NUTR 601/ANSC 601 General Animal Nutrition
Credits 3. 3 Lecture Hours.
Comparative nutrition of animal species contrasting digestive, metabolic and physiological functions involved in processing and using nutrients.
Prerequisite: ANSC 303 or 318 or equivalent.
Cross Listing: ANSC 601/NUTR 601.

NUTR 602/ANSC 602 Energetics of Metabolism and Growth
Credits 3. 3 Lecture Hours.
Current fundamental concepts in protein and energy metabolism relating to nutrients required for maintenance, growth and development of animals.
Prerequisite: BICH 410 or approval of instructor.
Cross Listing: ANSC 602/NUTR 602.

NUTR 610/FSTC 610 Nutritional Pharmacometrics of Food Compounds
Credits 3. 3 Lecture Hours.
Introduction into nutritional pharmacokinetics and pharmacodynamics of food compounds; specific examples of toxicological and pharmacological effects of food compounds.
Prerequisite: NUTR 202 or NUTR 203 or FSTC 201 or CHEM 227 or CHEM 222 or approval of instructor.
Cross Listing: FSTC 610/NUTR 610.

NUTR 613/ANSC 613 Protein Metabolism
Credits 3. 3 Lecture Hours.
Basic concepts and recent advances in protein metabolism in animals with emphasis on physiological and nutritional significance; discussion of protein digestion; absorption of peptides; absorption, synthesis and degradation of amino acids; hormonal and nutritional regulation of protein turnover; determination of protein quality and requirements.
Prerequisite: BICH 411 or BICH 601 or equivalent or approval of instructor.
Cross Listing: ANSC 613/NUTR 613.

NUTR 614 Fermentation and Gastrointestinal Microbiology
Credits 3. 3 Lecture Hours.
Fermentation and gastrointestinal ecosystems in terms of microorganisms present, their activities and requirements and their interactions in a dynamic system.
Prerequisite: Beginning microbiology and/or biochemistry or approval of instructor.
Cross Listing: POSC 614 and VTMI 614.

NUTR 617/ANSC 617 Experimental Techniques in Meat Science
Credits 3. 1 Lecture Hour. 6 Lab Hours.
Methods used in separating and identifying muscle proteins and fats; techniques for determining postmortem changes of muscle tissue as a result of antemortem treatments.
Prerequisite: ANSC 607/FSTC 607; BICH 411.
Cross Listing: ANSC 617/NUTR 617.

NUTR 618/ANSC 618 Lipids and Lipid Metabolism
Credits 3. 3 Lecture Hours.
Chemical nature of various classes of lipids and lipid-derived hormones; absorption and metabolism of fatty-acids and lipids; regulation of lipid biosynthesis and obesity; relationship between lipid metabolism and cholesterol homeostasis; lipids as hormones.
Prerequisite: BICH 410 or approval of instructor.
Cross Listing: ANSC 618/NUTR 618.

NUTR 630 Nutrition in Disease
Credits 3. 3 Lecture Hours.
Human nutritional requirements in health and disease, emphasizing effects of disease states on intake, digestion, absorption, metabolism and excretion of nutrients; relationship of diet to development of certain diseases.
Prerequisites: NUTR 202; BICH 410 or equivalent.

NUTR 640/FSTC 640 Therapeutic Microbiology I
Credits 3. 3 Lecture Hours.
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.
Prerequisite: Undergraduate survey course in microbiology (or instructor's consent).
Cross Listing: FSTC 640/NUTR 640.

NUTR 641 Nutritional Biochemistry I
Credits 3. 3 Lecture Hours.
Integration of the intermediary metabolism of glucose, amino acids and lipids with nutrition, physiology and pathophysiology in animals; regulation of metabolic pathways in cells, tissues and the whole body under normal and disease conditions; functions of vitamins and minerals in nutrient metabolism and health.
Prerequisite: BICH 411 or BICH 604. Offered during the fall semester.

NUTR 642 Nutritional Biochemistry II
Credits 3. 3 Lecture Hours.
Mechanisms through which specific nutrients modulate intracellular signal transduction and gene expression; molecular mechanisms by which nutrition modulates disease states such as atherosclerosis, cancer and arthritis.
Prerequisites: BICH 411; BICH 431/GENE 431 or equivalent.

NUTR 645/POSC 645 Nutrition and Metabolism of Vitamins
Credits 3. 3 Lecture Hours.
Chemistry and metabolism of the fat soluble and water soluble vitamins and their roles in animals; integrates cellular biochemistry and metabolism of the vitamins in vertebrate animal.
Prerequisites: POSC 411 or ANSC 303/NUTR 303; BICH 410 or BICH 603.
Cross Listing: POSC 645/NUTR 645.

NUTR 646 Fundamentals of Space Life Sciences
Credits 3. 3 Lecture Hours.
Integrates nutrition, physiology, and radiation biology to define major biological problems in long duration space flight; provide an overview of the problems of bone loss, muscle wasting, and radiation-enhanced carcinogenesis along with potential countermeasures; focus on nutritional interventions and exercise protocols.
Cross Listing: NUEN 646 and KINE 646.

NUTR 647/WFSC 647 Nutritional Biochemistry of Fishes
Credits 3. 3 Lecture Hours.
Principles of nutritional biochemistry including nutrient metabolism and biochemical energetics with special emphasis on finfish and shell fish.
Prerequisite: BICH 410 or equivalent.
Cross Listing: WFSC 647/NUTR 647.
NUTR 650/POSC 650 Nutrition and Metabolism of Minerals  
Credits 3. 3 Lecture Hours.  
Nutritional significance of minerals in animal metabolism; chemical, biochemical and physiological role of minerals and homeostatic control in animal metabolism.  
Prerequisites: POSC 411 or ANSC 303/NUTR 303; BICH 410 or BICH 603.  
Cross Listing: POSC 650/NUTR 650.  

NUTR 669/FSTC 669 Experimental Nutrition & Food Science Laboratory  
Credits 4. 1 Lecture Hour. 6 Lab Hours.  
Experimental Nutrition & Food Science Laboratory. Nutritional intervention in animal models of metabolic or emotional disorders; genetic modifications or pathogens in food products; analyses of gene expression and behavior.  
Prerequisite: BICH 432/GENE 432/GENE 432/BICH 432 recommended; graduate classification in nutrition or related major.  
Cross Listing: FSTC 669/NUTR 669.  

NUTR 671/FSTC 671 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; knowledge of nutrition, statistics, and technical writing helpful.  
Cross Listing: FSTC 671/NUTR 671.  

NUTR 679/POSC 679 Lipoproteins in Health and Disease  
Credits 3. 3 Lecture Hours.  
Understanding of lipoprotein biology as it relates to nutrient delivery and disease development; emphasis on understanding how structure influences the function of different lipoprotein particles in human and avian systems; opportunity to study individual lipoprotein profiles or those of animals by modern imaging techniques; background in basic lipid biochemistry helpful.  
Cross Listing: POSC 679/NUTR 679.  

NUTR 681 Seminar  
Credits 0-1. 0-1 Other Hours.  
Current developments in the field of nutrition; review of current literature and oral presentation of scientific papers on selected nutrition topics.  
Prerequisite: Graduate classification.  

NUTR 684 Professional Internship  
Credits 1 to 16. 1 to 16 Other Hours.  
Experience in application of formal training to applied nutrition under supervision of nutritionists, dietitians and faculty member. Student will investigate matter of mutual interest and report results in a professional paper approved by the graduate committee.  
Prerequisite: Graduate classification.  

NUTR 685 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Nutrition problems and procedures; problems assigned according to experience, interest and need of individual student.  
Prerequisite: Approval of instructor prior to registration.  

NUTR 689 Special Topics in...  
Credits 1 to 4. 0 to 4 Lecture Hours. 0 to 4 Lab Hours.  
Special topics in an identified area of nutrition. May be repeated for credit.  
Prerequisites: Graduate classification and approval of instructor.  

NUTR 691 Research  
Credits 1 to 23. 1 to 23 Other Hours.  
Investigations leading to thesis or dissertation in various areas of nutrition.  
Prerequisite: Graduate classification.