one's food choices can support personal health, community, and the environment. Development of skills to assess potential bias of multi-media messages. (Typically Offered: Fall)

FSHN 2030: Contemporary Issues in Food Science and Human Nutrition
Credits: 1. Contact Hours: Lecture 1.
Introduction to presentation of published research and discussion of current issues in food science and human nutrition. Emphasis on sources of credible information, ethics, and communication. (Typically Offered: Fall, Spring)

FSHN 2070: Processing of Foods: Basic Principles and Applications
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Prereq: FSHN 1010
Lecture and lab-based instruction on principles of food processing and packaging. Food product-based discussion and activities will highlight raw food materials; unit operations; food quality and safety; processing plant sanitation; food forming and extrusion; fermentation; properties and selection of packaging materials. (Typically Offered: Spring)

FSHN 2140: Scientific Study of Food
Credits: 3. Contact Hours: Lecture 3.
Prereq: FSHN 1670 *or* FSHN 2650*; CHEM 2310 or* CHEM 3310*; plus concurrent enrollment in* FSHN 1150 *or 2150*
Composition and structure of foods. Principles of preparation of standard quality food products. Behavior and interactions of food constituents. (Typically Offered: Fall, Spring)

FSHN 2150: Advanced Food Preparation Laboratory
Credits: 2. Contact Hours: Laboratory 6.
Prereq: Credit or enrollment in FSHN 2140
Practice standard methods of food preparation with emphasis on quality, nutrient retention, and safety. Development of culinary skills and advanced food preparation. (Typically Offered: Fall, Spring)

FSHN 2200: American Food and Culture
Credits: 3. Contact Hours: Lecture 3.
American cuisine reflects the history of the U.S. It is the unique blend of diverse groups of people from around the world, including indigenous Native American Indians, Africans, Asians, Europeans, Pacific Islanders, and South Americans. Explore factors that impact the American Cuisine of today including diverse ethnic and cultural group influences, historical events related to food diversity in the U.S., and agriculture and industrial impacts on food production. Practical knowledge and basic food preparation techniques related to the U.S. food system and trends. Class sessions will include lectures, class discussions and Tasting Immersion activities. (Typically Offered: Fall, Spring)

FSHN 2410: Introduction to Manufacturing Processes for Plastics
(Cross-listed with TSM 2410).
Credits: 2. Contact Hours: Lecture 1, Laboratory 2.
Prereq: MATH 1450 *or higher.*
A study of selected materials and related processes used in plastics manufacturing. Lecture and laboratory activities focus on materials, properties, and processes. (Typically Offered: Fall, Spring)

FSHN 2420: The US Food System
Credits: 3. Contact Hours: Lecture 3.
Prereq: FSHN 1010 *or* FSHN 1670
Exploration of the components of our food system including production, processing, and access. A systems approach is used to evaluate the social, environmental, and nutrition/health implications of the US food system. Controversial topics related to how food is produced, processed, marketed and consumed will be discussed. (Typically Offered: Spring)

FSHN 2640: Fundamentals of Nutritional Biochemistry
Credits: 3. Contact Hours: Lecture 3.
Prereq: FSHN 1670*; CHEM 1630, CHEM 1630L; 3 credits in BIOL*
Digestion, absorption, metabolism, and biochemical functions of nutrients. Biochemical aspects of nutrient deficiencies. (Typically Offered: Fall)

FSHN 2650: Nutrition for Active and Healthy Lifestyles
Credits: 3. Contact Hours: Lecture 3.
Prereq: FSHN 1670*; (credit or enrollment in* FSHN 2640 *or credit or enrollment in 3 credits in BBMB)*
Fundamentals of nutrient metabolism and nutrient requirements. Role of macronutrient metabolism in physical performance and disease prevention. Effect of manipulation of macronutrient metabolism on physical performance and disease prevention. Applications of nutrient metabolism principles to dietary recommendations and planning. (Typically Offered: Spring, Summer)

FSHN 2670X: Clinical Perspectives on Human Nutrition and Health
Credits: 1. Contact Hours: Lecture 1.
Prereq: 3 credits in Biology
Through case scenarios presented by practicing physicians and other health care professionals of various specializations, students will gain appreciation for the actual clinical impact of nutrition on health and disease. Through interactions with clinicians, students will learn about the current and future status of health care. (Typically Offered: Spring)

FSHN 2760: Understanding Grape and Wine Science
(Cross-listed with HORT 2760).
Credits: 3. Contact Hours: Lecture 2, Laboratory 2.
A scientific introduction to viticulture (grape-growing) and enology (wine-making) and grape and wine chemistry. Topics include grape biology and cultivars, vineyard management, geography of wine, wine production, wine classification, grape and wine chemistry, wine sensory. No wine tasting. (Typically Offered: Spring)

FSHN 3010: Nutrigenomics: From Basic Science to Translational Impact
Credits: 1. Contact Hours: Lecture 2.
Introduction to the concepts of nutrigenomics and nutrigenetics and how it affects consumers of food, as well as the implications for human diseases. The potential impact of personalized nutrition and full genome sequencing on health maintenance, chronic disease prevention, and the ethical implications of this knowledge will be explored. (Typically Offered: Fall)

FSHN 3050: Food Quality Management and Control
Credits: 2. Contact Hours: Lecture 2.
Prereq: 3 credits in statistics
Fundamentals of statistical decision-making processes and quality control procedures used in food quality assurance programs. (Typically Offered: Spring)

FSHN 3110: Food Chemistry
Credits: 3. Contact Hours: Lecture 3.
*Prereq: Credit or enrollment in BBMB course 3000 or higher; (*CHEM 2310 *or* CHEM 3310*);* ENGL 2500
The structure, properties, and chemistry of food constituents and animal and plant commodities. (Typically Offered: Fall)

FSHN 3110L: Food Chemistry Laboratory
Credits: 1. Contact Hours: Laboratory 3.
Prereq: Credit or concurrent enrollment in FSHN 3110
The laboratory practices of structure, properties, and chemistry of food constituents. (Typically Offered: Fall)

FSHN 3140: Professional Development for Culinary Food Science and Food Science Majors
Credits: 1. Contact Hours: Lecture 1.
Prereq: Major or minor in Culinary Food Science or Food Science; Junior or senior classification.
Introduction to the roles culinary scientists and food scientists hold within industry. Discussions focused on professional and educational development and emerging issues and trends in the food industry. (Typically Offered: Fall)

FSHN 3150: Professional Skills for Culinary Food Science and Food Science Majors
Credits: 1. Contact Hours: Lecture 1.
Prereq: Major or minor in FSHN
Focus on the importance of professional skills and application of those skills to potential job situations. Professional skills include communication, team building, leadership vs. management styles, business ethics, and continual learning. Junior classification recommended. (Typically Offered: Fall)

FSHN 3400: Foundations of Dietetic Practice
Credits: 2. Contact Hours: Lecture 2.
Prereq: Major in Dietetics (A or H) or Pre-Diet and Exercise; Junior classification
Introduction to the profession of dietetics and responsibilities associated with dietetic professional practice. Emphasis on exploring career options in dietetics and preparation for supervised practice and graduate school. Leadership and professional career development for the dietitian is addressed through self reflection and creation of materials for post-baccalaureate programs. Professional issues related to dietetic practice include Code of Ethics, legal credentialing and standards of professional practice, leadership and future trends in the profession. (Typically Offered: Fall)

FSHN 3420: World Food Issues: Past and Present
(Cross-listed with ENVS 3420/ AGRON 3420).
Credits: 3. Contact Hours: Lecture 3.
Prereq: Junior classification
Issues associated with global agricultural and food systems including ethical, social, economic, environmental, and policy contexts. Investigation of various causes and consequences of overnutrition/ undernutrition, global health, poverty, hunger, access, and distribution. Meets International Perspectives Requirement. (Typically Offered: Fall, Spring, Summer)

FSHN 3510: Introduction to Food Engineering Concepts
Credits: 3. Contact Hours: Lecture 3.
*Prereq: (*FSHN 2070*; [*MATH 1600 *or* MATH 1650*]; [*PHYS 1310 *or* PHYS 2310*]) or Permission of Instructor*
Methodology for solving problems in food processing and introduction to food engineering concepts including food properties, material and energy balances, sources of energy, thermodynamics, fluid flow, heat transfer, and mass transfer. Graduation Restriction: Credit for only FSHN 3510 or CHE 3570 may be applied toward graduation for the Food Science major or Food Science minor. (Typically Offered: Spring)

FSHN 3600: Advanced Nutrition and the Regulation of Metabolism in Health and Disease
Credits: 3. Contact Hours: Lecture 3.
Prereq: ENGL 2500*;* FSHN 2650
Physiological and biochemical basis for nutrient needs; assessment of nutrient deficiency and toxicity; examination of nutrient functions and the regulation of metabolism; nutrient-gene interactions; mechanistic role of nutrients in health and disease. 3 credits or concurrent enrollment in 3000-level or above Biochemistry recommended. 3 credits in physiology recommended. (Typically Offered: Fall)

FSHN 3610: Nutrition and Health Assessment
Credits: 2. Contact Hours: Lecture 2, Laboratory 2.
Prereq: FSHN 2650
The assessment of nutritional status in healthy individuals. Laboratory experiences in food composition and assessment of dietary intake, body composition, and biochemical indices of nutritional status. (Typically Offered: Spring)

FSHN 3620: Nutrition and Health Throughout the Lifecycle
Credits: 3. Contact Hours: Lecture 3.
Prereq: FSHN 3600*; credit or enrollment in* BIOL 2560 *or 3350*
Molecular, biochemical and physiological basis to understand the nutritional aspects of human development and aging. Nutrient needs and various disease states at each stage of human life cycle. (Typically Offered: Spring)

FSHN 3640: Nutrition and Prevention of Chronic Disease
Credits: 3. Contact Hours: Lecture 3.
*Prereq: (*BIOL 2560 *and* BIOL 2560L*) or enrolled in NRS major*
Overview of nutrients, their functions, metabolism, food sources and optimal choices for the promotion of health and wellness. Nutrition strategies for the prevention of chronic disease, including cancer, diabetes and obesity, as they apply to individuals or the wider population will be discussed. (Typically Offered: Fall)

FSHN 3650: Obesity and Health
Credits: 3. Contact Hours: Lecture 3.
Multifactorial aspects of obesity, maintenance of healthy weight, and the relationship of weight status and chronic disease prevention. Traditional and novel nutrition and exercise theories as well as current popular diet and exercise trends will be discussed. (Typically Offered: Spring)

FSHN 3660: Communicating Nutrition Messages
Credits: 3. Contact Hours: Lecture 3.
Prereq: FSHN 2640 *or* FSHN 2650
Theory and application of adult learning and behavior change as it relates to the role of nutrition in health promotion and disease prevention. Discussion of nutrition education and interventions relative to various models. Focus on communication strategies for providing nutrition messages to diverse community audiences using various forms of media and outreach. (Typically Offered: Spring)

FSHN 3670: Medical Terminology for Health Professionals
Credits: 1. Contact Hours: Lecture 1.
An independent course focused on medical terminology, abbreviations, and simple clinical mathematical calculations. (Typically Offered: Fall, Spring, Summer)

FSHN 3730: Science and Practice of Brewing
(Cross-listed with ME 3730).
Credits: 3. Contact Hours: Lecture 1.5, Laboratory 4.5.
Introduction to brewing science and technology. Understanding the role of malts, hops, water, and yeast in production of ale and lager beers. Unit operations in brewing. Health, safety, and environmental sustainability in alcohol production and consumption. Weekly laboratory in practical aspects of beer production. (Typically Offered: Fall, Spring)

FSHN 3760X: Science and Practice of Cheesemaking
Credits: 2. Contact Hours: Lecture 2.
Science and Practice of Cheesemaking is designed to provide students with applied knowledge about milk chemistry and microbiology, sanitation, and cheesemaking. Small teams will engage in various aspects of research and development, including brainstorming, basic market research, food processing, sensory evaluation, and marketing pitches for a new cheese with beer or wine. The course culminates with an invitational culinary event, designed and executed by the students. (Typically Offered: Fall)

FSHN 3920: Food and Nutrition Services Management
Credits: 3. Contact Hours: Lecture 3.
Prereq: HSPM 3800*;* HSPM 3800L
Functions and responsibilities related to the management of foodservice systems and nutrition services, including planning, marketing, human resource management, and cost accounting.Graduation Restriction: Only one of HSPM 3920 or FSHN 3920 may count toward graduation. (Typically Offered: Spring)

FSHN 4030: Food Laws and Regulations
Credits: 2. Contact Hours: Lecture 2.
Prereq: 3 credits in FSHN at 2000-level or above
History of food law in the US and the world. Relationship between policy, legislation and regulation. Introduction to primary US regulatory agencies and enforcement principles. Discussion of key laws related to food safety and nutrition. Overview of federal and independent research tools and sources of food law. (Typically Offered: Spring, Summer)

FSHN 4060: Sensory Evaluation of Food
(Dual-listed with FSHN 5060).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Prereq: FSHN 3050 *and credit or enrollment in* FSHN 4110*; 3 credits in statistics*
Sensory evaluation techniques used to evaluate the appearance, aroma, flavor, texture and acceptability of foods. Relationships between sensory and instrumental measurements of color and texture. Work independently and cooperatively (in a team) to identify sensory evaluation objectives, write hypotheses, design and conduct experiments, and analyze and interpret data. (Typically Offered: Fall)

FSHN 4070: Microbiological Safety of Foods of Animal Origins
(Dual-listed with FSHN 5070/ MICRO 5070). (Cross-listed with MICRO 4070).
Credits: 3. Contact Hours: Lecture 3.
Prereq: MICRO 2010 *or* MICRO 3020
Examination of the various factors in the production of foods, from production through processing, distribution and final consumption which contribute to the overall microbiological safety of the food. Upon successful completion of this class, the student will receive both the Preventive Controls for Human Foods certificate (FDA program) and the International HACCP Alliance certificate (USDA-FSIS program). Recommended: FSHN 4200 or MICRO 4200 and one semester of Microbiology Laboratory. (Typically Offered: Fall, Spring)

FSHN 4080: Dairy Products Evaluation
Credits: 1. Contact Hours: Laboratory 3.
Gain experience in identifying quality defects in dairy products including milk, cottage cheese, cheddar cheese, strawberry yogurt, butter, and vanilla ice cream. Intensive training for the National Collegiate Dairy Products Evaluation competition and for dairy product evaluation in the food industry. (Typically Offered: Spring)

FSHN 4100: Food Analysis
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Prereq: FSHN 3110 *or* CHEM 2110
An introduction to the theory and application of chemical and instrumental methods for determining the constituents of food. Use of standard procedures for food analysis and food composition data bases. (Typically Offered: Fall, Spring)

FSHN 4110: Food Ingredient Interactions and Formulations
Credits: 2. Contact Hours: Lecture 1, Laboratory 3.
Prereq: FSHN 2140 *or* FSHN 3110*; 3 credits in STAT*
Application of food science principles to ingredient substitutions in food products. Laboratory procedures for standard formulations and instrumental evaluation, with emphasis on problem-solving and critical thinking. (Typically Offered: Fall)

FSHN 4120: Food Product Development
(Dual-listed with FSHN 5120).
Credits: 3. Contact Hours: Lecture 1, Laboratory 6.
Prereq: FSHN 4110*; senior classification*
Principles of developing consumer packaged food products. Application of skills gained in food chemistry, formulation, quality, sensory and processing. Emphasis on teamwork and effective communication. (Typically Offered: Spring)

FSHN 4190: Foodborne Hazards
(Cross-listed with MICRO 4190/ TOX 4190).
Credits: 3. Contact Hours: Lecture 3.
Prereq: MICRO 2010 *or* MICRO 3020*; 3 credits in BBMB*
Pathogenesis of human microbiological foodborne infections and intoxications, principles of toxicology, major classes of toxicants in the food supply, governmental regulation of foodborne hazards. Assessed service-learning component. Offered even-numbered years. Graduation Restriction: Only one of FSHN 4190 and FSHN 5190 may count toward graduation. (Typically Offered: Spring)

FSHN 4200: Food Microbiology
(Cross-listed with MICRO 4200/ TOX 4200).
Credits: 3. Contact Hours: Lecture 3.
Prereq: MICRO 2010 *or* MICRO 3020
Effects of microbial growth in foods. Methods to control, detect, and enumerate microorganisms in food and water. Foodborne infections and intoxications. (Typically Offered: Fall)

FSHN 4210: Food Microbiology Laboratory
(Cross-listed with MICRO 4210).
Credits: 3. Contact Hours: Lecture 1, Laboratory 5.
Prereq: MICRO 2010 *or* MICRO 3020*;* MICRO 2010L *or* MICRO 3020L*. Credit or enrollment in FSHN/*MICRO 4200
Standard techniques used for the microbiological examination of foods. Independent and group projects on student-generated questions in food microbiology. Emphasis on oral and written communication and group interaction. (Typically Offered: Spring)

FSHN 4300: U.S. Health Systems and Policy
(Dual-listed with FSHN 5300).
Credits: 2. Contact Hours: Lecture 2.
Prereq: Junior standing
Introduction to public policy for health care professionals. Emphasis on understanding the role of the practitioner for participating in the policy process, interpreting government policies and programs such as Medicare and Medicaid, determining reimbursement rates for eligible services, and understanding licensure and accreditation issues. Discussion and exploration of federal, state and professional policy-relevant resources. (Typically Offered: Fall, Spring)

FSHN 4350: Analysis of Food Markets
(Cross-listed with ECON 4350).
Credits: 3. Contact Hours: Lecture 3.
Prereq: STAT 2260*,* ECON 2350*, and* ECON 3010
Food market analysis from an economics perspective; food markets and consumption; methods of economic analysis; food industry structure and organization; food and agriculture regulations; labeling; consumer concerns; agricultural commodity promotion. Final project required. (Typically Offered: Spring)

FSHN 4420: Issues in Food and Society
Credits: 2. Contact Hours: Lecture 2.
Prereq: Sophomore classification
In-depth discussion, synthesis, and analysis of domestic and global food issues from a systems approach. Mutually reinforcing interactions between culture, biology, and environmental influences on human dietary habits, nutrition and health will be emphasized. Historical and current foodways of cultural groups will be presented with specific attention to understanding cultural differences. Students will demonstrate how to locate, interpret, evaluate and use professional literature to inform about current food and society issues. Meets U.S. Diversity Requirement. (Typically Offered: Fall)

FSHN 4450: Strategies for Personal Food Waste Reduction
Credits: 1. Contact Hours: Lecture 1.
Prereq: Junior standing
In-depth analysis and discussion of economic, environmental, social, and ethical implications of food waste. Overview of personal food waste reduction strategies, food recycling/recovery, and responsible waste disposal methods. Discussion and application of advocacy tactics for the promotion of food waste reduction in local communities. (Typically Offered: Spring)

FSHN 4600: Global Nutrition, Health and Sustainability
(Dual-listed with FSHN 5600).
Credits: 3. Contact Hours: Lecture 3.
An overview of current global nutrition and health-related issues in relation to the Sustainable Development Goals. The etiology, epidemiology, and program/policy responses to topics will be discussed, in relation to the sociocultural, biological, economic, and environmental context of health and disease. Topics include childhood malnutrition, growth stunting, micronutrient deficiences, global nutrition transition, parasitic infections, sanitation, and chronic disease incidence. Participatory course, students will engage in a series of class activities, discussions, and presentations. Meets International Perspectives Requirement. Meets International Perspectives Requirement. (Typically Offered: Spring)

FSHN 4610: Medical Nutrition and Disease I
Credits: 4. Contact Hours: Lecture 4.
Prereq: BIOL 2560 *or* BIOL 3350*;* FSHN 3600*;* FSHN 3610*;* FSHN 3670
Pathophysiology of selected chronic disease states and their associated medical problems. Specific attention will be directed to medical nutrition needs of patients in the treatment of each disease state to optimize nutritional status and improve health. (Typically Offered: Fall)

FSHN 4630: Community Nutrition and Health
(Dual-listed with NUTRS 5630).
Credits: 3. Contact Hours: Lecture 3.
Prereq: FSHN 3610
Dual-listed with NUTRS 5630. Survey of current public health nutrition challenges and assets among nutritionally vulnerable individuals and groups. Culturally informed interventions or improvements of community nutrition and public health programs will be developed through needs assessment and primary research literature review. Significant emphasis on written and oral communication at the lay and professional level as it relates to community nutrition and health. Students should have a prior background in nutrition or social sciences. Meets U.S. Diversity Requirement. Meets U.S. Diversity Requirement. (Typically Offered: Fall)

FSHN 4640: Medical Nutrition and Disease II
(Dual-listed with NUTRS 5640).
Credits: 4. Contact Hours: Lecture 4.
Prereq: FSHN 4610 *or* NUTRS 5610
(Dual-listed with NUTRS 5640) Pathophysiology of selected acute and chronic disease states and their associated medical problems. Specific attention will be directed to medical nutrition needs of patients in the treatment of each disease state to optimize nutritional status and promote health. (Typically Offered: Spring)

FSHN 4660: Nutrition Counseling and Education Methods
(Dual-listed with FSHN 5660).
Credits: 3.
Prereq: FSHN 3610 *and* FSHN 3620
Application of counseling and learning theories with individuals and groups in community and clinical settings. Includes discussion and experience in building rapport, assessment, diagnosis, intervention, monitoring, evaluation, and documentation. Literature review of specific counseling and learning theories. (Typically Offered: Fall, Spring)

FSHN 4670: Molecular Basis of Nutrition in Disease Etiology and Health Promotion
Credits: 3. Contact Hours: Lecture 3.
Prereq: BBMB course 2000 or higher OR instructor permission
Understanding the molecular basis for the role of nutrients, nutrient-derivatives, and bioactive compounds in the development, prevention, and treatment of common diseases including diabetes, cancer, vascular disease, obesity, neurological disease, aberrant mineral metabolism, and autoimmune disease. Translating this understanding into practical approaches for improving the health of individuals and populations. Credit for FSHN 3600 suggested. (Typically Offered: Spring)

FSHN 4710: Food Processing
Credits: 3. Contact Hours: Lecture 3.
Prereq: (AE 4510 or CHE 3570 *or* FSHN 3510*)*
Principles and application of food processing using both thermal (ex., blanching, pasteurization, canning, drying, freezing, evaporation, aseptic processing, extrusion) and non-thermal (ex., high pressure, irradiation, pulsed electric field, fermentation) unit operations. Emphasis on microbial inactivation, process heat and mass balance, and numerical problem solving. (Typically Offered: Fall)

FSHN 4720: Food Processing Laboratory
Credits: 2. Contact Hours: Lecture 1, Laboratory 3.
Prereq: FSHN 4710
Hands-on and demonstration laboratory activities related to food processing principles and applications using lab and pilot-scale equipment. Laboratory experiences include important food processing operations, e.g., blanching/pasteurization, canning, freezing, drying, corn wet milling, fermentation, baking etc. Emphasis on mass balance, interpreting data, writing reports, and presentations. Occasional field trips. (Typically Offered: Spring)

FSHN 4890: Issues in Food Safety
(Cross-listed with ANS 4890/ HSPM 4890/ VDPAM 4890).
Credits: 1. Contact Hours: Lecture 1.
Prereq: (Credit or concurrent enrollment in FSHN 1010 *or FSHN 2720 or* HSPM 2330*); (*FSHN 4190 *or* FSHN 4200*);* FSHN 4030
Capstone seminar for the food safety minor. Case discussions and independent projects about safety issues in the food system from a multidisciplinary perspective. (Typically Offered: Spring)

FSHN 4900A: Independent Study: Dietetics
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
Independent work in food science, nutrition, or dietetics. Graduation Restriction: A maximum of 6 credits of FSHN 4900 may be used toward graduation. (Typically Offered: Fall, Spring, Summer)

FSHN 4900B: Independent Study: Food Science
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
Independent work in food science, nutrition, or dietetics. Graduation Restriction: A maximum of 6 credits of FSHN 4900 may be used toward graduation. (Typically Offered: Fall, Spring, Summer)

FSHN 4900C: Independent Study: Nutrition
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
Independent work in food science, nutrition, or dietetics. Graduation Restriction: A maximum of 6 credits of FSHN 4900 may be used toward graduation. (Typically Offered: Fall, Spring, Summer)

FSHN 4900D: Independent Study: International Experience
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
Independent work in food science, nutrition, or dietetics. Graduation Restriction: A maximum of 6 credits of FSHN 4900 may be used toward graduation. (Typically Offered: Fall, Spring, Summer)

FSHN 4900E: Independent Study: Entrepreneurship
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
Independent work in food science, nutrition, or dietetics.Graduation Restriction: A maximum of 6 credits of FSHN 4900 may be used toward graduation. (Typically Offered: Fall, Spring, Summer)

FSHN 4900H: Independent Study: Honors
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
Independent work in food science, nutrition, or dietetics. Graduation Restriction: A maximum of 6 credits of FSHN 4900 may be used toward graduation. (Typically Offered: Fall, Spring, Summer)

FSHN 4910A: Supervised Work Experience: Dietetics
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Permission of Instructor; Permission of Advisor
Supervised off-campus work experience relevant to the academic major. Graduation Restriction: A maximum of 4 credits of FSHN 4910 may be used toward graduation. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

FSHN 4910B: Supervised Work Experience: Food Science
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Permission of Instructor; Permission of Advisor
Supervised off-campus work experience relevant to the academic major. Graduation Restriction: A maximum of 4 credits of FSHN 4910 may be used toward graduation. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

FSHN 4910C: Supervised Work Experience: Nutrition
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Permission of Instructor; Permission of Advisor
Supervised off-campus work experience relevant to the academic major. Graduation Restriction: A maximum of 4 credits of FSHN 4910 may be used toward graduation. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

FSHN 4910D: Supervised Work Experience: Culinary Science
Credits: 1-4. Repeatable, maximum of 4 credits.
Prereq: Permission of Instructor; Permission of Advisor
Supervised off-campus work experience relevant to the academic major. Graduation Restriction: A maximum of 4 credits of FSHN 4910 may be used toward graduation. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

FSHN 4920: Research Concepts in Human Nutrition
Credits: 2.
*Prereq: (*FSHN 3600*; Senior classification) or Permission of Instructor*
Students will develop and implement research projects with faculty supervision, based on knowledge gained from nutrition, biology and chemistry courses and write a formal science paper to share the results of their research. Students will gain appreciation for independent research and experience creative and innovative aspects of nutrition research. (Typically Offered: Fall)

FSHN 4930: Food Preparation Workshop
Credits: 1-3. Repeatable, maximum of 3 credits.
Selected topics in food preparation including scientific principles, culture and culinary techniques. Variable format may include laboratory, recitation, and lecture. Offered on a satisfactory-fail basis only.

FSHN 4960A: Food Science and Human Nutrition Travel Course: International travel
(Dual-listed with FSHN 5960A).
Credits: 1-4. Repeatable.
Prereq: Instructor Permission for Course
(One credit per week traveled.) Limited enrollment. Tour and study of food industry, dietetic and nutritional agencies in different regions of the world. Pre-travel session arranged. Travel expenses paid by students. Meets International Perspectives Requirement. (Typically Offered: Fall, Spring, Summer)

FSHN 4960B: Food Science and Human Nutrition Travel Course: Domestic travel
(Dual-listed with FSHN 5960B).
Credits: 1-4. Repeatable.
Prereq: Instructor Permission for Course
(One credit per week traveled.) Limited enrollment. Tour and study of food industry, dietetic and nutritional agencies in different regions of the world. Pre-travel session arranged. Travel expenses paid by students. (Typically Offered: Fall, Spring, Summer)

FSHN 4980: Cooperative Education
Credits: Required. Repeatable, maximum of 0 credits.
Prereq: Department Chair Permission for Course
Required for students completing professional work periods in a cooperative education program. Students must register prior to commencing each work period. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)

FSHN 4990: Undergraduate Research
Credits: 1-6. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
Research under staff guidance. Graduation Restriction: A maximum of 6 credits of FSHN 4990 may be used toward graduation. (Typically Offered: Fall, Spring, Summer)

Courses primarily for graduate students, open to qualified undergraduates:

FSHN 5060: Sensory Evaluation of Food
(Dual-listed with FSHN 4060).
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Sensory evaluation techniques used to evaluate the appearance, aroma, flavor, texture and acceptability of foods. Relationships between sensory and instrumental measurements of color and texture. Work independently and cooperatively (in a team) to identify sensory evaluation objectives, write hypotheses, design and conduct experiments, and analyze and interpret data. (Typically Offered: Fall)

FSHN 5070: Microbiological Safety of Foods of Animal Origins
(Dual-listed with FSHN 4070/ MICRO 4070). (Cross-listed with MICRO 5070).
Credits: 3. Contact Hours: Lecture 3.
Prereq: MICRO 4200 *or Graduate Classification*
Examination of the various factors in the production of foods, from production through processing, distribution and final consumption which contribute to the overall microbiological safety of the food. Upon successful completion of this class, the student will receive both the Preventive Controls for Human Foods certificate (FDA program) and the International HACCP Alliance certificate (USDA-FSIS program). Recommended: FSHN 4200 or MICRO 4200 and one semester of Microbiology Laboratory. (Typically Offered: Fall, Spring)

FSHN 5080: Consumer Perceptions and Nutrition Communication
Credits: 2. Contact Hours: Lecture 2.
Examination of current consumer food and nutrition trends. Critical analysis of consumer perceptions relative to current research base. Use of various media to create effective nutrition messages for consumers. Activities designed to meet accreditation standards. (Typically Offered: Fall, Spring, Summer)

FSHN 5090: Sensory Evaluation of Wines
Credits: 2. Contact Hours: Lecture 1, Laboratory 2.
Principles of sensory evaluation and their application to wine evaluation. Sensory testing methods such as discrimination tests, ranking, descriptive analysis and scoring of wines will be covered. Students will have the opportunity to evaluate and learn about major types and styles of wines of the world. Lab fee. (Typically Offered: Spring)

FSHN 5110: Integrated Food Science
Credits: 3. Contact Hours: Lecture 3.
Critical review of the key principles of food science and applications in the chemistry, microbiology, and processing of food. Understanding of the impact of processing on the quality of foods with respect to composition, quality and safety. (Typically Offered: Fall)

FSHN 5120: Food Product Development
(Dual-listed with FSHN 4120).
Credits: 3. Contact Hours: Lecture 1, Laboratory 6.
Principles of developing consumer packaged food products. Application of skills gained in food chemistry, formulation, quality, sensory and processing. Emphasis on teamwork and effective communication. (Typically Offered: Spring)

FSHN 5160: Advanced Nutrition I
Credits: 2. Contact Hours: Lecture 2.
Examination of current literature relative to molecular, cellular, and physiologic aspects of macronutrient and micronutrient metabolism. Integration of current evidence-based information, including peer-reviewed literature, to inform nutrition practice. Activities designed to meet accreditation standards. (Typically Offered: Fall)

FSHN 5170: Gut Microbiome: Implications for Health and Diseases
(Cross-listed with ANS 5170/ MICRO 5170/ VMPM 5170).
Credits: 3. Contact Hours: Lecture 3.
Explore current research on gut microbiome including modern tools used to study the gut microbiome. Examine the linkages between gut microbiome and health status, diseases, and manipulation of gut microbiome to improve health. (Typically Offered: Fall)

FSHN 5180: Advanced Nutrition II
Credits: 3. Contact Hours: Lecture 3.
Principles of research design/methods and interpreting results/statistics in the current peer-reviewed scientific literature. Critical evaluation of the evidence-base to inform nutrition practice. Activities designed to meet accreditation standards. (Typically Offered: Spring)

FSHN 5210: Microbiology of Food
Credits: 2. Contact Hours: Lecture 2.
Identification, enumeration, and characterization of bacteria, yeasts, and mold associated with foods and food processing. Effects of physical and chemical agents on micro-organisms will be studied. Microbiological problems in food spoilage, food preservation, food fermentation, and food-borne disease will be discussed. (Typically Offered: Spring, Summer)

FSHN 5220: Advanced Food Microbiology and Biotechnology
Credits: 2. Contact Hours: Lecture 2.
Basic principles in biotechnology and applied food microbiology, including current topics of interest in food biotechnology. Introduction to recombinant DNA techniques and how they are applied to genetically modify microorganisms, the use of nucleic acids as tools of rapid detection of microorganisms in foods, basic enzyme immobilization and down-stream processing techniques, and regulatory aspects of food biotechnology. Offered odd-numbered years. (Typically Offered: Spring).

FSHN 5230: A Multidisciplinary Overview of Food Safety and Security
Credits: 2. Contact Hours: Lecture 2.
Multidisciplinary food safety and security perspectives provided by numerous subject matter experts. Topics include food safety policy, ag bioterrorism, border security, animal ID, food defense and site security, risk analysis, crisis communication, epidemiology, HACCP, and more. (Typically Offered: Fall, Summer)

FSHN 5240: Food Microbiology
Credits: 3. Contact Hours: Lecture 3.
Food Microbiology looks at the nature, physiology, and interactions of microorganisms in foods. The course is an introduction to food-borne diseases, the effect of food processing systems on the microflora of foods, principles of food preservation, food spoilage, and foods produced by microorganisms. Additionally, the course looks at food plant sanitation and criteria for establishing microbial standards for food products. (Typically Offered: Fall)

FSHN 5250: Principles of HACCP
Credits: 2. Contact Hours: Lecture 2.
A comprehensive study of the Hazard Analysis and Critical Control Point System and its application in the food industry. (Typically Offered: Fall)

FSHN 5260: Ethnic Foods: Food Safety, Food Protection and Defense
Credits: 2. Contact Hours: Lecture 2.
Understanding of the various factors that impact safety of ethnic and imported ethnic foods; knowledge about the handling, preparation, processing and storage of ethnic and imported foods and food products; science-based characterization of representative ethnic foods. (Typically Offered: Summer)

FSHN 5270: Microbiology of Fermented Foods
Credits: 2. Contact Hours: Lecture 2.
Microbiology of fermented foods covers the physiology, biochemistry, and genetics of microorganisms important in food fermentations. The course looks at how microorganisms are used in fermentations and the effects of processing and manufacturing conditions on production of fermented foods. (Typically Offered: Summer)

FSHN 5280: Food Protection and Defense-Essential Concepts
Credits: 2. Contact Hours: Lecture 2.
This course will provide students with an understanding of the principles required in a food defense program for a food manufacturing, warehousing or distribution center. The topics covered include: defining threats and aggressors; the Bioterrorism Act; food defense teams; vulnerability assessments; security programs; recall and traceability basics; security inspections; crisis management; emergency preparedness; and workplace violence. (Typically Offered: Spring)

FSHN 5290: Foodborne Toxicants
(Cross-listed with TOX 5290).
Credits: 2. Contact Hours: Lecture 2.
Mechanisms of action, metabolism, sources, remediation/detoxification, risk assessment of major foodborne toxicants of current interest, design of HAACP plans for use in food industries targeting foodborne toxicants, discussion of toxicants from a food defense perspective. Offered online only. (Typically Offered: Fall, Spring, Summer)

FSHN 5300: U.S.Health Systems and Policy
(Dual-listed with FSHN 4300).
Credits: 2. Contact Hours: Lecture 2.
Introduction to public policy for health care professionals. Emphasis on understanding the role of the practitioner for participating in the policy process, interpreting government policies and programs such as Medicare and Medicaid, determining reimbursement rates for eligible services, and understanding licensure and accreditation issues. Discussion and exploration of federal, state and professional policy-relevant resources. (Typically Offered: Fall, Spring)

FSHN 5330: Diet and Integrative Therapies for Prevention and Treatment of Diseases
Credits: 2. Contact Hours: Lecture 2.
Explore the role of specific nutrients, dietary bioactive compounds and integrative therapies on disease prevention and treatment. Activities designed to meet accreditation standards. (Typically Offered: Fall)

FSHN 5370: Leadership and Management in Dietetics
Credits: 3. Contact Hours: Lecture 3.
Application of leadership and management theories and approaches relevant to dietetics practice. Use of self-reflection and self-assessment to assist in recognition and development of leadership behaviors. Activities designed to meet accreditation standards. (Typically Offered: Summer)

FSHN 5380: Advanced Medical Nutrition Therapy
Credits: 3. Contact Hours: Lecture 3.
Nutritional biochemistry and physiology related to selected pathophysiology of disease with emphasis on treatment of complex medical problems and current issues. The nutrition care process will be utilized. Evidenced-based practice will be integrated into each disease state covered to optimize nutritional status and promote health. Activities designed to meet accreditation standards. (Typically Offered: Spring)

FSHN 5420A: Introduction to Molecular Biology Techniques: DNA Techniques
(Cross-listed with BMS 5420A/ EEOB 5420A/ BBMB 5420A/ GDCB 5420A/ HORT 5420A/ NREM 5420A/ NUTRS 5420A/ VDPAM 5420A/ VMPM 5420A).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes genetic engineering procedures, sequencing, PCR, and genotyping. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

FSHN 5420B: Introduction to Molecular Biology Techniques: Protein
(Cross-listed with BMS 5420B/ EEOB 5420B/ BBMB 5420B/ GDCB 5420B/ HORT 5420B/ NREM 5420B/ NUTRS 5420B/ VDPAM 5420B).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: immunophenotyping, ELISA, flow cytometry, microscopic techniques, image analysis, confocal, multiphoton and laser capture microdissection. Offered on a satisfactory-fail basis only. (Typically Offered: Spring, Summer)

FSHN 5420C: Introduction to Molecular Biology Techniques: Cell Techniques
(Cross-listed with BMS 5420C/ EEOB 5420C/ BBMB 5420C/ GDCB 5420C/ HORT 5420C/ NREM 5420C/ NUTRS 5420C/ VMPM 5420C/ VDPAM 5420C).
Credits: 1. Contact Hours: Laboratory 2.
Repeatable.
Includes: immunophenotyping, ELISA, flow cytometry, microscopic techniques, image analysis, confocal, multiphoton and laser capture microdissection.ular biology techniques and related procedures. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

FSHN 5420D: Introduction to Molecular Biology Techniques: Plant Transformation
(Cross-listed with BMS 5420D/ EEOB 5420D/ BBMB 5420D/ GDCB 5420D/ HORT 5420D/ NREM 5420D/ NUTRS 5420D/ VMPM 5420D/ VDPAM 5420D).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: Agrobacterium and particle gun-mediated transformation of tobacco, Arabidopsis, and maize, and analysis of tranformants. Offered on a satisfactory-fail basis only. (Typically Offered: Spring)

FSHN 5420E: Introduction to Molecular Biology Techniques: Proteomics
(Cross-listed with BMS 5420E/ EEOB 5420E/ BBMB 5420E/ GDCB 5420E/ HORT 5420E/ NREM 5420E/ NUTRS 5420E/ VMPM 5420E/ VDPAM 5420E).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: two-dimensional electrophoresis, laser scanning, mass spectrometry, and database searching. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

FSHN 5420F: Introduction to Molecular Biology Techniques: Metabolomics
(Cross-listed with BMS 5420F/ EEOB 5420F/ BBMB 5420F/ GDCB 5420F/ HORT 5420F/ NREM 5420F/ NUTRS 5420F/ VMPM 5420F/ VDPAM 5420F).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Includes: metabolomics and the techniques involved in metabolite profiling. For non-chemistry majoring students who are seeking analytical aspects into their biological research projects. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

FSHN 5420G: Introduction to Molecular Biology Techniques: Genomic
(Cross-listed with BMS 5420G/ EEOB 5420G/ BBMB 5420G/ GDCB 5420G/ HORT 5420G/ NREM 5420G/ NUTRS 5420G/ VMPM 5420G/ VDPAM 5420G).
Credits: 1. Contact Hours: Lecture 0.5, Laboratory 1.
Repeatable.
Sessions in basic molecular biology techniques and related procedures. Offered on a satisfactory-fail basis only. (Typically Offered: Spring)

FSHN 5540: Supervised Experience in Food Systems Management
Credits: 3.
Supervised experiential learning in food service and management. Capstone project. Experiences and activities designed to meet accreditation standards. (Typically Offered: Summer)

FSHN 5550: Supervised Experience in Community Nutrition
Credits: 3.
Supervised experiential learning in community nutrition. Capstone project. Experiences and activities designed to meet accreditation standards. (Typically Offered: Fall)

FSHN 5560: Supervised Experience in Medical Nutrition Therapy
Credits: 5.
Supervised experiential learning in medical nutrition therapy. Capstone project. Experiences and activities designed to meet accreditation standards. (Typically Offered: Spring)

FSHN 5600: Global Nutrition, Health and Sustainability
(Dual-listed with FSHN 4600).
Credits: 3. Contact Hours: Lecture 3.
An overview of current global nutrition and health-related issues in relation to the Sustainable Development Goals. The etiology, epidemiology, and program/policy responses to topics will be discussed, in relation to the sociocultural, biological, economic, and environmental context of health and disease. Topics include childhood malnutrition, growth stunting, micronutrient deficiencies, global nutrition transition, parasitic infections, sanitation, and chronic disease incidence. Participatory course, students will engage in a series of class activities, discussions, and presentations. Meets International Perspectives Requirement. Meets International Perspectives Requirement. (Typically Offered: Spring)

FSHN 5620: Advanced Nutrition Assessment
Credits: 4. Contact Hours: Lecture 4.
Overview and practical applications of methods for assessing nutritional status, including: theoretical framework of nutritional health and disease, dietary intake, biochemical indices, nutrition focused physical exam and body composition across the lifecycle. Activities designed to meet accreditation standards. (Typically Offered: Fall)

FSHN 5660: Nutrition Counseling and Education Methods
(Dual-listed with FSHN 4660).
Credits: 3.
Application of counseling and learning theories with individuals and groups in community and clinical settings. Includes discussion and experience in building rapport, assessment, diagnosis, intervention, monitoring, evaluation, and documentation. Literature review of specific counseling and learning theories. (Typically Offered: Fall)

FSHN 5680X: Foundations of Sustainable, Resilient, and Healthy Food Systems
Credits: 3. Contact Hours: Lecture 3.
Utilize a systems-based approach to critically analyze current and future societal issues specific to nutrition, health, and policy in the US food system. Controversial topics influencing multiple sectors of the US food system will be explored. Pathways forward for local and regional food system transformation will be explored and community-based solutions will be proposed. (Typically Offered: Fall)

FSHN 5690X: Food Disconnected - What We Eat Matters
Credits: 3. Contact Hours: Lecture 3.
Our food systems are at a crossroad and sustainability is a pressing need. In this course, students will apply a systems-based approach to critically evaluate food production and processing challenges in the US food system using domestic and global case studies. We will consider how food production can be done in environmentally friendly way and reflect on whether consumers can play a role through their food choices. Finally, students will enhance their knowledge regarding food literacy and the ability to apply skills to engage in enterprises that can transform current food systems. (Typically Offered: Fall)

FSHN 5700X: Sustainable and Healthy Eating Patterns
Credits: 3. Contact Hours: Lecture 3.
This course will utilize a system-based approach to consider multisectoral actions integrating health, economic considerations, environmental impacts, and sociocultural wellbeing to comprehensively explore sustainable diets. We will discuss topics related to the benefits and challenges of transitioning to sustainable diets in the context of current and future food systems. The course will also address the role of food environments, link nutrition guidelines to sustainability issues, review complex ethical issues, and identify how sustainable diets fit in the context of global environmental goals. Food systems frameworks and models will be applied to evaluate the sustainability of select foods and eating patterns at the local and global level. (Typically Offered: Spring)

FSHN 5750: Processed Foods
Credits: 3. Contact Hours: Lecture 3.
This course will examine effect of industrial and domestic food processing on the nutrient content of food and risk of developing chronic disease. Offered odd-numbered years. (Typically Offered: Spring).

FSHN 5800: Orientation to Food Science and Nutrition Research
Credits: 1. Contact Hours: Lecture 1.
Orientation to and discussion of research interests in food science and nutrition. Discussion of policy and ethical issues in the conduct of research. Intended for entering students in FSHN. Offered on a satisfactory-fail basis only. (Typically Offered: Fall)

FSHN 5810: Seminar
Credits: 1. Contact Hours: Lecture 1.
Discussion and practice of oral presentation of scientific data in a professional setting. Discussion of issues related to data presentation. Intended for graduate students in their first or second semester in FSHN. (Typically Offered: Fall)

FSHN 5890: Systems Neuroscience: Brain, Behavior, and Nutrition-Related Integrative Physiology
(Cross-listed with NUTRS 5890/ GERON 5890/ NEURO 5890/ PSYCH 5890).
Credits: 2. Contact Hours: Lecture 2.
Structural, functional, and biochemical aspects of brain and non-motor behavior across the human lifespan. Types of neuroimaging used to assess the brain. Current research is leveraged to gauge how nutrition, diseases related to nutrition, and associated physiological processes influence the brain, particularly for common developmental, psychological, and neurological disorders. (Typically Offered: Spring)

FSHN 5900A: Special Topics: Nutrition
Credits: 1-3. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
(Typically Offered: Fall, Spring, Summer)

FSHN 5900B: Special Topics: Food Science
Credits: 1-3. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
(Typically Offered: Fall, Spring, Summer)

FSHN 5900C: Special Topics: Teaching
Credits: 1-3. Repeatable, maximum of 6 credits.
Prereq: Instructor Permission for Course
(Typically Offered: Fall, Spring, Summer)

FSHN 5960A: Food Science and Human Nutrition Travel Course: International Travel
(Dual-listed with FSHN 4960A).
Credits: 1-4. Repeatable.
(One credit per week traveled.) Limited enrollment. Tour and study of food industry, dietetic and nutritional agencies in different regions of the world. Pre-travel session arranged. Travel expenses paid by students. Meets International Perspectives Requirement. (Typically Offered: Fall, Spring, Summer)

FSHN 5960B: Food Science and Human Nutrition Travel Course: Domestic travel
(Dual-listed with FSHN 4960B).
Credits: 1-4. Repeatable.
(One credit per week traveled.) Limited enrollment. Tour and study of food industry, dietetic and nutritional agencies in different regions of the world. Pre-travel session arranged. Travel expenses paid by students. (Typically Offered: Fall, Spring, Summer)

FSHN 5990: Creative Component
Credits: 1-30. Repeatable.
Prereq: Instructor Permission for Course
Nonthesis option only. (Typically Offered: Fall, Spring, Summer)

Courses for graduate students:

FSHN 6060: Advanced Food Analysis and Instrumentation
Credits: 3. Contact Hours: Lecture 2, Laboratory 3.
Instrumental methods for measuring chemical and physical properties of foods, food quality and functionality. Techniques for methods development, sample preparation, optimization of operating conditions, and data analysis needed to obtain accurate, reproducible results by means of instrumentation. Offered even-numbered years. (Typically Offered: Fall). .

FSHN 6110: Advanced Food Processing
Credits: 3. Contact Hours: Lecture 3.
Recent advances in the science and technology of food processing and preservation; examples include both thermal and non-thermal processes, including cold plasma, nanotechnology, and extrusion. Advances in extraction and separation technologies, by-product utilization, and sustainability in food processing industry will also be discussed. Students to research on select topics and present. Offered odd-numbered years. (Typically Offered: Fall).

FSHN 6120: Advanced Food Chemistry
Credits: 3. Contact Hours: Lecture 3.
Structure, chemical and physical properties of lipids, proteins and carbohydrates, and their food and industrial applications. Changes in functionalities during processing and storage. Offered even-numbered years. (Typically Offered: Spring).

FSHN 6260: Advanced Food Microbiology
(Cross-listed with MICRO 6260/ TOX 6260).
Credits: 3. Contact Hours: Lecture 3.
Topics of current interest in food microbiology, including new foodborne pathogens, rapid identification methods, effect of food properties and new preservation techniques on microbial growth, and mode of action of antimicrobials. Offered odd-numbered years. (Typically Offered: Spring)

FSHN 6270: Rapid Methods in Food Microbiology
(Cross-listed with MICRO 6270/ TOX 6270).
Credits: 2. Contact Hours: Lecture 2.
Provides an overview of rapid microbial detection methods for use in foods. Topics include historical aspects of rapid microbial detection, basic categories of rapid tests (phenotypic, genotypic, whole cell, etc.), existing commercial test formats and kits, automation in testing, sample preparation and 'next generation' testing formats now in development. (Typically Offered: Fall, Spring, Summer)

FSHN 6530: Food and Agricultural Traceability
Credits: 3. Contact Hours: Lecture 3.
Current issues and concepts of food and agricultural product traceability in the U.S., from production to consumption. Food types, microbial agents of concern, adulterants, disease investigations, risk analysis, risk mitigation, prevention and regulatory policy and advocacy. Travel to Washington, D.C. (Typically Offered: Fall)

FSHN 6810: Seminar
Credits: 1. Contact Hours: Lecture 1.
Repeatable, maximum of 2 credits.
Presentation of thesis or dissertation research. Must be taken once for each graduate program; once for the M.S. program and once for the Ph.D. program. (Typically Offered: Fall, Spring, Summer)

FSHN 6820: Seminar Reflection
Credits: Required. Contact Hours: Lecture 1.
Repeatable.
Active listening and critical thinking activities related to research seminars in food science and human nutrition. Required each semester for all FSHN graduate students. Electronic documentation. Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring)

FSHN 6900: Special Problems
Credits: 1-30. Repeatable.
Prereq: Instructor Permission for Course
(Typically Offered: Fall, Spring, Summer)

FSHN 6950: Grant Proposal Writing
(Cross-listed with NUTRS 6950).
Credits: 1. Contact Hours: Lecture 1.
Grant proposal preparation experiences including writing and critiquing ofproposals and budget planning. Understanding the grant funding process from federal, foundation, and commodity agencies. Includes preparing a grant for possible submission and participation in the review of proposals. Discussion of the role of successful grant writing in career development. (Typically Offered: Fall, Spring)

FSHN 6990: Research in Food Science and Technology

Credits: 1-30. Repeatable.

Prereq: Instructor Permission for Course

Offered on a satisfactory-fail basis only. (Typically Offered: Fall, Spring, Summer)