NFSC - NUTRITION AND FOOD SCIENCE (NFSC)

NFSC 201 Food Science
Credits 3. 3 Lecture Hours.
(AGRI 1329) Food Science. The fundamental biological, chemical and physical scientific principles associated with the study of foods; topics include food composition and nutrition, food additives and regulations, food safety and toxicology, food processing, food engineering, food biotechnology, product development and sensory evaluation.

NFSC 202 Fundamentals of Human Nutrition
Credits 3. 3 Lecture Hours.
(BIOL 1322, HECO 1322) Fundamentals of Human Nutrition. Principles of nutrition with application to the physiologic needs of individuals; food sources and selection of an adequate diet; formulation of Recommended Dietary Allowances; nutritional surveillance; for non-nutrition majors only.

NFSC 203 Scientific Principles of Human Nutrition
Credits 3. 3 Lecture Hours.
Chemistry and physiology of proteins, carbohydrates, lipids, vitamins and minerals; their ingestion, digestion, absorption, transport and metabolism.
Prerequisite: CHEM 119; majors only.

NFSC 204 Perspectives in Nutrition and Food Science
Credit 1. 1 Lecture Hour.
Current trends in the fields of nutrition and food science; critical review of relevant literature in these fields ranging from popular press to peer-reviewed research; study of original research and market trends in understanding food, food processing, nutrients, health and diseases.
Prerequisites: NUTR and FSTC majors.

NFSC 210 Horizons in Nutrition and Food Science
Credits 2. 2 Lecture Hours.
Introduction to nutrition and food science career opportunities through presentations by nutrition and food science researchers and industry professionals; addresses issues of professionalism including portfolio development, teamwork, and critical thinking skills.

NFSC 211 Scientific Principles of Foods
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Basic principles underlying selection, preparation and preservation of food in relation to quality standards, acceptability and aesthetics. Introduction to composition, nutritive value, chemical and physical properties of foods; introduction to experimental study of foods.
Prerequisites: CHEM 101, CHEM 111; NFSC 202 or NFSC 203; sophomore classification or above.

NFSC 222 Nutrition for Health and Health Care
Credits 3. 3 Lecture Hours.
Analysis of nutrition with emphasis on providing a basic understanding of nutrition and its role in disease prevention and treatment.

NFSC 285 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study of selected problems in the area of nutrition and food science.
Prerequisites: Approval of instructor; 2.0 GPR in major and overall.

NFSC 289 Special Topics in...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in an identified area of nutrition and food science. May be repeated for credit.
Prerequisite: Approval of instructor.

NFSC 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in nutrition and food science. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.

NFSC 300 Religious and Ethnic Foods
Credits 3. 3 Lecture Hours.
Understanding religious and ethnic foods with application to product development, production, and nutritional practices; emphasis on different food rules and priorities with attention given to different religious and ethnic groups within the US and around the world.
Prerequisites: Junior or senior classification or approval of instructor; basic knowledge of food science and nutrition helpful.

NFSC 301 Nutrition Through Life
Credits 3. 3 Lecture Hours.
Analysis of nutrition with emphasis on human biological needs through stages of the life cycle; biochemical, physiological and anthropometric aspects of nutrition.
Prerequisites: NFSC 203; junior classification or approval of department head.

NFSC 303/ANSC 303 Principles of Animal Nutrition
Credits 3. 3 Lecture Hours.
Scientific approach to nutritional roles of water, carbohydrates, proteins, lipids, minerals, vitamins, and other dietary components; emphasis on the comparative aspects of gastrointestinal tracts and on digestion, absorption, and metabolism of nutrients.
Prerequisites: CHEM 119 and a grade of C or better in ANSC 113, or CHEM 222 or CHEM 227; junior classification or approval of instructor.
Cross Listing: ANSC 303/NFSC 303.

NFSC 304 Food Service Systems Management
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Principles of food service management used in selecting, storing, preparing and serving food in quantity; emphasis on menu planning, quality control, purchasing, equipment and layout/design; application of basic food service systems management principles, including financial planning and personnel issues.
Prerequisites: NFSC 203 and NFSC 211, junior or senior classification.

NFSC 305 Fundamental Baking
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Fundamentals of baking; chemical and physical properties of ingredients, methods of baking all products, fundamental reactions of dough, fermentation and oven baking.
Prerequisite: CHEM 222 or CHEM 227 or approval of department head.

NFSC 307/ANSC 307 Meats
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Integrated studies of the meat animal processing sequence regarding the production of meat-type animals and the science and technology of their conversion to human food.
Prerequisites: Grade of C or better in ANSC 111 and ANSC 113; junior classification or approval of instructor.
NFSC 311 Principles of Food Processing  
**Credits 3. 2 Lecture Hours. 3 Lab Hours.**  
Principles and practices of canning, freezing, dehydration, pickling and specialty food manufacture; fundamental concepts of various techniques of preparation, processing, packaging and use of additives; processing plants visited.  
**Prerequisite:** NFSC 201; junior or senior classification or approval of department head or instructor.

NFSC 312 Food Chemistry  
**Credits 3. 3 Lecture Hours.**  
The fundamental and relevant chemistry and functionality of the major food constituents (water, carbohydrates, lipids, proteins, phytochemical nutraceuticals) and study of food emulsion systems, acids, enzymes, gels, colors, flavors and toxins.  
**Prerequisite:** NFSC 201; CHEM 227; CHEM 237 or approval of department head or instructor.

NFSC 313 Food Chemistry Laboratory  
**Credit 1. 3 Lab Hours.**  
Laboratory exercises investigating specific molecules, such as food acids, enzymes, pigments and flavors, and chemical interactions in foods, such as oxidation reactions, emulsion systems, and functional properties from a fundamental chemistry rather than an analytical perspective.  
**Prerequisite:** NFSC 201; CHEM 227; CHEM 237 or approval of department head or instructor.

NFSC 314 Food Analysis  
**Credits 3. 1 Lecture Hour. 4 Lab Hours.**  
Selected standard methods for assay of food components; principles and methodology of both classical and instrumental techniques for food analysis.  
**Prerequisite:** NFSC 201, NFSC 311, CHEM 227; CHEM 237 or approval of department head or instructor.

NFSC 315/AGSM 315 Food Process Engineering Technology  
**Credits 3. 2 Lecture Hours. 2 Lab Hours.**  
Elementary mechanics, physical and thermal properties of food and processing materials, heat transfer, mass and energy balances, psychrometrics (properties of air), insulation.  
**Prerequisites:** Grade of C or better in PHYS 201 or PHYS 218, or approval of instructor.  
**Cross Listing:** AGSM 315/NFSC 315.

NFSC 320 Understanding Obesity: A Social and Scientific Challenge  
**Credits 3. 3 Lecture Hours.**  
Perspectives of obesity in food science, nutrition, health and psychology; study of obesity factors in relation to genetics, exercise physiology and sociology with emphasis on food and nutrition.  
**Prerequisites:** Junior or senior classification or approval of instructor.

NFSC 324 Food Safety and Preventive Controls for Human Food  
**Credits 3. 3 Lecture Hours.**  
Microbiological food spoilage, fermentation and safety; U.S. Food and Drug Administration (FDA) recognized curriculum for “preventive controls qualified individual” within the FDA Hazard Analysis and Risk#based Preventive Controls for Human Food regulation.  
**Prerequisites:** Junior or senior classification or approval of instructor.

NFSC 326/ANSC 326 Food Bacteriology  
**Credits 3. 3 Lecture Hours.**  
Microbiology of human foods and accessory substances; raw and processed foods; physical, chemical and biological phases of spoilage; standard industry techniques of inspection and control.  
**Prerequisite:** Junior or senior classification or approval of instructor.  
**Cross Listing:** ANSC 326/NFSC 326.

NFSC 327/ANSC 327 Food Bacteriology Lab  
**Credit 1. 3 Lab Hours.**  
Laboratory to accompany ANSC 326/NFSC 326 or NFSC 326/ANSC 326.  
**Cross Listing:** ANSC 327/NFSC 327.

NFSC 330 Dairy and Food Technology  
**Credits 4. 3 Lecture Hours. 3 Lab Hours.**  
Principles and practices involved in processing of milk into market milk, butter, cheese and cheese foods; fundamental principles of these processes as related to their design and control.  
**Prerequisite:** NFSC 330 or approval of department head.

NFSC 365 Nutritional Physiology of Vitamins and Minerals  
**Credits 3. 3 Lecture Hours.**  
Fundamental nutritional significance of fat soluble and water soluble vitamins and minerals to human metabolism, cell biology and physiology; micro-nutrient groups as per metabolic function or biochemical and physiological actions; important dietary sources, absorption, storage, metabolism, (bio)chemistry, deficiency and toxicity of individual nutrients in this context and basis of DRIs.  
**Prerequisites:** NFSC 203 and NFSC 301; junior or senior classification.

NFSC 401 Food Product Development  
**Credits 3. 2 Lecture Hours. 3 Lab Hours.**  
Design and develop food products using principles of food chemistry, food processing, nutrition, sensory analysis and statistics; team collaborate to improve food product characteristics to meet the needs of a changing society.  
**Prerequisites:** NFSC 201, NFSC 311, NFSC 312, NFSC 313, NFSC 314, NFSC 315/AGSM 315, NFSC 326/ANSC 326, or concurrent enrollment; senior classification or approval of instructor.

NFSC 404 Nutrition Assessment and Planning  
**Credits 3. 3 Lecture Hours.**  
Examines the methods of determining the nutritional status of individuals, dietary assessment techniques, planning nutritional care including diet modification and nutrition counseling.  
**Prerequisites:** NFSC 203, NFSC 211 and NFSC 301; junior classification or approval of department head.

NFSC 405/POSC 405 Egg and Poultry Meat Processing  
**Credits 3. 3 Lecture Hours.**  
Principles of egg and poultry meat processing, understanding egg and poultry meat markets, egg and meat grading, product safety, packaging and consumer acceptance of shell eggs and poultry meat, specifically turkey and broilers.  
**Prerequisites:** Junior or senior classification or approval of instructor.  
**Cross Listing:** POSC 405/NFSC 405.

NFSC 406/POSC 406 Poultry Further Processing  
**Credits 4. 3 Lecture Hours. 2 Lab Hours.**  
Science and practice of value-added products; physical, chemical, microbiological and functional characteristics of value-added poultry products as they affect consumer acceptance, efficiency of production and regulatory approval.  
**Prerequisites:** CHEM 222; DASC 326 or NFSC 326/ANSC 326; POSC 309; POSC 405/NFSC 405; junior or senior classification or approval of instructor.  
**Cross Listing:** POSC 406/NFSC 406.
NFSC 407 Nutrition Care and Therapy
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Application of the Nutrition Care Process for clinical diagnoses and conditions; planning of nutritional care plans for complex patients, including the formulation and planning for enteral and parenteral nutrition support.
Prerequisites: NFSC 203, NFSC 211, NFSC 301 and NFSC 404; junior classification; dietetics track; or approval of instructor.

NFSC 410 Nutritional Pharmacometrics of Food Compounds
Credits 3. 3 Lecture Hours.
Nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
Prerequisites: NFSC 201, NFSC 202, NFSC 203, CHEM 222, or CHEM 227, or approval of instructor; junior or senior classification.

NFSC 412 Nutritional Treatment of Disease
Credits 3. 3 Lecture Hours.
Nutritional intervention in pathological conditions, based on biochemical, physiological and psychological effects of disease state; current research in clinical nutrition.
Prerequisites: NFSC 203; NFSC 301, BIOL 319 and BICH 410, or concurrent enrollment; senior classification or approval of instructor.

NFSC 417/AGSM 417 Food Process Engineering Technology II
Credits 3. 3 Lecture Hours.
Applications of basic engineering concepts to understand common unit operations in the food (and related) industry.
Prerequisites: AGSM 315/NFSC 315 or NFSC 315/AGSM 315; approval of instructor.
Cross Listing: AGSM 417/NFSC 417.

NFSC 420 Supervised Research in Mediterranean Nutrition and Food Processing in Italy
Credits 3. 3 Other Hours.
Exploration of principles of Mediterranean diet, European nutrition regulatory aspects, wine-making and food processing in Italy.
Prerequisites: NFSC 201, NFSC 202, or NFSC 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.

NFSC 422 Food Processing for Sustainable Nutrition in Brazil
Credits 3. 3 Other Hours.
Sustainable nutrition and food processing in Brazil; hands-on learning at the Federal University of Vicosa, the Amazon Biotechnology Center, food processing plants and other research centers in the Amazon, central Brazil and Rio De Janeiro.
Prerequisites: NFSC 201, NFSC 202, or NFSC 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.

NFSC 423 Community Nutrition
Credits 3. 3 Lecture Hours.
Principles of assessing nutrition problems in populations and planning nutrition programs to promote health in communities including nutrition education and food and nutrition policy; introduction to food and nutrition assistance programs.
Prerequisites: NFSC 203 and NFSC 301; junior or senior classification.

NFSC 440 Therapeutic Microbiology: Probiotics and Related Strategies
Credits 3. 3 Lecture Hours.
Topics relevant to alimentary (gastrointestinal) microbiology including (i) the ‘normal’ intestinal microbiota; (ii) probiotic and prebiotic nutritional supplements; (iii) recombinant pharmabiotics; (iv) gut-associated lymphoid tissue and mucosal immunity; (v) foodborne gastrointestinal pathogens; and (vi) fermented products as functional foods.
Prerequisites: Undergraduate survey course in microbiology or approval of instructor; junior or senior classification.

NFSC 444 Fundamentals of Food Law
Credits 3. 3 Lecture Hours.
History, development of, and fundamental principles behind current food regulations, including food labeling, adulteration, food safety, food additives, dietary supplements, and import and export laws; overview of government agency jurisdiction, international law and ethics.
Prerequisite: NFSC 201; junior or senior classification.

NFSC 446 Commercial Fruit and Vegetable Processing
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Pilot plant and laboratory operations pertaining to processed fruits, vegetables and beverages; new product development emphasized via individual laboratory projects.
Prerequisite: NFSC 311.

NFSC 450 Nutrition and Metabolism of Minerals
Credits 3. 3 Lecture Hours.
The role of minerals in living systems and the exploration of their multitude of functions; chemical properties of minerals and how that relates to function in cells and tissues; consequences of mineral deficiencies based on known functions; insight into experimental approaches used to assess minerals in a living environment.
Prerequisite: NFSC 203, BICH 303, or BICH 410, or approval of instructor.

NFSC 457/ANSC 457 Hazard Analysis and Critical Control Point System
Credits 3. 3 Lecture Hours.
Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and poultry; microbiological and process overviews; good manufacturing practices and standard operating procedures development.
Prerequisite: NFSC 326/ANSC 326 or approval of instructor.
Cross Listing: ANSC 457/NFSC 457.

NFSC 469 Experimental Nutrition Laboratory
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Investigation of tools and molecular techniques used in studies of nutrition and metabolism (e.g. obesity, diabetes, cardiovascular disease, etc.); didactic and hands-on laboratory components; includes model systems, measurements of energy balance, body composition, RNA and protein analyses.
Prerequisites: Junior or senior classification or approval of instructor.

NFSC 470/ANSC 470 Quality Assurance for the Food Industry
Credits 3. 3 Lecture Hours.
Principles of food system process control including statistical process control (SPC) and the tools required to assure uniform communication and understanding of quality assurance systems.
Prerequisite: Junior or senior classification.
Cross Listing: ANSC 470/NFSC 470.
NFSC 471 Critical Evaluation of Nutrition and Food Science Literature: Evidence Based Reviews
Credits 3. 3 Lecture Hours.
Evaluation of scientific literature, research methods within the literature, and the quality of scientific studies to produce an evidence-based review in areas specific to nutrition and food science.
Prerequisites: NFSC 202 or NFSC 203; STAT 302; junior or senior classification; knowledge of technical writing helpful.

NFSC 475 Nutrition and Physiological Chemistry
Credits 3. 3 Lecture Hours.
Fundamentals of physiology, biochemistry and nutrition and their relationship to the organismic and cellular metabolism of animals; biochemical basis of hormonal action.
Prerequisites: NFSC 203, NFSC 301, NFSC 365, and BICH 410; senior classification or approval of department head.

NFSC 481 Seminar
Credit 1. 1 Lecture Hour.
Guidelines and practice in journal article review and making effective technical presentations; strategies for conducting a job search; development of résumés and letters and interviewing targeted for careers in nutrition and food science or graduate school.
Prerequisite: Senior classification in nutrition and food science.

NFSC 485 Directed Studies
Credits 0 to 4. 0 to 4 Other Hours.
Directed study on selected problems in the area of nutrition and food science not covered in other courses.
Prerequisites: Junior or senior classification; approval of department head; 2.0 GPR in major and overall.

NFSC 487/ANSC 487 Sensory Evaluation of Foods
Credits 3. 2 Lecture Hours. 2 Lab Hours.
Application of sensory science principles and practices to food systems including an understanding of discriminative, descriptive and consumer sensory techniques.
Prerequisites: CHEM 222 or CHEM 228; junior or senior classification.
Cross Listing: ANSC 487/NFSC 487.

NFSC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Other Hours.
Selected topics in an identified area of nutrition and food science. May be repeated for credit.
Prerequisite: Junior or senior classification.

NFSC 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of a faculty member in nutrition and food science. May be repeated 3 times for credit. Registration in multiple sections of this course are possible within a given semester provided that the per semester credit hour limit is not exceeded.