DEPARTMENT OF NUTRITION AND FOOD SCIENCE

Nutritional sciences prepares majors with a comprehensive knowledge of the biological and social sciences to understand the relationships between nutrients, food components and human health. Prevention of diseases that are related to lifestyle, particularly diet and nutrition, is a focus of the curriculum. Core courses emphasize the role of nutrients in biochemistry, genetics, physiology, microbiology and immunology that promotes wellness and enhances the quality of life. The major also provides an excellent background for those interested in pursuing graduate degrees in biological, nutritional or food sciences; professional degrees in human or veterinary medicine; degrees in dentistry, pharmacy, physical therapy, nursing, public health and other health professions; or dietetic internships.

The Didactic Program in Dietetics (DPD) and the Graduate Degree/Dietetic Internship Program are accredited by the Accreditation Council for Education in Nutrition and Dietetics (ACEND). Students who successfully complete the DPD and a dietetic internship are eligible to take the Registration Examination to become a Registered Dietitian (RD).

Three curriculum tracks are offered (General Nutrition, Didactic Program in Dietetics and Molecular and Experimental Nutrition) to provide flexibility in one’s chosen career path. The Nutrition major prepares one for graduate school, corporate wellness positions, health promotion programs, the food industry, public health programs, pharmaceutical sales, clinical dietics, medical and research laboratories, biotechnology firms, government agencies and related fields. For more information, visit http://nfs.tamu.edu

Faculty

Acuff, Gary R, Professor
Nutrition & Food Science
PHD, Texas A&M University, 1985

Allred, Clinton D, Associate Professor
Nutrition & Food Science
PHD, University of Illinois at Urbana-Champaign, 2002

Beathard, Karen M, Senior Lecturer
Nutrition & Food Science
MS, Texas Woman’s University, 1990

Chapkin, Robert S, Professor
Nutrition & Food Science
PHD, University of California, Davis, 1986

Chew, Boon P, Professor
Nutrition & Food Science
PHD, Purdue University, 1978

Creasy, Rebecca A, Lecturer
Nutrition & Food Science
PHD, University of Florida, 2013

Geismar, Karen S, Lecturer
Nutrition & Food Science
PHD, Texas Woman’s University, 1998

Giles, Erin D, Assistant Professor
Nutrition & Food Science
PHD, McMaster University, 2015

Guo, Shaodong, Associate Professor
Nutrition & Food Science
PHD, Peking University, China, 1995

Kubena, Karen S, Professor
Nutrition & Food Science
PHD, Texas A&M University, 1982

Lorenz, Saundra G, Lecturer
Nutrition & Food Science
MS, Texas A&M University, 2002

McIntosh, Alex, Professor
Nutrition & Food Science
PHD, Iowa State University, 1975

Murano, Elsa, Professor
Nutrition & Food Science
PHD, Virginia Polytechnic Institute and State University, 1990

Murano, Peter S, Senior Associate Professor
Nutrition & Food Science
PHD, Virginia Polytechnic Institute and State University, 1989

Patil, Bhimanagouda, Professor
Nutrition & Food Science
PHD, Texas A&M University, 1994

Riaz, Mian, AgriLife Professor
Nutrition & Food Science
PHD, University of Maine, 1992

Sun, Yuxiang, Assistant Professor
Nutrition & Food Science
PHD, University of Manitoba, Canada, 2000

Talcott, Stephen T, Professor
Nutrition & Food Science
PHD, University of Arkansas, 2000

Talcott, Susanne U, Associate Professor
Nutrition & Food Science
PHD, University of Florida, 2004

Turner, Nancy D, Research Professor
Nutrition & Food Science
PHD, Texas A&M University, 1995

Wu, Chaodong, Associate Professor
Nutrition & Food Science
PHD, Beijing Medical University, 1998

Xie, Linglin, Assistant Professor
Nutrition & Food Science
PHD, Kansas State University, 2008

Majors

- Bachelor of Science in Food Science and Technology, Food Industry Option (http://catalog.tamu.edu/undergraduate/agriculture-life-sciences/nutrition-food-science/food-science-technology-food-industry-bs-option)
Courses

- Food Science and Technology (FSTC) (p. 2)
- Nutritional Sciences (NUTR) (p. 4)

Food Science and Technology

FSTC 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.

FSTC 210/NUTR 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.


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

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

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

FSTC 300/NUTR 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.
Cross Listing: NUTR 300/FSTC 300.

FSTC 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 227 or approval of department head.

FSTC 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: ANSC 107 and 108 or approval of department head.

FSTC 311/HORT 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: FSTC 201; junior or senior classification or approval of department head or instructor.
Cross Listing: HORT 311/FSTC 311.

FSTC 312/DASC 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: FSTC 201; CHEM 227; CHEM 237 or approval of department head or instructor.
Cross Listing: DASC 312/FSTC 312.

FSTC 313/DASC 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: FSTC 201; CHEM 227; CHEM 237 or approval of department head or instructor.
Cross Listing: DASC 313/FSTC 313.

FSTC 314/DASC 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 in food analysis.
Prerequisite: FSTC 201; FSTC 311/HORT 311; CHEM 227; CHEM 237 or approval of department head or instructor.
Cross Listing: DASC 314/FSTC 314.
FSTC 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: PHYS 201 or PHYS 218, or approval of instructor.  
Cross Listing: AGSM 315/FSTC 315.

FSTC 326/DASC 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: BIOL 206 or approval of instructor; junior or senior classification.  
Cross Listing: DASC 326/FSTC 326.

FSTC 327/DASC 327 Food Bacteriology Lab  
Credit 1. 3 Lab Hours.  
Laboratory to accompany FSTC 326/DASC 326.  
Cross Listing: DASC 327/FSTC 327.

FSTC 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.

FSTC 331 Dairy and Food Technology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Manufacture of frozen, freeze-dehydrated, concentrated and dehydrated dairy foods; fundamental aspects of freezing, concentration and dehydration of foods.  
Prerequisite: FSTC 330 or approval of department head.

FSTC 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: FSTC 201, FSTC 311/HORT 311, FSTC 312/DASC 312, FSTC 313/DASC 313, FSTC 314/DASC 314, FSTC 315/AGSM 315, FSTC 326/DASC 326 or registration therein; senior classification or approval of instructor.

FSTC 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/FSTC 405.

FSTC 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/FSTC 326/FSTC 326/DASC 326; POSC 309; POSC 405/FSTC 405; junior or senior classification or approval of instructor.  
Cross Listing: POSC 406/FSTC 406.

FSTC 410/NUTR 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: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 222 or CHEM 227 or approval of instructor; junior or senior classification.  
Cross Listing: NUTR 410/FSTC 410.

FSTC 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/FSTC 315 or FSTC 315/AGSM 315.  
Cross Listing: AGSM 417/FSTC 417.

FSTC 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.  
Prerequisite: FSTC 201, NUTR 202 or NUTR 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.  
Cross Listing: NUTR 420.

FSTC 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 Vícosa, the Amazon Biotechnology Center, food processing plants and other research centers in the Amazon, central Brazil and Rio De Janeiro.  
Prerequisites: FSTC 201, NUTR 202 or NUTR 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.  
Cross Listing: NUTR 422.

FSTC 440/NUTR 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.  
Cross Listing: NUTR 440/FSTC 440.

FSTC 444/NUTR 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: FSTC 201; junior or senior classification.

FSTC 446/HORT 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: FSTC 311/HORT 311.  
Cross Listing: HORT 446/FSTC 446. (Offered in even numbered years.)
FSTC 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: FSTC 326/DASC 326 or approval of instructor.
Cross Listing: ANSC 457/FSTC 457.

FSTC 469/NUTR 469 Experimental Nutrition and Food Science Laboratory
Credits 4. 1 Lecture Hour. 6 Lab Hours.
Investigation of nutritional intervention in animal models of metabolic and psychological disorders (e.g. obesity and depression); investigational approaches such as behavioral analyses; RNA and protein analyses; reverse transcription PCR.
Prerequisites: CHEM 227; CHEM 237; junior or senior classification or approval of instructor.
Cross Listing: NUTR 469/FSTC 469.

FSTC 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/FSTC 470.

FSTC 471/NUTR 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: NUTR 202 or NUTR 203 and STAT 302; junior or senior classification; knowledge of technical writing helpful.
Cross Listing: NUTR 471/FSTC 471.

FSTC 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 the food industry or graduate school.
Prerequisite: Senior classification in food science and technology.

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

FSTC 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/FSTC 487.

FSTC 489 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of food science and technology. May be repeated for credit.

FSTC 491 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in food science and technology. 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.

Nutritional Sciences

NUTR 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.

NUTR 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 101 and CHEM 111. Majors only.

NUTR 210/FSTC 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.

NUTR 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; NUTR 202 or NUTR 203; sophomore classification or above.

NUTR 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.

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

NUTR 289 Special Topics in...
Credits 1 to 4. 1 to 4 Lecture Hours.
Selected topics in an identified area of nutrition. May be repeated for credit.
Prerequisite: Approval of department head.

NUTR 291 Research
Credits 0 to 4. 0 to 4 Other Hours.
Research conducted under the direction of faculty member in nutrition. May be repeated 2 times for credit.
Prerequisites: Freshman or sophomore classification and approval of department head.
NUTR 300/FSTC 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.  
Cross Listing: FSTC 300/NUTR 300.

NUTR 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: NUTR 203; junior classification or approval of department head.

NUTR 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 digestion, absorption, and metabolism of nutrients.  
Prerequisites: ANSC 107 and ANSC 108; CHEM 222 or CHEM 227 or equivalent.  
Cross Listing: ANSC 303/NUTR 303.

NUTR 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: NUTR 203 and NUTR 211, junior or senior classification.

NUTR 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.

NUTR 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: NUTR 203 and NUTR 301; junior or senior classification.

NUTR 404 Nutrition Assessment and Planning  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Methods of determining the nutritional status of individuals; dietary techniques; planning nutritional care including diet modification and/or nutrition support; nutrition counseling.  
Prerequisites: NUTR 203, NUTR 211 and NUTR 301; junior classification or approval of department head.

NUTR 405 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: NUTR 203, NUTR 301; BIOL 319; BICH 410 or concurrent enrollment; senior classification or approval of instructor.

NUTR 410/FSTC 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: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 222 or CHEM 227 or approval of instructor; junior or senior classification.  
Cross Listing: FSTC 410/NUTR 410.

NUTR 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.  
Prerequisite: FSTC 201, NUTR 202 or NUTR 203; must be 18 years of age; class and tours taught in English; priority given to majors in FSTC or NUTR.  
Cross Listing: FSTC 420.

NUTR 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: NUTR 203, NUTR 301; BIOL 319; BICH 410 or concurrent enrollment; senior classification or approval of instructor.

NUTR 430 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: NUTR 203 and NUTR 301; junior or senior classification.

NUTR 440/FSTC 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.  
Cross Listing: FSTC 440/NUTR 440.
NUTR 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: NUTR 203, BICH 303 or BICH 410 or approval of instructor.

NUTR 469/FSTC 469 Experimental Nutrition and Food Science Laboratory  
Credits 4. 1 Lecture Hour. 6 Lab Hours.  
Investigation of nutritional intervention in animal models of metabolic and psychological disorders (e.g. obesity and depression); investigational approaches: behavioral analyses; RNA and protein analyses; reverse transcription PCR.  
Prerequisites: CHEM 227; CHEM 237; junior or senior classification or approval of instructor.  
Cross Listing: FSTC 469/NUTR 469.

NUTR 470 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: NUTR 203; NUTR 301; BICH 410; senior classification or approval of department head.

NUTR 471/FSTC 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: NUTR 202 or NUTR 203 and STAT 302; junior or senior classification; knowledge of technical writing helpful.  
Cross Listing: FSTC 471/NUTR 471.

NUTR 481 Seminar  
Credit 1. 1 Lecture Hour.  
Review of current literature and research in nutrition; oral presentations and critical discussions.  
Prerequisite: NUTR 203; NUTR 301; senior classification or approval of department head.

NUTR 485 Directed Studies  
Credits 0 to 4. 0 to 4 Other Hours.  
Directed study on selected problems in the area of nutrition.  
Prerequisites: Junior or senior classification in scientific nutrition or allied area; approval of instructor; 2.0 GPR in major and overall.

NUTR 489 Special Topics in...  
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Selected topics in an identified area of nutrition. May be repeated for credit.  
Prerequisite: Junior or senior classification.

NUTR 491 Research  
Credits 0 to 4. 0 to 4 Other Hours.  
Research conducted under the direction of faculty member in nutrition. 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.