

ANSC - ANIMAL SCIENCE

ANSC101 Principles of Animal Science (3 Credits)

A comprehensive overview of the application of biology in the care and use of animals that live in close association with humans including food animals, companion animals, lab animals, zoo animals, etc. The role of science in modern food production using animals will be emphasized.

ANSC103 Principles of Animal Science Laboratory (1 Credit)

Laboratory focusing on the application of biology in the care and use of animals that live in close association with humans including livestock and companion animals. Labs will include live animals.

Prerequisite: Must have completed or be concurrently enrolled in ANSC101.

Restriction: Must be in one of the following programs (Environmental Sci & Pol-Environment & Agriculture; Agricultural and Veterinary Medicine; Agricultural Science and Technology) ; or must be in a major within the AGNR-Animal & Avian Sciences department; or permission of department required for students in other College of AGNR programs.

ANSC105 Horse Care Practicum (1 Credit)

This practicum course provides the opportunity for students to be involved in the routine care of the horses housed at the Campus Farm including grooming, feeding, turnout, first aid, record-keeping, and cleaning. Practical skills are supplemented with online learning.

Restriction: Permission of the instructor.

Credit Only Granted for: ANSC108 or ANSC105.

Formerly: ANSC108.

ANSC115 Careers in the Animal Sciences (1 Credit)

Discussion of current employment opportunities in Animal Science, primarily by invited speakers. In addition, students will have the opportunity to prepare resumes and improve oral presentation skills while working with their peers.

Prerequisite: ANSC101 and ANSC103.

ANSC120 Introduction to Dairy Judging (2 Credits)

Students will establish an understanding of dairy cattle anatomy and importance in dairy production, while gaining the ability to evaluate dairy cattle for soundness and show-ring appeal. Additionally, the class aims to provide students with confidence in justifying decisions of evaluation and gain confidence in public speaking.

ANSC121 Introduction to Livestock Judging (2 Credits)

Students will establish a working understanding of the structural anatomy of several livestock species- cattle, sheep, pigs, goats- and their individual importance in the Agricultural Industry, while gaining the ability to evaluate these species for soundness and show-ring appeal. Additionally, the class aims to provide students with confidence in justifying decisions of based on their evaluations and gain skills in public speaking. The course will include two weekend field trips to farms in order to practice judging skills.

ANSC201 Anatomy and Physiology of Domestic Animals (4 Credits)

The anatomy and physiology of domesticated animals with emphasis on functions related to homeostasis. Students will be developing an ability to think about material in processes. They will also gain experience in scientific writing and data analysis.

Prerequisite: ANSC101, ANSC103, BSCI170, and (BSCI180 or BSCI171).

ANSC210 Veterinary Terminology (1 Credit)

Students will learn terminology related to the clinical practice of small and large animal medicine including medical record terminology and a systems-based consideration of common practices and pathologies.

Prerequisite: ANSC204 and ANSC205; or ANSC201.

Restriction: Must be a major in Animal Sciences.

Additional Information: The course is offered on-line through a series of self-paced modules on ELMS.

ANSC226 The Future of Animal Agriculture (3 Credits)

Offers students the opportunity to learn about the history of animal agriculture in the United States and envision what its future might be as it adapts to major challenges such as our growing global population, climate change, food injustice, antimicrobial and insecticide resistance, animal welfare concerns, and farmer distress. The course will examine technological & biotechnological, agroecological, and social innovations that address these issues while providing healthy, safe, nutritious food. Students are invited to learn about these issues and to create and propose their own solutions through weekly "extend your learning" opportunities and a course project in animal agricultural extension.

Additional Information: The course is hosted on ELMS-Canvas and will require students to have reliable access to the internet.

ANSC227 Eating with Eyes Wide Open (3 Credits)

Are our diet and agricultural production methods sustainable? Students will investigate tensions created by trade-offs made by consumers relative to dietary choices which, in turn, can influence agricultural production methods. The course will inform students about their food supply so they can make informed dietary decisions and practice intentional/informed eating.

ANSC232 Horse Management (3 Credits)

An introductory course on the care, management, and use of horses. Major topics include the industry, breeds, conformation, feeding, health, reproduction, facilities and business.

Prerequisite: ANSC101 and ANSC103.

Credit Only Granted for: ANSC232 or ANSC332.

Formerly: ANSC332.

ANSC237 Equine Reproductive Management (3 Credits)

Students learn the fundamental skills necessary to manage an equine breeding herd including anatomy/physiology of genital tracts, estrus detection, manipulation of the estrous cycle, semen collection, pre- and post-foaling techniques, infertility, and health and nutrition of the mare, foal and stallion. Students will be required to spend ~ 30 hours during the spring semester caring for broodmares and foals and attending at least one foaling and estrous detection checks on broodmares outside of regularly scheduled class time.

Prerequisite: ANSC232.

Credit Only Granted for: ANSC237 or INAG233.

Additional Information: Course participation will include nightly checks of mares in the two weeks prior to parturition, and out-of-class time imprinting and working with newborn foals.

ANSC242 Dairy Cattle Management (3 Credits)

All aspects of dairy production, including nutrition, reproduction, mastitis control, milking management, farmstead facilities, financial management and forage production.

Prerequisite: ANSC101 and ANSC103.

Formerly: ANSC240 and ANSC241.

ANSC245 Sheep Management (3 Credits)

Popularly known as "Lamb Watch", this course provides an immersion environment for learning and understanding pre- and post-natal care of ewes and lambs through direct, hands-on involvement in the birthing process and care of the neonate through weaning on the campus farm. Course topics include zoonoses, basic reproductive physiology of the sheep, normal and abnormal parturition, management of lambs, qualitative assessment, breeding principles, nutrition, products and their marketing, and ram management.

Prerequisite: Minimum grade of C- in ANSC101 and ANSC103.

Restriction: Must be in one of the following programs (Animal Sciences: Animal Care & Management; Animal Sciences: Equine Studies; Animal Sciences: Laboratory Animal Care; Animal Sciences: Sciences/Preprofessional; Animal Sciences: Animal Biotechnology; Agricultural and Veterinary Medicine).

Credit Only Granted for: ANSC235 or ANSC245.

ANSC246 Beef Management (3 Credits)

Provides an interactive environment for learning and understanding all areas of beef cattle management including hands-on involvement in the birthing process and care of newborn calves on the campus farm. Course topics will include: An introduction to Beef Production, Breeding and Selection, Reproduction, Nutrition, Cattle Health and Diseases, Cattle Behavior, facility design and management, and Careers working in the American Beef industry.

Prerequisite: ANSC101 and ANSC103.

Additional Information: Students will participate in night watches at the campus farm.

ANSC250 Companion Animal Care and Management (3 Credits)

Care and management of the companion small animals. Species covered include the cat, dog, rodents, lagomorphs, reptiles, amphibians, birds and others as class interest and schedule dictate. Basic description, evolutionary development, breeding, nutritional and environmental requirements, and public health aspects will be presented for each species.

Credit Only Granted for: ANSC250 and ANSC305.

Formerly: ANSC305.

ANSC255 Introduction to Aquaculture (3 Credits)

Introduces the art and science of rearing aquatic animals and the essential principles of aquaculture. Students receive hands-on training in the methods required for successful husbandry and management of aquatic animals in their water environment.

Prerequisite: ANSC101 and ANSC103; or must have completed an introductory biology course (BSCI170 and BSCI171; OR BSCI160 and BSCI161).

ANSC260 Laboratory Animal Management (3 Credits)

A comprehensive course in care and management of laboratory animals. Topics covered include regulations governing the use of animals in research, laboratory animal facility design and management, animal research models, animal health management and husbandry, responsibilities of lab animal workers and career opportunities in the field. Hands-on labs focus on lab animal handling, husbandry and common techniques. Field trips are required, and you must attend a minimum number of field trips which will be held during lab time.

Prerequisite: ANSC101 and ANSC103.

Credit Only Granted for: ANSC260 or ANSC413.

Formerly: ANSC413.

ANSC262 Poultry Management (3 Credits)

This course introduces the theory and science of poultry management and flock health, with an emphasis on basic poultry epidemiology in both commercial and backyard settings. Topics include poultry rearing, marketing of poultry meat and eggs, current industry issues, industry organization, and the fundamental biology of poultry. Students learn how management practices influence disease occurrence and spread, and apply introductory epidemiologic concepts to biosecurity, vaccination, and flock health decision-making in vertically integrated and small-scale systems. Students will examine the vertical integration of the commercial poultry industry through field trips and study backyard and small-scale poultry production, including biosecurity, housing, nutrition, and flock health management. During the semester, students will help raise flocks of broiler chickens and laying hens.

Prerequisite: ANSC101 and ANSC103.

ANSC270 Animal Enterprise Management (3 Credits)

General principles of enterprise organization, management, and operation as applicable to food, livestock, and companion animals. Enterprise planning and establishment, management of financial, human, and animal resources, and other related topics will be investigated.

Prerequisite: ANSC101 and ANSC103; or permission of instructor.

Credit Only Granted for: ANSC270 or AREC306.

ANSC282 Grazing Animal Management (3 Credits)

For students interested in acquiring knowledge and skills in pasture management, grazing management of livestock (large and small ruminants, horses), and hay production. Fundamental information regarding best management practices for soils, plants, and grazing livestock will be covered.

Prerequisite: ANSC101 and ANSC103; or permission of instructor.

Credit Only Granted for: ANSC110, ANSC282, or INAG116.

Formerly: ANSC110.

ANSC314 Comparative Animal Nutrition (3 Credits)

The fundamental role and implications of dietary preference, gastrointestinal physiology and nutrients in animal nutrition. Biochemical roles of nutrients in metabolism, digestion, absorption and assimilation as it relates to various life processes.

Prerequisite: ANSC101 and ANSC103; and (CHEM231, PLSC275 or AGST275).

ANSC315 Applied Animal Nutrition (3 Credits)

Elements of nutrition, source characteristics and adaptability of various feedstuffs to several classes of livestock. A study of the composition of feeds, nutrient requirements and computerized formulation of economic diets and rations for livestock.

Prerequisite: ANSC314.

ANSC327 Molecular and Quantitative Animal 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.

Prerequisite: ANSC101, CHEM131, and BSCI170.

ANSC330 Equine Science (3 Credits)

Students will explore key principles of equine anatomy, physiology, exercise, genetics, nutrition, and health management. Emphasis is placed on recognizing, managing, and preventing common equine disorders, providing students with the skills to address challenges faced by horse owners and farm managers. Through case studies and practical applications, students will develop a comprehensive understanding of maintaining equine well-being and optimizing performance.

Prerequisite: ANSC232; or permission of instructor.

Recommended: ANSC212 and ANSC214; or ANSC201.

Credit Only Granted for: ANSC230 or ANSC330.

Formerly: ANSC230.

ANSC340 Health Management of Animal Populations (3 Credits)

A study of common and emerging animal infectious diseases and their prevention and control. The main focus will be on diseases of livestock, poultry, and companion animals; however, zoonotic, wildlife, and laboratory animal diseases will also be discussed along with biosecurity measures.

Prerequisite: BSCI223; and (ANSC232, ANSC237, ANSC242, ANSC245, ANSC246, ANSC247, ANSC250, ANSC255, ANSC260, ANSC262, or ANSC282).

Recommended: ANSC212 or ANSC201.

ANSC359 Internship Experience in Animal and Avian Sciences (3-6 Credits)

Experiential learning is a key component in an animal science education. Through the internship program, you will have the opportunity to develop your expertise in a specific species and discipline within the animal science curriculum. You will arrange an on- or off-campus internship experience related to animal science. You will spend a specified number of hours at the internship site each week and attend biweekly classroom sessions where we will discuss how the study of animal science fits into your specific internship experience as well as understand how to achieve each of the course learning outcomes.

Prerequisite: ANSC232, ANSC237, ANSC242, ANSC245, ANSC246, ANSC247, ANSC250, ANSC255, ANSC260, ANSC262, or ANSC282.

Restriction: Must be in a major within the AGNR-Animal & Avian Sciences department; and permission of instructor.

Repeatable to: 6 credits if content differs.

Additional Information: Students are required to submit an application to the Animal Science Internship Coordinator to enroll in this course.

ANSC371 Sustainable Agriculture and Environment: Global Seminar (1 Credit)

Students will learn how developing countries are building their agricultural economies to address multiple goals including reducing poverty, improving food security, as well as decreasing impacts from climate change and decreasing greenhouse gas emissions. The historical, political and social context will be discussed, and perspectives will be provided from representatives from diverse groups including farm workers, farm owners, women, and indigenous peoples. We will discuss examples of sustainable agroecology and incentives and impediments to their implementation.

Additional Information: This course is a prerequisite and companion to an optional winter-term study abroad course, ANSC372. Together these courses provide 3 General Education credits for Scholarship in Practice (DSSP) and Diversity: Cultural Competence (DVCC), and an elective for the Sustainability Minor.

ANSC372 Sustainable Agriculture and Environment: Study Abroad (2 Credits)

A short-term study abroad course on agriculture in developing countries. Travel destination will vary from year to year among member countries with campuses of the Latin American Institute of Agroecology, and member organizations in the international farm organization, La Via Campesina. Travel will include farm visits, women's cooperatives, and cultural organizations. Students will focus on poverty reduction, food security, and climate change, and the historical, political, and social context. A research paper is required based on interviews.

Prerequisite: ANSC371.

Additional Information: This course and the prerequisite (ANSC371) together provide 3 General Education credits for Scholarship in Practice (DSSP) and Diversity: Cultural Competence (DVCC), and an elective for the Sustainability Minor.

ANSC379 Animal Science Undergraduate Teaching Assistant Seminar (2 Credits)

Seminar course for undergraduate teaching assistants within ANSC.

Prerequisite: Permission of instructor.

Repeatable to: 8 credits.

Formerly: ANSC390.

ANSC386 Experiential Learning (3-6 Credits)

Prerequisite: Permission of AGNR-Animal & Avian Sciences department.

Restriction: Junior standing or higher.

ANSC388 Honors Thesis Research (3-6 Credits)

Undergraduate honors thesis research conducted under the direction of an AGNR faculty member in partial fulfillment of the requirements of the College of AGNR Honors Program. The thesis will be defended to a faculty committee.

Restriction: Must be in the AGNR Honors program.

Repeatable to: 6 credits if content differs.

ANSC389 Experiential Learning (3-6 Credits)

Prerequisite: Permission of AGNR-Animal & Avian Sciences department.

Restriction: Junior standing or higher.

Repeatable to: 6 credits if content differs.

Formerly: ANSC386.

ANSC398 Seminar - Research (1 Credit)

Presentation and discussion of current literature and research work in animal science.

Prerequisite: ANSC101 and ANSC103.

Repeatable to: 2 credits if content differs.

ANSC399 Special Problems in Animal Science (1-2 Credits)

Work assignments are designed to be proportional to the amount of credit. Students are expected to develop an abstract, fact sheet, manuscript, oral presentation, poster, webpage, journal-log, or other scholarly product associated with their study and/or project.

Prerequisite: ANSC101 and ANSC103.

Restriction: Permission of AGNR-Animal & Avian Sciences department; and junior standing or higher.

Repeatable to: 6 credits if content differs.

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 study of the gut microbiome and its role in nutrition, metabolism, immunity, and disease prevention, with applications to farm animal health, food value, and human gastrointestinal health.

Prerequisite: 1 course from (BSCI223, ANSC201, ANSC212, ANSC327, EPIB301, BSCI222, BSCI421, NFSC430); or students who have taken courses with comparable content may contact the department.

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: ANSC232, ANSC237, ANSC242, ANSC245, ANSC246, ANSC247, 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 in animal embryology with emphasis on domestic livestock systems as applied to research and production systems. Lab will include hands-on experiments and demonstrations of techniques that are commonly used in industry and research.

Prerequisite: ANSC212 or ANSC201.

Recommended: ANSC446.

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.

Cross-listed with: VMSC436.

Restriction: Must be in a major within the AGNR-Animal & Avian Sciences department; or permission of AGNR-VA-MD Regional COL Veterinary Med.

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)

Examines zoonotic diseases of importance in the United States and worldwide, with an emphasis on those originating from farm animals as well as those transmitted by vectors such as rodents and arthropods. Topics include major foodborne and vector-borne zoonoses, principles of transmission and control, human risk factors, and surveillance methods. Students will also explore the historical and emerging significance of zoonotic diseases, approaches to vector management, alternatives to pesticide use, and relevant regulations and safety measures.

Prerequisite: 1 course from (BSCI223, ANSC201, ANSC212, ANSC327, BSCI222, BSCI421, NFSC430); or students who have taken courses with comparable content may contact the department.

ANSC444 Domestic Animal Endocrinology (3 Credits)

A comprehensive course covering the major endocrine systems in domestic animals. Topics include each of the major endocrine axes, hormonal regulation of homeostasis, growth and reproduction, molecular endocrinology and endocrine mechanisms of action.

Prerequisite: ANSC212 or ANSC201.

Restriction: Must not have completed ANSC644.

Credit Only Granted for: ANSC444 or ANSC644.

ANSC445 Comparative Gut Physiology & Diseases (3 Credits)

Explores the anatomy, histology, and physiology of the gastrointestinal (GI) system in humans and animals, including dogs, pigs, horses, cattle, and birds. Students will study how gut function supports health and development, and how it becomes disrupted in common and emerging diseases. The course also explores the gut's functions beyond the GI tract, including its roles in the gut-liver and gut-brain axes, while reviewing important research on gastrointestinal disorders. It prepares students for careers in veterinary and human medicine, industry, and scientific research.

Prerequisite: ANSC212 or ANSC201.

ANSC446 Physiology of Mammalian Reproduction (3 Credits)

Provides an in-depth examination of reproductive anatomy and physiology in domesticated livestock species, emphasizing the biological mechanisms and management strategies that influence reproductive efficiency. Students will explore the endocrine regulation of reproduction, assisted reproductive technologies, and factors affecting fertility, pregnancy, parturition, and lactation. The course integrates scientific principles with practical applications in animal agriculture, preparing students to evaluate and apply reproductive management techniques in livestock production systems.

Prerequisite: ANSC212, ANSC201 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)

Provides a comparative study of avian and mammalian physiology, with emphasis on similarities and differences across systems. Students will analyze the reproductive, digestive, renal, respiratory, circulatory, immune, endocrine, and nervous systems of birds, as well as physiological adaptations unique to avian species such as flight and migration.

Prerequisite: ANSC201 or 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 BSCI160 and (BSCI180 or 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 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 BSCI170; 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 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, ANSC201, BSCI201, or BSCI440.

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.