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/NUTR 303 or ANSC 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, NUTR 203, FSTC 201, CHEM 227, or CHEM 222,  
or instructor approval.  
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 significances; 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 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.

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  iosynthesis 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 632 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.  
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 approval of  
instructor.  
Cross Listing: FSTC 640.

NUTR 641/ANSC 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.  
Cross Listing: ANSC 641/NUTR 641.

NUTR 642 Nutritional Biochemistry II  
Credits: 3. 3 Lecture Hours.  
Integration of nutrition, biochemistry and other life sciences focusing  
on nutrients and their needs in healthy and unhealthy individuals;  
macronutrients and their metabolism and the pertinent regulation;  
nutrient sensing and signaling pathways; nutritional and hormonal  
regulation of gene expression; commonly used nutritional and  
biochemical assays.  
Prerequisites: NUTR 475, BICH 410 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 animals.  
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 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 651/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 651.

NUTR 655 Nutrition and Healthy Aging  
Credits 3. 3 Lecture Hours.  
Fusion of biology of aging and geriatric nutrition; different aging theories, pathophysiology of aging and age-related diseases, nutritional needs of older adults, nutritional impacts on lifespan and healthspan and nutritional interventions for healthy aging.  
Prerequisite: Graduate classification.

NUTR 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 or GENE 432/BICH 432 recommended; graduate in nutrition or related major.

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, STAT 302; knowledge of nutrition, statistics, and technical writing helpful.  
Cross Listing: FSTC 671/NUTR 671.

NUTR 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.

NUTR 681 Seminar  
Credits 0-1. 0-1 Other Hours.  
Oral reports and discussions of current research and developments in nutrition designed to broaden understanding of problems and to stimulate research.

NUTR 684 Professional Internship  
Credits 0 to 16. 0 to 16 Other Hours.  
Experience in application of formal training to a commercial operation under supervision of operations manager and designated faculty member; investigation of matter of mutual interest and report results in a professional paper approved by the graduate committee.

NUTR 685 Directed Studies  
Credits 1 to 4. 1 to 4 Other Hours.  
Directed study of selected problems emphasizing recent developments in research techniques.

NUTR 689 Special Topics in...  
Credits 1 to 4. 1 to 4 Other Hours.  
Special topics in an identified area of nutrition. May be repeated for credit.

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