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: ANSC220, ANSC222, ANSC224, ANSC225, ANSC260, or ANSC282; or permission of instructor.
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, ANSC222, ANSC224, ANSC225, ANSC260, or ANSC282; or permission of instructor.
Additional Information: Field trips may be required for this course.

ANSC425 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 ANGR-VA-MD Regional COL Veterinary Med.
Credit Only Granted for: ANSC489A or ANSC436.
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: ANSC227; 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: ANSC223, ANSC212, ANSC227, 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: CHEM231, ANSC212, and CHEM232.
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 have completed ANSC644.
Credit Only Granted for: ANSC489I, ANSC444, or ANSC644.
Formerly: ANSC489I.

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, MATH130, MATH136, MATH140).
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.
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 in nutrition, 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 BSCI1170; or students who have taken courses with comparable content may contact the department.
Credit Only Granted for: ANSC4890 or ANSC454.
Formerly: ANSC4890.
ANSC455 Applied Animal Behavior (3 Credits)
Principles of animal behavior applied to production systems in animal agriculture.
Prerequisite: ANSC101 and ANSC103; or BSCI1160 and BSCI1161.
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 ANSC489.
Formerly: ANSC489.
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 Quantitative Techniques in Physiology and Nutrition (3 Credits)
Development and evaluation of quantitative techniques to explore mechanisms of physiological and nutritional regulation. Kinetic and dynamic models will be emphasized.
Prerequisite: MATH120; or permission of AGNR-Animal & Avian Sciences department.