# ANSC - ANIMAL SCIENCE

**ANSC401 Animal Growth and Development for Production Agriculture (3 Credits)**
An integration of the physiological, genetic, and nutritional bases of animal growth, development, and body composition with application to livestock production.
**Prerequisite:** ANSC201.

**ANSC410 The Gut Microbiome and its Roles in Health and Disease (3 Credits)**
A comprehensive perspective of the role of gut microbiome/microflora in nutrition, metabolism, disease prevention and health issues including farm animal health and food value, and human gastrointestinal health and immunity.
**Prerequisite:** BSCI223, ANSC212, ANSC327, EPIB301, BSCI222, BSCI421, or NFSC430; or students who have taken courses with comparable content may contact the department.
**Credit Only Granted for:** ANSC489M or ANSC410.
**Formerly:** ANSC489M.

**ANSC417 Regulatory Issues in Animal Care and Management (3 Credits)**
A study of regulatory issues affecting animal care and management in the livestock industry. Guest speakers and classroom discussions will focus on key topics including animal welfare, feed and drug regulations, animal identification, CAFO management, processing and marketing of animal products.
**Prerequisite:** ANSC220, ANSC232, ANSC242, ANSC250, ANSC255, ANSC260, ANSC262, or ANSC282; or permission of instructor.
**Additional Information:** Field trips may be required for this course.

**ANSC435 Experimental Embryology (3 Credits)**
Experimental approaches to mammalian embryology with emphasis on domestic livestock systems as applied to research and production systems. Lab will include hands-on experiments and demos of in vitro embryo production, embryo splitting, cell injection and nuclear transfer.
**Prerequisite:** ANSC212.
**Recommended:** Completion of one course in reproductive physiology is recommended.
**Credit Only Granted for:** ANSC435 or ANSC489M.
**Formerly:** ANSC489M.

**ANSC436 Animal Health Policy and Communication (3 Credits)**
Intended for upper level students in Veterinary Medicine or Animal Science as well as other students who are interested in understanding how science and politics interact and influence animal health policy and how veterinarians and animal scientists can effectively communicate science to non-scientists such as legislators and policymakers.
**Recommended:** Completion of ANSC225 and ANSC340 recommend.
**Restriction:** Must be in a major within the AGNR-Animal & Avian Sciences department; or permission of AGNR-VA-MD Regional COL Veterinary Med.
Cross-listed with: VMSC436.
**Credit Only Granted for:** ANSC489A, ANSC436, or VMSC436.
**Formerly:** ANSC489A.

**ANSC437 Animal Biotechnology (3 Credits)**
Key concepts and current issues in animal biotechnology are covered. Current techniques and applications systems as well as social, ethical, and regulatory issues associated with biotechnology will be discussed.
**Prerequisite:** ANSC327; or students who have taken courses with comparable content may contact the department.

**ANSC440 Zoonotic Diseases and Control (3 Credits)**
Global perspective of foodborne diseases common to animals and man, specifically those caused by farm animal-originated human pathogens (zoonoses) and their control. A selection of important zoonoses and food safety issues will be specifically covered with an emphasis on the principles of zoonotic disease transmission and control, risk factors to humans, and surveillance methods.
**Prerequisite:** BSCI223, ANSC212, ANSC327, BSCI222, BSCI421, or NFSC430; or students who have taken courses with comparable content may contact the department.
**Credit Only Granted for:** ANSC440 or ANSC489R.
**Formerly:** ANSC489R.

**ANSC443 Physiology of Lactation (3 Credits)**
A comprehensive survey of lactation in laboratory and domestic animals. Other species are discussed where possible. Emphasis will be placed on physiological aspects of milk synthesis and secretion and on the cellular and molecular biology of mammary gland development.
**Prerequisite:** ANSC212; and (CHEM231, PLSC275 or AGST275).
**Recommended:** BCHM463.

**ANSC444 Domestic Animal Endocrinology (3 Credits)**
Current developments in endocrinology as it relates to animals used in the production of food and other products important to the well being of humans will be covered.
**Prerequisite:** ANSC212; or permission of instructor.
**Restriction:** Must not have completed ANSC644.
**Credit Only Granted for:** ANSC489I, ANSC444, or ANSC644.
**Formerly:** ANSC489I.

**ANSC445 Comparative Digestive Physiology (3 Credits)**
Comparative gastrointestinal physiology and the pathophysiology of diseases involved in animal-related research. A comparative approach will be presented for much of this material, using the human, canine, porcine, equine, bovine, and avian when information is available. The ultimate aim of the course is to provide a comprehensive knowledge of comparative gastrointestinal pathophysiology, and to give students an insight into the current field of human and veterinary gastroenterology. Students should feel more comfortable reading cutting edge literature by the end of the course, and should acquire a greater understanding of potential digestive disease areas for their future career such as graduate, medical, and veterinary students.
**Prerequisite:** ANSC212.

**ANSC446 Physiology of Mammalian Reproduction (3 Credits)**
Anatomy and physiology of reproductive processes in domesticated and wild mammals.
**Prerequisite:** ANSC212 or BSCI440.

**ANSC447 Physiology of Mammalian Reproduction Laboratory (1 Credit)**
Gross and micro-anatomy, artificial insemination, estrous cycle synchronization and invitro-fertilization procedures and analytical techniques useful in animal management and reproduction.
**Prerequisite:** Must have completed or be concurrently enrolled in ANSC446.

**ANSC450 Animal Breeding Plans (3 Credits)**
Design of animal breeding programs for the genetic improvement of livestock and companion animal species. Principles of population and quantitative genetics. Genetic evaluations of animals, selection strategies and crossbreeding systems. Incorporation of statistics and biotechnology into animal breeding plans.
**Prerequisite:** ANSC101; and 1 course with a minimum grade of C- from (MATH120, MATH136, MATH140, or BIOM301).
**Restriction:** Junior standing or higher.

**ANSC452 Avian Physiology (3 Credits)**
The digestive, excretory, respiratory, circulatory, immune, skeletal muscle, endocrine and nervous systems of avian species will be examined.
**Prerequisite:** ANSC212.
**Restriction:** Junior standing or higher.

**ANSC453 Animal Welfare and Bioethics (3 Credits)**
Ethical concerns related to the use of animals in modern society. Historical and philosophical overview of animal welfare and bioethics. Applied ethical discussions on human/animal interrelationships, physical and genetic manipulation, and other current issues associated with the treatment of animals used in food production, research, zoos, and as pets.
**Prerequisite:** ANSC101 and ANSC103; or BSCI106; or (BSCI160 and BSCI161); or permission of instructor.
**Restriction:** Junior standing or higher.

**ANSC454 Nutritional Aspects of Metabolic Disease (3 Credits)**
Biochemical and physiological fundamentals of nutrition. Discussion of protein, fat,carbohydrate, minerals and vitamins and their roles and interrelationships innutrition, metabolism and diseases in humans and animals. The course will use recommended texts for foundation material as well as research papers to provide in-depth coverage and illustrate emerging themes in metabolic aspects of nutrition and disease.
**Prerequisite:** CHEM131 and ANSC101, or BSCI170; or students who have taken courses with comparable content may contact the department.
**Credit Only Granted for:** ANSC4890 or ANSC454.
**Formerly:** ANSC489O.

**ANSC455 Applied Animal Behavior (3 Credits)**
Principles of animal behavior applied to production systems in animal agriculture.
**Prerequisite:** ANSC101 and ANSC103; or BSCI106; or (BSCI160 and BSCI161).

**ANSC460 Comparative Vertebrate Immunology (3 Credits)**
Basic concepts in immunology, and comparing immunity in different vertebrates, including organization of immune systems, innate and adaptive immune responses. Special attention will be paid to how cell-mediated and humoral immune responses are induced in natural infections, and what are the effector mechanisms in both of these processes. Immune response in representative disease models such as infections with viruses and bacteria, cancer, and autoimmune disease will be discussed. Lectures concerning cutting-edge research will also be given.
**Prerequisite:** ANSC212, BSCI201, or BSCI440.
**Credit Only Granted for:** ANSC460 or ANSC489I.
**Formerly:** ANSC489I.

**ANSC489 Current Topics in Animal Science (1-3 Credits)**
Examination of current developments in the animal sciences.
**Repeatable to:** 6 credits if content differs.

**ANSC497 Animal Biotechnology Recombinant DNA Laboratory (3 Credits)**
An advanced course offering hands-on experience in performing recombinant DNA experiments. Current molecular biology techniques used for cloning genes, analyzing the gene products, and modifying the genes of animals will be performed. Techniques include isolation of DNA, use of restriction enzymes; cloning procedures, PCR analysis, and Southern hybridizations. Lecture material focuses on interpretation of results generated in the laboratory.
**Prerequisite:** ANSC327; or students who have taken courses with comparable content may contact the department.
**Recommended:** ANSC437 and ANSC435.

**ANSC617 Quantative Techniques in Physiology and Nutrition (3 Credits)**
Development and evaluation of quantative techniques to explore mechanisims of physiological and nutritional regulation. Kinetic and dynamic models will be emphasized.
**Prerequisite:** MATH120; or permission of AGNR-Animal & Avian Sciences department.

**ANSC624 Recent Advances in Animal and Avian Sciences (1 Credit)**
Seminar course in advanced animal science research.
**Restriction:** Must be an Animal Sciences graduate student.
**Credit Only Granted for:** ANSC698C or ANSC624.
**Formerly:** ANSC698C.

**ANSC625 Developing Presentation Skills (1 Credit)**
Seminar designed to teach oral presentation skills for animal science students.
**Restriction:** Must be an Animal Sciences graduate student.
**Credit Only Granted for:** ANSC625 or ANSC698D.
**Formerly:** ANSC698D.

**ANSC627 Molecular and Quantitative Genetics (3 Credits)**
Classical, molecular, and population genetics with specific emphasis on animal systems will be covered. Also, disseminate information on molecular approaches for manipulating genetics at the whole animal level (transgenic and cloning). Other model organisms will be discussed to provide a conceptual framework.

**ANSC644 Molecular and Cellular Endocrinology (3 Credits)**
A comprehensive course covering the major endocrine systems in animals. Lecture topics include major endocrine axes, hormonal regulation of homeostasis, growth and reproduction, and endocrine mechanisms of action. Advanced concepts in the molecular and cell biology of hormone action and regulation addressed in weekly discussion sessions centered on current research publications in the field of molecular and cellular endocrinology.
**Restriction:** Must not have completed ANSC444.
**Credit Only Granted for:** ANSC444,ANSC489I, ANSC644, or ANSC688I.
**Formerly:** ANSC688I.

**ANSC660 Poultry Literature (1-4 Credits)**
Readings on individual topics are assigned. Written reports required. Methods of analysis and presentation of scientific material are discussed.

**ANSC688 Special Topics (1-4 Credits)**
Lectures, experimental courses, and other special subjects in the fields of animal sciences and veterinary medicine.
**Repeatable to:** 4 credits.

**ANSC698 Seminar (1 Credit)**
Students are required to prepare papers based upon current scientific publications relating to animal science, or upon their research work, for presentation before and discussion by the class; (1) recent advances; (2) nutrition; (3) physiology; (4) biochemistry.

**ANSC699 Special Problems in Animal Science (1-2 Credits)**
Work assigned in proportion to amount of credit. Prerequisite: approval of staff. Problems will be assigned which relate specifically to the character of work the student is pursuing.

**ANSC799 Master's Thesis Research (1-6 Credits)**

**ANSC898 Pre-Candidacy Research (1-8 Credits)**

**ANSC899 Doctoral Dissertation Research (1-8 Credits)**