

# ANSC - ANIMAL SCIENCE

## ANSC 601/NUTR 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 ANSC 318 or equivalent. **Cross Listing:** NUTR 601/ANSC 601.

## ANSC 602/NUTR 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:** NUTR 602/ANSC 602.

## ANSC 604 Ruminant Nutrition

**Credits 3. 3 Lecture Hours.** Current concepts in anatomy, physiology of digestion and metabolism in ruminant nutrition and their relationships to nutrition practice and research with emphasis on ruminants. **Prerequisite:** ANSC 601/NUTR 601 or NUTR 601/ANSC 601, or ANSC 602/NUTR 602 or NUTR 602/ANSC 602; BICH 411 or BICH 603 or approval of instructor.

## ANSC 605 Advancements in Beef Cattle Production

**Credits 3. 3 Lecture Hours.** Current knowledge and concepts in production of lean beef; review of research in beef cattle production, breeding, nutrition, reproduction and economics. **Prerequisite:** Graduate classification or approval of instructor.

## ANSC 607/FSTC 607 Physiology and Biochemistry of Muscle as a Food

**Credits 3. 3 Lecture Hours.** Biochemical, histological, anatomical and physical characteristics of muscle cells and factors associated with transformation of muscle cells into meat. **Prerequisite:** BICH 410 or approval of instructor. **Cross Listing:** FSTC 607/ANSC 607.

## ANSC 608 Beef Cattle Management

**Credits 3. 3 Lecture Hours.** Current knowledge of beef cattle ranch and feedlot production systems; nutrition, management, breeding, body composition, economics, health, pollution and sanitation control. **Prerequisite:** ANSC 406 or ANSC 408.

## ANSC 609 Physiology of Growth and Stress in Livestock

**Credits 3. 3 Lecture Hours.** Basic biochemical, physiological and endocrine mechanisms involved in processes regulating metabolism, growth and stress in livestock; current research and management principles/concepts useful to study growth and stress physiology; anabolic agents, anti-stress agents, immunoneutralization; transgenic livestock. **Prerequisites:** BICH 410 and BICH 411 or approval of instructor.

## ANSC 611 Equine Nutrition

**Credits 3. 3 Lecture Hours.** Review and evaluation of current research in equine nutrition; principles of digestive physiology and nutrition unique to equine species; comparative digestion; integration of scientific principles into feeding management systems to enhance productivity, health and longevity of the equine. **Prerequisite:** ANSC 601/NUTR 601 or approval of department head.

## ANSC 613/NUTR 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:** NUTR 613/ANSC 613.

## ANSC 614 Maximum Likelihood Estimation of Genetics

**Credits 3. 3 Lecture Hours.** Theoretical and analytical approaches to the application of maximum likelihood for the estimation of parameters under linear and nonlinear models; single and polygene genetic models including Hardy-Weinberg equilibrium, linkage analysis and quantitative trait loci detection. **Prerequisites:** GENE 603; STAT 651; STAT 652 or STAT 601.

## ANSC 616 Equine Exercise Physiology

**Credits 3. 3 Lecture Hours.** Review and evaluation of current research in equine exercise science; physical, physiologic and metabolic adaptation to physical training in the horse; bioenergetics; nutritional requirements; problems in the hard-working horse; management and training approaches to delay fatigue in race/performance horses. **Prerequisite:** Graduate classification.

## ANSC 618/NUTR 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:** NUTR 618/ANSC 618.

## ANSC 619 Physiological Chemistry of Livestock Species

**Credits 3. 3 Lecture Hours.** Integration of biochemical concepts with physiological chemistry and intermediary metabolism of livestock species; unique aspects of absorption and cellular metabolism of carbohydrates, lipids and proteins in livestock species; regulation of cellular nutrient metabolism in livestock species. **Prerequisite:** BICH 410 or approval of instructor.

## ANSC 621 Issues in the Equine Industry

**Credit 1. 1 Lecture Hour.** Integration of cumulative knowledge acquired in the equine science curriculum to demonstrate critical thinking and communication skills to address critical issues in the equine industry. **Prerequisite:** Approval of instructor or enrollment in master of equine industry management program.

## ANSC 622 Research Methods in Animal Science

**Credits 3. 3 Lecture Hours.** Development of the conceptual framework of research; study of software programs for data recording, management, and analysis; evaluation of specific experimental designs historically used in animal experiments; discussion of interpretations found in peer-reviewed research publications; data presentation for scientific meetings and publication; the peer review process and publication in technical journals. **Prerequisite:** Graduate classification or approval of instructor.

## ANSC 623/POSC 625 Precision Diet Formula

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Theoretical and applied principles associated with precision feeding and diet formulation to optimize nutrient requirements; optimization using least-cost formulation, ingredient inventory, farm and feed mill management, and nutrient management of non-ruminants (poultry, swine, horse, and fish) and ruminant animals (beef and dairy). **Prerequisite:** POSC 411 or ANSC 318. **Cross Listing:** POSC 625/ANSC 623.

## ANSC 624 Mammalian Developmental Genetics

**Credits 3. 3 Lecture Hours.** Genetic control of developmental pathways responsible for pattern formation and morphogenesis in mammals; genetic networks and genome organization; significance of genetic regulatory networks as a source of evolutionary diversity. **Prerequisites:** GENE 301 or GENE 320/BIMS 320; BICH 410/411 or equivalent.

## ANSC 626/GENE 626 Analyses of Gene Expression

**Credits 2. 1 Lecture Hour. 3 Lab Hours.** Proficiency in handling DNA and RNA gained during exercises used routinely in analyses of gene expression; RNA preparation and analysis on Northern blots; in vitro transcription and polyacrylamide gel analysis of nucleic acids; sub-cloning and mRNA quantitation using polymerase chain reaction. **Prerequisites:** GENE 450 or approval of instructor; radiation safety training. **Cross Listing:** GENE 626.

## ANSC 627 Carcass Composition and Quality

**Credits 3. 3 Lecture Hours.** Survey of scientific literature regarding carcass composition; quality and palatability of meat animals; factors that affect differences among animals of the same specie; impact on value and usefulness. **Prerequisite:** Graduate classification.

## ANSC 628 Animal Breeding

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Concepts from Mendelian, population and quantitative genetics; heritability, selection response, selection criteria, selection index, genetic relationship, inbreeding, mating systems, hybrid vigor and genetic-environmental interaction applied to livestock breeding and to production systems; interactions between genetics and nutrition, reproduction, production and management for both established concepts and recent trends emphasized according to special interests of students. **Prerequisite:** ANSC 305 or POSC 414.

## ANSC 629 Applied Animal Genomics

**Credits 3. 3 Lecture Hours.** Theory and application of genomics by livestock industries; consideration of genetic markers, gene mapping methods, genome analysis and emerging technologies such as microarrays, transgenesis, cloning and marker assisted selection; exposure to bioinformatic tools for genomics. **Prerequisite:** GENE 603. **Cross Listing:** GENE 629 and POSC 630.

## ANSC 630 Reproductive Biology I

**Credits 4. 4 Lecture Hours.** Embryological, physiological, hormonal, cellular and molecular mechanisms involving the endocrine and reproductive systems of mammals; emphasis on domestic livestock, rodents and humans; current theories evaluated and discussed using information from recent scientific publications. **Prerequisite:** ANSC 333; BICH 410 and BICH 411 or equivalent.

## ANSC 631 Reproductive Biology II

**Credits 4. 4 Lecture Hours.** Embryological, physiological, hormonal, cellular and molecular mechanisms involving the endocrine and reproductive systems of mammals; emphasis on domestic livestock, rodents and humans; current theories evaluated and discussed using information from recent scientific publications. **Prerequisite:** ANSC 630 or approval of instructor.

## ANSC 632 Equine Industry Tour

**Credits 2. 2 Lecture Hours.** All facets of the Texas Equine Industry, including breed associations, large events, breeding and production operations, large ranches, performance horse training barns, media, history, veterinary medicine, retail, sports medicine, and nutrition; network and gain a holistic perspective on the inner workings of the equine industry. **Prerequisites:** Graduate classification or approval of instructor.

## ANSC 633 Concepts in Reproduction

**Credits 3. 3 Lecture Hours.** Concepts from current research in physiology of reproduction evaluated and applied for enhancement of livestock production efficiency; ovulation control, embryo transfer, multiple births and control of parturition. **Prerequisite:** ANSC 433 or equivalent or approval of department head.

## ANSC 636 Texas Panhandle Beef Production Tour

**Credits 2. 2 Lecture Hours.** Covers all facets of beef production from cow/calf operation to retail product; experiential knowledge of technologies and practices to enhance efficiency; enlightens the array of career opportunities in the beef production industry. **Prerequisite:** Approval of instructor.

## ANSC 637 Food Safety: Policy, Regulations and Issues

**Credits 3. 3 Lecture Hours. 0 Lab Hours.** Designed to explore the complexities of the regulations governing the production of foods of animal origin in the United States; requirements for countries importing products into the United States; federal, state and local requirement will be addressed. **Prerequisites:** ANSC 457/FSTC 457, FSTC 457/ANSC 457, ANSC 657/FSTC 657, FSTC 657/ANSC 657, or approval of instructor.

## ANSC 638/GENE 638 Prediction of Genetic Merit

**Credits 3. 3 Lecture Hours.** Mixed linear models and best linear unbiased prediction for genetic evaluation. **Prerequisite:** GENE 613. **Cross Listing:** GENE 638/ANSC 638.

## ANSC 639/GENE 639 Bacterial Genomics

**Credits 3. 3 Lecture Hours.** Analysis of bacteria on the whole genome level including effects on microbiology, ecology, epidemiology, diagnostics and bacterial pathogenesis; exploration of the variability of bacterial genomes within and across bacterial species; discovery of how these variations affect bacterial cell function, virulence and epidemiology. **Prerequisites:** Graduate classification or approval of instructor. **Cross Listing:** GENE 639/ANSC 639.

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

## ANSC 642/GENE 642 Advanced Quantitative Genetics

**Credits 3. 3 Lecture Hours.** Introduction to Bayesian methods of genetic analysis; understanding of distributions associated with genetic analyses; describe basic methodology and procedures for random sampling; set up and conduct basic linear regression analysis and mixed model prediction of genetic merit using Bayesian methodology. **Prerequisites:** GENE 613 and STAT 651, graduate classification or approval of instructor. **Cross Listing:** GENE 642/ANSC 642.

## ANSC 647/FSTC 647 Technology of Meat Processing and Distribution

**Credits 3. 3 Lecture Hours.** Quantitative and qualitative characteristics of meat and meat products as related to food technology processing operations; manufacturing, preservation, packaging and merchandising. **Cross Listing:** FSTC 647/ANSC 647.

## ANSC 651 Current Issues in Animal Agriculture

**Credits 3. 3 Lecture Hours.** Projecting a professional image and utilizing communication skills to describe animal agriculture; strengths and weaknesses of animal agriculture. **Prerequisite:** Graduate classification.

## ANSC 652 Animal Welfare Assessment

**Credits 3. 3 Lecture Hours.** Multidisciplinary instruction in animal welfare science; exploration of issues including physiology, behavior, human-animal interactions, suffering and pain, ethics, health, assessment and standards and economics; experience in assessment of welfare of animals of a variety of species in virtual situations; promotion of problem solving and critical thinking skills through assessments, discussions, readings and assignments.

## ANSC 655 System Dynamics for Animal Science

**Credits 2. 2 Lecture Hours.** Exploration of system dynamics modeling emphasizing animal science; mapping of complex system structures; development and testing of computer-based models of animal science. **Prerequisites:** Graduate classification.

## ANSC 657/FSTC 657 Hazard Analysis and Critical Control Point System

**Credits 3. 3 Lecture Hours.** Examination of the Hazard Analysis and Critical Control Point (HACCP) principles specifically related to meat and poultry; microbiological and process overviews; good manufacturing practices (GMP) and standard operating procedures (SOP) development; team-building and implementation into industry operations. This class is designed for the production of food and fulfills the training requirements of USDA's HACCP regulation for meat and poultry (9 CFR Part 417), and FDA's HACCP regulations for fish and fishery products (21 CFR Part 123 and 1240) and for juice (21 CFR Part 120). **Cross Listing:** FSTC 657/ANSC 657.

## ANSC 660 System Dynamics for Animal Sciences

**Credits 2. 2 Lecture Hours.** System dynamics modeling for the analysis of business policy and strategy; study of visualization of a business organization in terms of structures and policies that create dynamics and regulate performance; emphasis on animal production. **Prerequisite:** ANSC 303, ANSC 320, or approval of the instructor.

## ANSC 667/FSTC 667 Industrial Processed Meat Operations

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Application of scientific principles and business practices to manufactured meat products; interrelationships among marketing, manufacturing, product development, regulatory compliance and quality assurance in commercial processed meat operations. **Prerequisite:** Approval of instructor. **Cross Listing:** FSTC 667/ANSC 667.

## ANSC 670/FSTC 670 Quality Assurance for the Food Industry

**Credits 3. 3 Lecture Hours.** Principles of food system process control; statistical process control (SPC); tools required to assure uniform communication and understanding of quality assurance systems. **Prerequisite:** Graduate classification. **Cross Listing:** FSTC 670.

## ANSC 680 Applied Concepts of Meat Animal Myology

**Credits 3. 2 Lecture Hours. 2 Lab Hours.** Introduction to fundamental concepts of meat animal myology as they pertain to industrial meat science; standard formats for scientific nomenclature in the context of meat science and industry related terminology; fabricated cuts used to illustrate myology concepts. **Prerequisite:** Graduate classification.

## ANSC 681 Seminar

**Credit 1. 1 Lecture Hour.** Important current developments in field of animal science; review of current literature and presentation of papers on selected animal science topics. **Prerequisite:** Graduate classification in animal science.

## **ANSC 684 Professional Internship**

**Credits 1 to 16. 1 to 16 Other Hours.** Experience in the application of formal training to a commercial operation under supervision of the operations manager and a designated faculty member. The student will investigate a matter of mutual interest to the enterprise manager and to Texas A&M University; will collect, analyze and interpret the data and report the results in a professional paper approved by his or her graduate committee.

## **ANSC 685 Directed Studies**

**Credits 1 to 4. 1 to 4 Other Hours.** Advanced studies in animal science problems and procedures. Problems assigned according to experience, interest and needs of individual student. **Prerequisite:** Approval of department head.

## **ANSC 687/FSTC 687 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.

**Prerequisite:** CHEM 222 or CHEM 228. **Cross Listing:** FSTC 687/ANSC 687.

## **ANSC 689 Special Topics in...**

**Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.** Special topics in an identified area of animal science. May be repeated for credit. **Prerequisite:** Approval of department head.

## **ANSC 691 Research**

**Credits 1 to 23. 1 to 23 Other Hours.** Investigations leading to student's thesis or dissertation in fields of animal production, meats, wool and mohair, nutrition, inheritance of farm animals and physiology of reproduction.

## **ANSC 697/FSTC 697 Applied Microbiology for Foods of Animal Origin: Processing, Sanitation and Sanitary Design**

**Credits 3. 3 Lecture Hours.** Application of basic food microbiology knowledge and principles to food production processes and products; sources of microbiological contamination and their impact on food safety and spoilage; application of sanitary design and validation; testing and auditing to monitor and trouble-shoot the process. **Prerequisites:** DASC 326 or FSTC 326/ANSC 326, or FSTC 606/DASC 606, or equivalent. **Cross Listing:** FSTC 697/ANSC 697.