NFSC - NUTRITION AND FOOD SCIENCE

NFSC412 Food Processing Technology (4 Credits)
Provides in-depth study of the major industrial modes of food preservation. It integrates aspects of the biology, microbiology, biochemistry and engineering disciplines as they relate to food processing technology and food science.
Prerequisite: CHEM241 and CHEM242.
Recommended: MATH120; or completion of MATH220 recommended.

NFSC414 Mechanics of Food Processing (4 Credits)
Applications in the processing and preservation of foods, of power transmission, hydraulics, electricity, thermodynamics, refrigeration, instruments and controls, materials handling and time and motion analysis.
Prerequisite: PHYS121.
Credit Only Granted for: ENBE414 or NFSC414.
Formerly: ENBE414.

NFSC416 Food Safety System (2 Credits)
Focuses on identifying and reducing biological, chemical and physical risks in food manufacturing and thereby reduce outbreak incidences and improve public health. The course is based on the US FDA recognized curriculum on 'Hazard Analysis and Risk Based Preventive Controls' (HARPC) regulations for manufacturing human foods. A successful completion of this course will result in students becoming 'preventive controls qualified individuals' as defined by the US FDA.
Restriction: Permission of AGNR-Nutrition and Food Science department.
Repeatable to: 0 credit.
Credit Only Granted for: NFSC498T, NFSC416, NFSC679T, or NFSC616.
Formerly: NFSC498T.

NFSC420 Nutritional Biochemistry (4 Credits)
This is a comprehensive course that integrates aspects of biochemistry, nutrition, and molecular biology. This course deals with (1) structure and function of biochemical macromolecules including carbohydrates, proteins, lipids, and nucleic acids; (2) transcriptional and translational regulation focusing on how gene expression is controlled at the level of transcription and translation, particularly in response to nutritional factors; (3) nutritional principles covering impact of digestion and absorption; (4) biochemical metabolism on emphasis of how the body processes nutrients and how metabolic pathways are regulated.
Prerequisite: NFSC315 and BCHM461.

NFSC421 Food Chemistry (3 Credits)
Basic chemical and physical concepts are applied to the composition and properties of foods. Emphasis on the relationship of processing technology to the keeping quality, nutritional value, and acceptability of foods.
Prerequisite: BCHM461.

NFSC422 Food Product Research and Development (3 Credits)
A capstone course for FDSC majors. A study of the research and development of new food products. Application of food technology, engineering, safety and packaging are integrated by teams of students to develop a new food product from concept to pilot plant scale-up. Students will travel to nearby food processing plants on two to four Saturdays during the semester.
Restriction: Senior standing; and must be in a major within AGNR-Nutrition and Food Science department; and permission of AGNR-Nutrition and Food Science department.
Formerly: FDSC422.

NFSC423 Food Chemistry Laboratory (3 Credits)
Analysis of the major and minor constituents of food using chemical, physical and instrumental methods in concordance with current food industry and regulatory practices. Laboratory exercises coincide with lecture subjects in NFSC421.
Prerequisite: Must have completed or be concurrently enrolled in NFSC421.

NFSC426 Current Topics in Nutrition and Chronic Disease (3 Credits)
Analysis of current topics related to diet, nutrition, and human health at cellular, molecular and biochemical level. Further, this course will provide overview of the current methods, and in vitro and in vivo model systems used in nutrition research. Syllabus includes topics relevant to dietary regulation of genes/proteins and their impact on both physiological and pathological conditions including hyperlipidemia, hyperglycemia, fibrosis, food allergy, nutraceuticals, inflammatory diseases (IBD), cardiovascular diseases (atherosclerosis and stenosis), and oncogenesis. This course is designed to help students to understand and apply current scientific concepts and research methods, and to obtain necessary skills in evaluation and interpretation of evidence based scientific data.
Jointly offered with: NFSC621.
Credit Only Granted for: NFSC498F, NFSC426, NFSC678F, or NFSC621.
Formerly: NFSC498F.

NFSC427 Current Topics on Diet, Gut Microbiota Health and Metabolic Disease (3 Credits)
A review of current science linking the gut microbiota/microbiome with general and public health. It covers the composition of a healthy gut microbiota, its acquisition, how it is studied and analyzed; Gut microbiota changes with diet, specific foods, immigration and globalization and exercise; Its links to obesity, liver disease, insulin resistance and diabetes and cardiovascular disease; Links to the immune system; Targeting the gut microbiota composition and function to protect against or treat metabolic diseases. This course will be of use to public health and health care professionals, Food and/or Nutrition scientists, Dieticians, and those generally interested in understanding the health relevance of news reports or scientific reports on the microbiome.
Recommended: BCHM461.
Jointly offered with: NFSC627.
Credit Only Granted for: NFSC678K, NFSC498K, NFSC427, or NFSC627.
Formerly: NFSC498K.

NFSC430 Food Microbiology (3 Credits)
A study of microorganisms of major importance to the food industry with emphasis on food-borne outbreaks, public health significance, bioprocessing of foods, disease control, and the microbial spoilage of foods.
Prerequisite: BSCI223; or permission of instructor.
Credit Only Granted for: ANSC430 or NFSC430.
Formerly: FDSC430.

NFSC431 Food Quality Control (4 Credits)
Definition and organization of the quality control function in the food industry; preparation of specifications; statistical methods for acceptance sampling; in-plant and processed product inspection. Instrumental and sensory methods for evaluating sensory quality, identity and wholesomeness and their integration into grades and standards of quality. Statistical Process Control (SPC).

NFSC434 Food Microbiology Laboratory (3 Credits)
A study of techniques and procedures used in the microbiological examination of foods.
Prerequisite: Must have completed or be concurrently enrolled in NFSC430.
Credit Only Granted for: NFSC434 or ANSC434.
Formerly: FDSC434.

NFSC436 Diet and Optimal Human Health (3 Credits)
Focuses on maintaining optimal health and preventing diseases in humans with attention to diet. Reviews the main causes (nutritional/behavioral/lifestyle/ environmental/genetic factors) of diseases and nutrient needs, sources, functions and interactions, and deals with the benefits of healthy diets and nutraceutical/pharmaceutical option on human health. The emphasis will be on developing conceptual knowledge, critical thinking and problem solving skills and the application of nutrition in the health promotion.
Prerequisite: NFSC100, BSCI170, and (BSCI180 or BSCI171) .
Jointly offered with: NFSC636.
Credit Only Granted for: NFSC498L, NFSC678L, NFSC436, or NFSC636.
Formerly: NFSC498L.

NFSC440 Advanced Human Nutrition (4 Credits)
A critical study of physiologic, molecular and metabolic influences on utilization of carbohydrates, lipids, proteins, vitamins, macro-and micro-minerals, and nonnutritive components of food. Interactions of these nutrients and food components will be examined relative to maintaining health.
Prerequisite: Minimum of C- in NFSC100, BCHM462 and BSCI450.

NFSC450 Food and Nutrient Analysis (3 Credits)
Methods and practices of the analysis of foods and nutrients. An overview of the principles and basic mechanisms used in many of the analytical procedures commonly used in food and nutrition research. Emphasis will be placed on hands-on development of skills necessary to complete each analytical procedure; and on the accurate and concise description of the methodology and results from their application and on the regulations governing food analysis for nutritional labeling.
Prerequisite: BCHM461 and NFSC100.
Formerly: NUTR450.

NFSC455 Medical Nutrition Therapy I (4 Credits)
Advanced clinical nutrition course for dietetics or nutrition science majors. Modifications of the normal adequate diet to meet human nutritional needs in acute and chronic diseases and metabolic disorders. Includes energy balance and weight management, nutritional genomics, nutrition counseling, autoimmune disease, nutrition for pediatric conditions.
Prerequisite: NFSC380.
Corequisite: NFSC440.

NFSC456 Medical Nutrition Therapy II (4 Credits)
Modifications of the normal adequate diet to meet human nutritional needs in acute and chronic diseases and metabolic disorders.
Prerequisite: Minimum of C- in NFSC380 and NFSC440; and permission of AGNR-Nutrition and Food Science department.

NFSC470 Community Nutrition (3 Credits)
Perspectives underlying the practice of nutrition services in community settings. Assessment of needs, program planning and evaluation. Programs and strategies to meet nutrition needs outside the acute care setting, such as nutrition education and food assistance. National nutrition policy and federal initiatives in nutrition will be examined. Students will be required to travel to local community nutrition sites during the semester.
Prerequisite: Minimum of C- in NFSC315.

NFSC490 Special Problems in Nutrition (2-3 Credits)
Individually selected problems in the area of human nutrition.
Prerequisite: NFSC440; and permission of AGNR-Nutrition and Food Science department.

NFSC491 Professional Issues and Opportunities in Dietetics (3 Credits)
A capstone course for dietetics majors. Students will integrate knowledge and theory of nutrition, food, management, psychology, and social behaviors necessary to support quality dietetic practice. Working in teams, students will participate in case studies, simulated situations and community projects. Individuals and groups will present cases as well as papers on published research.
Prerequisite: Minimum of C- in NFSC350 and permission of Nutrition and Food Science Dietetics program.
Corequisite: NFSC456.
Restriction: Senior standing or higher; and must be in Nutrition and Food Science: Dietetics program.

NFSC498 Selected Topics (1-3 Credits)
Selected current aspects of food.
Restriction: Permission of AGNR-Nutrition and Food Science department.
Repeatable to: 6 credits if content differs.

NFSC612 Advanced Food Processing Technology (4 Credits)
Food Processing covers background of food processing and maintenance of nutritive quality. Lecture classes dealing with the principles of science and engineering rationale of various food additives and processing systems and their unit operations. Chemical, physical, and microbiological characteristics of the products will be discussed in relationship to processing variables. Methods of quality control, assurance of product standards, calculation of process variables, including ingredient formulation, formula adjustments, and product yield will be covered. Concluding lectures will cover management approaches to assuring efficiency of energy usage, quality maintenance, and product safety in the processing, distribution, and marketing of food products.
Repeatable to: 6 credits if content differs.
Credit Only Granted for: NFSC679F or NFSC612.
Formerly: NFSC679F.

NFSC620 Diet and Cancer Prevention (3 Credits)
1. The nature of cancer and the relationship between dietary/nutritional factors and incidence of cancer 2. Basic concepts of general cancer biology with focus on effects of dietary components on genes and their encoded proteins, epigenetic changes and cell signaling 3. Effect of dietary factors in various types of cancer with respect to the benefit of intervention strategies for chemoprevention 4. Scientific knowledge, critical thinking, and the practical application of diet in cancer prevention.
Recommended: NFSC440.
Credit Only Granted for: NFSC620 or NFSC679D.
Formerly: NFSC678D.

NFSC624 Advanced Research Design and Methods in Nutrition Education (3 Credits)
Health promotion and nutrition education are parts of behavioral and social science that can be used to promote health and prevent diet-related diseases. Their purpose is to positively influence the health-related behaviors of individuals, communities, surrounding environments, and policies. The major goals of this course are to help students understand fundamental behavioral and social models and theories used in the field of community nutrition and to address methodological issues in developing, implementing, and evaluating nutrition education programs.
Credit Only Granted for: NFSC678V, NFSC498V, or NFSC624.
Formerly: NFSC678V.
Additional Information: Must have completed one statistics course (300 or higher); or permission of instructor.

NFSC627 Advanced Current Topics on Diet, Gut Microbiota Health and Metabolic Disease (3 Credits)
A review of current science on links between the gut microbiota and general and public health. It covers the composition of a healthy gut microbiota, its acquisition, how it is studied and analyzed; Gut microbiota changes with diet, specific foods, immigration and globalization and exercise; Its links to obesity, liver disease, insulin resistance and diabetes and cardiovascular disease; Links to the immune system; Targeting the gut microbiota in preventing and treating metabolic disease obesity and related diseases; How the gut microbiota changes with immigration and globalization. This course will be of use to public health and health care professionals, Food and/or Nutrition scientists, Dieticians, and those generally interested in understanding the health relevance of news reports or scientific reports on the microbiome.
Recommended: BCHM461 .
Jointly offered with: NFSC427.
Credit Only Granted for: NFSC678K, NFSC498K, NFSC427, or NFSC627.
Formerly: NFSC678K.

NFSC631 Advanced Food Microbiology (3 Credits)
One lecture and one laboratory period a week. An in-depth understanding and working knowledge of a selected number of problem areas and contemporary topics in food microbiology.
Prerequisite: NFSC430.
Restriction: Permission of instructor.

NFSC633 Food Polymer Science (3 Credits)
Food polymers including protein and carbohydrate from food, and their chemical, physical, and functional properties together with their structure-function relationship will be discussed. Food polymer applications in food and non-food areas will be covered. Principles and applications of instrumental methods for polymer characterization will be introduced. An emphasis on nanotechnology and its application to design and characterization food polymers will be included.
Prerequisite: Permission of instructor.
Credit Only Granted for: NFSC633 or NFSC679P.
Formerly: NFSC679P.

NFSC636 Advanced Diet and Optimal Human Health (3 Credits)
Focuses on maintaining optimal health and preventing diseases in humans with attention to diet. Reviews main causes (nutritional/ behavioral/lifestyle/ environmental/genetic factors) of diseases and nutrient needs, sources, functions and interactions, and deals with the benefits of healthy diet and nutraceutical/pharmaceutical option on human health. The emphasis will be on developing conceptual knowledge, critical thinking and problem solving skills and the application of nutrition in the health promotion.
Jointly offered with: NFSC436.
Credit Only Granted for: NFSC498L, NFSC678L, NFSC436, or NFSC636.
Formerly: NFSC678L.
Additional Information: Students must have prior coursework similar to the content offered in undergraduate courses NFSC100, BSCI170, and BSCI171 .

NFSC641 Advanced Fermented Food, Feed, and Pharmaceuticals (3 Credits)
Provides an in-depth exploration of fermentation as both a biochemical process and a biotechnology tool for food, feed, and pharmaceutical production. Students will critically analyze the microbiology, metabolic pathways, and process engineering principles underlying the fermentation of diverse substrates. Emphasis will be placed on the selection, characterization, and optimization of microbial starter cultures used in the production of probiotic-rich and functional foods.
Prerequisite: AGST130; CHEM131/271; or by Permission.
Jointly offered with: NFSC341.

NFSC660 Research Methods (3 Credits)
A study of appropriate research methodology and theories including experimental design. Each student is required to develop a specimen research proposal.
Formerly: NUTR 660.
Additional Information: Must have completed one statistics course.

NFSC678 Selected Topics in Nutrition (1-6 Credits)
Individual or group study in an area of nutrition.
Repeatable to: 6 credits.
Formerly: NUTR678.

NFSC679 Selected Topics in Food Science (1-6 Credits)
Individual or group study in an area of food science.
Repeatable to: 6 credits if content differs.

NFSC680 Human Nutritional Status (3 Credits)
Indirect and direct methods of appraisal of human nutritional status which include: dietary, anthropometric, clinical evaluations and biochemical measures.
Additional Information: Must have completed coursework in advanced nutrition, biochemistry and physiology.

NFSC688 Seminar in Nutrition and Food Science (1-3 Credits)
This is a seminar course presentedy by NFSC graduate students and invited speakers in the field of nutrition and food science.
Restriction: Must be in a major within AGNR-Nutrition and Food Science department.
Repeatable to: 3 credits.
Formerly: NUTR688.

NFSC690 Nutrition and Aging (3 Credits)
Examine the physiological, social and psychological changes that may occur with aging and their impact on nutritional status and on successful aging.
Recommended: NFSC440 or BSCI440; or students who have taken courses with comparable content may contact the department.

NFSC698 Colloquium in Food Science (1 Credit)
Oral reports on special topics or recently published research in food science and technology. Distinguished scientists are invited as guest lecturers. A maximum of three credits allowed for the M.S.
Formerly: FDSC698.

NFSC699 Problems in Nutrition and Food Science (1-4 Credits)
Credit according to time scheduled and magnitude of problem. An experimental program on a topic other than the student's thesis problem will be conducted. Four credits shall be the maximum allowed toward an advanced degree.
Restriction: Permission of AGNR-Nutrition and Food Science department.
Formerly: FDSC 699 and NUTR 699.

NFSC735 Food Toxicology (3 Credits)
An introduction to basic concepts in toxicology in relation to toxic food contaminants and additives; both synthetic and naturally occurring. Focus on exposure routes, molecular targets and susceptible individuals. Also includes regulatory toxicology with respect food toxins.
Recommended: BCHM462, BSCI440, or CHEM131. Cross-listed with MIEH735.
Credit Only Granted for: MIEH735 or NFSC735.

NFSC799 Master's Thesis Research (1-6 Credits)
First and second semesters. Credit in proportion to work done and results accomplished. Investigation in some phases of foodservice administration which may form the basis of a thesis. results in the form of a thesis.
Formerly: FDSC 799, NUSC 799, and NUTR 799.

NFSC898 Pre-Candidacy Research (1-8 Credits)
First and second semesters. Oral reports on special topics or recently published research in nutrition. Distinguished scientists are invited as guest lecturers. A maximum of three credits allowed for the M.S.
Formerly: NUSC898.

NFSC899 Doctoral Dissertation Research (1-8 Credits)
Formerly: FDSC 899, NUSC 899, and NUTR 899.