ANIMAL SCIENCES MAJOR

ansc-undergrad-prog@umd.edu

Program Director: Amy O. Burk, Ph.D.

The Department of Animal and Avian Sciences provides a challenging program for academically talented students interested in the application of biology and technology to the care, management and study of domestic and aquatic animals. In addition to emphasizing the traditional farm species of dairy and beef cattle, sheep, swine and poultry, our program includes options for courses in equine science, animal biotechnology, and sciences which prepare students for veterinary or graduate school. Animal sciences majors explore a wide range of subjects - from fundamental biology to animal nutrition, physiology and genetics - while integrating science and economics into animal management. Courses offered by this department may be found under the following acronym: ANSC.

Our department offers B.S., M.S., and Ph.D. degrees. Many students in our Science/Pre-Professional option choose to continue their education in a variety of professional schools, ranging from veterinary school and MS/PhD graduate programs to things like human medical school or higher education. Our graduates also pursue industry and hands-on careers, such as research technicians, animal care specialists, sales or marketing representatives, and animal producers.

Admission to the Major

The Animal Science curriculum for all options is a rigorous and science-based programs. Students receive a solid foundation in basic biological sciences and ANSC courses are largely taught on a comparative basis, where students can then apply the knowledge they gain to a variety of species and situations.

Program Objectives

The Department of Animal and Avian Sciences was formed in 1997 through the merger of the Animal Science, Dairy Science and Poultry Science Departments. Animal science is the study of domesticated animals used for food, fiber, work, biomedical research, and leisure. Our department fulfills a tripartite mission of research, teaching, and extension.

Program Learning Outcomes

Graduates of the ANSC undergraduate program will be able to:

1. Animal husbandry requirements- Graduates of the ANSC undergraduate program will be able to apply animal science knowledge and research to the creation of rational, feasible, and legal animal management programs that take into consideration appropriate nutrition, husbandry, health, reproduction, and welfare considerations.
2. Safely handle animals- Graduates of the ANSC undergraduate program will be able to safely approach, restrain, and move horses, sheep, dairy cows, pigs, chickens and other species specific to their curricula.
3. Animal Science literacy- Graduates of the ANSC undergraduate program will be able to select, understand, and critically evaluate scientific studies in animal sciences disciplines such that they employ research that is applicable, timely, accurate, and useful for their animal care and management needs.
4. Knowledge of major issues in ANSC- Graduates of the animal sciences program will be well-versed in the issues related to animal agriculture such that they contribute to societal debates around the future of farming, the use of antibiotics in animal agriculture, sustainability of our animal farms, animal welfare, farm worker needs, and scaling agricultural enterprises up and down to meet our growing population's protein needs.
5. Careers and opportunities in ANSC- Graduates of the ANSC undergraduate program will be able to describe at least five career options available to them with the knowledge, skills, and experience they receive as undergraduates and identify specific job opportunities that match their abilities, experience, and interests.
6. Animal structure and function- Graduates of the ANSC undergraduate program will be able to correctly apply their knowledge of anatomy and physiology of domestic animals to explain normal homeostatic functioning of program-specific domestic species at the organismal, tissue, cellular, and molecular levels. Students will be able to adapt that knowledge to address abnormalities in at least one body system.
7. Communication- Graduates of the ANSC program will be able to communicate effectively with the public, producers, and the scientific community through oral, written, and visual means in print and on-line.

REQUIREMENTS

Animal Sciences prepares students for veterinary school, graduate school, and careers in research, sales and marketing, biotechnology, aquaculture, and animal production. The curricula apply the principles of biology and technology to the care, management, and study of dairy and beef cattle, horses, fish, sheep, swine, and poultry. Students complete the Animal Sciences core courses and choose between two broad tracks: Animal Care and Management, for students interested in going directly into a career, or Sciences/Professional Option to prepare for admission to graduate, veterinary, pharmacy, nursing or medical school. Students can customize their program based on their area of interest (emphasis area (https://ansc.umd.edu/undergraduate/prospective-students/)) by selecting courses from that area to fulfill major requirements.

Students pursuing the major should review the academic benchmarks established for this program. See http://4yearplans.umd.edu or visit the ANSC Program Requirements (https://ansc.umd.edu/undergraduate/current-students/academics-advising/) website. Students will be periodically reviewed to ensure they are meeting benchmarks and progressing to the degree. Students who fall behind program benchmarks are subject to special advising requirements and other interventions.

Please note: there is a $50 per course fee for Animal Science Laboratory courses.

All undergraduates majoring in Animal Sciences must complete the following course requirements:

Course	Title	Credits
Animal Sciences Core		
ANSC101 & ANSC103	Principles of Animal Science and Principles of Animal Science Laboratory	4
ANSC201	Anatomy and Physiology of Domestic Animals (Anatomy and Physiology of Domestic Animals)	4
ANSC314	Comparative Animal Nutrition	3
ANSC315	Applied Animal Nutrition	3

ANSC401	Animal Growth and Development for Production Agriculture	3
BSCI160 & BSCI161	Principles of Ecology and Evolution and Principles of Ecology and Evolution Lab	4
BSCI170 & BSCI171	Principles of Molecular & Cellular Biology and Principles of Molecular & Cellular Biology Laboratory	4
BSCI223	General Microbiology	4
CHEM131 & CHEM132	Chemistry I - Fundamentals of General Chemistry and General Chemistry I Laboratory	4
AREC250	Elements of Agricultural and Resource Economics	3-4
or AREC240	Introduction to Economics and the Environment	
or ECON200	Principles of Microeconomics	
BIOM301	Introduction to Biometrics	3
Select one of the following specializations:		**31-36**
Animal Care and Management		
Sciences & Combined AG and Vet Sci		
Total Credits		**70-76**

Specializations:

Animal Care and Management

Course	Title	Credits
Required Courses		
ANSC327	Molecular and Quantitative Animal Genetics	3
or ANSC450	Animal Breeding Plans	
ANSC446 & ANSC447	Physiology of Mammalian Reproduction and Physiology of Mammalian Reproduction Laboratory	4
AREC306	Farm Management and Sustainable Food Production	3
or ANSC270	Animal Enterprise Management	
or INAG204	Agricultural Business Management	
CHEM231	Organic Chemistry I	3
or PLSC275		
or AGST275	Fundamentals of Agricultural and Environmental Chemistry	
ANSC359	Internship Experience in Animal and Avian Sciences	3-6
Advanced ANSC Electives		
Select 9 credits of the following:		9
ANSC330	Equine Science	
ANSC340	Health Management of Animal Populations	
ANSC410	The Gut Microbiome and its Roles in Health and Disease	
ANSC417	Regulatory Issues in Animal Care and Management	
ANSC435	Experimental Embryology	
ANSC437	Animal Biotechnology	
ANSC440	Zoonotic Diseases and Control	
ANSC443	Physiology of Lactation	
ANSC444	Domestic Animal Endocrinology	
ANSC450	Animal Breeding Plans	
ANSC452	Avian Physiology	
ANSC453	Animal Welfare and Bioethics	
ANSC455	Applied Animal Behavior	
ANSC460	Comparative Vertebrate Immunology	
ANSC497	Animal Biotechnology Recombinant DNA Laboratory	
Management Courses		
Select 9 credits of the following:		9
ANSC220	Livestock Management	
ANSC232	Horse Management	
ANSC237	Equine Reproductive Management	
ANSC242	Dairy Cattle Management	
ANSC245	Sheep Management	
ANSC246	Beef Management	
ANSC250	Companion Animal Care and Management	
ANSC255	Introduction to Aquaculture	
ANSC260	Laboratory Animal Management	
ANSC262	Commercial Poultry Management	
ANSC282	Grazing Animal Management	
Total Credits		**34-37**

Science/Professional & Combined Ag-Veterinary Medicine

Course	Title	Credits
Required Courses		
ANSC327	Molecular and Quantitative Animal Genetics	3
BCHM463	Biochemistry of Physiology	3-4
or BSCI330	Cell Biology and Physiology	
CHEM231 & CHEM232	Organic Chemistry I and Organic Chemistry Laboratory I	4
CHEM241 & CHEM242	Organic Chemistry II and Organic Chemistry Laboratory II	4
CHEM271 & CHEM272	General Chemistry and Energetics and General Bioanalytical Chemistry Laboratory	4
PHYS121	Fundamentals of Physics I	4
or PHYS131	Fundamentals of Physics for Life Sciences I	
PHYS122	Fundamentals of Physics II	4
or PHYS132	Fundamentals of Physics for Life Sciences II	
Advanced ANSC Electives		
Select 9 credits of the following:		9
ANSC330	Equine Science	
ANSC340	Health Management of Animal Populations	
ANSC359	Internship Experience in Animal and Avian Sciences	
ANSC410	The Gut Microbiome and its Roles in Health and Disease	
ANSC417	Regulatory Issues in Animal Care and Management	
ANSC435	Experimental Embryology	
ANSC437	Animal Biotechnology	
ANSC440	Zoonotic Diseases and Control	
ANSC443	Physiology of Lactation	
ANSC444	Domestic Animal Endocrinology	
ANSC446	Physiology of Mammalian Reproduction	

ANSC447	Physiology of Mammalian Reproduction Laboratory	
ANSC450	Animal Breeding Plans	
ANSC452	Avian Physiology	
ANSC453	Animal Welfare and Bioethics	
ANSC455	Applied Animal Behavior	
ANSC460	Comparative Vertebrate Immunology	
ANSC497	Animal Biotechnology Recombinant DNA Laboratory	
Management Courses		
Select 3 credits of the following:		3
ANSC220	Livestock Management	
ANSC232	Horse Management	
ANSC237	Equine Reproductive Management	
ANSC242	Dairy Cattle Management	
ANSC245	Sheep Management	
ANSC246	Beef Management	
ANSC250	Companion Animal Care and Management	
ANSC255	Introduction to Aquaculture	
ANSC260	Laboratory Animal Management	
ANSC262	Commercial Poultry Management	
ANSC282	Grazing Animal Management	
Total Credits		**38-39**

**A complete listing of all currently approved Management and Advanced ANSC Elective courses is available from our* ANSC Course Listing *(*https://ansc.umd.edu/undergraduate/current-students/academics-advising/courses/*) page.*

Other Requirements for the Major

Animal sciences majors select one of two options to guide their coursework. Program requirements (https://ansc.umd.edu/undergraduate/program-overview/) for all options are available on our website, along with a list of all ANSC courses (https://ansc.umd.edu/undergraduate/current-students/courses/) and when they are offered.

Animal Care & Management (0104A) - Is designed for students whose career plans include animal management, production and the marketing of animal products. The curriculum provides basic courses in genetics, nutrition, physiology and reproduction while allowing students to focus on the management of one particular livestock species. You are required to supplement academic work with practical experience by completing an internship. Dairy science students, for example, intern at local farms where they participate in decisions about breeding, feeding, health practices, milk production and other aspects of herd management. This option will prepare you for ownership or management positions with dairy, livestock or poultry production enterprises; positions with marketing and processing organizations; breed associations; and positions in agribusiness fields such as sales of feed, pharmaceutical products and agricultural equipment. Graduates also work with state and federal agencies.

Science/Professional (0104E) - Prepares students for admission to veterinary, medical, and/or graduate school. Graduate study can open the door to an exciting research career in specialty areas of animal or biological sciences such as genetics, nutrition, physiology or cell biology. The curriculum emphasizes advanced courses in the biological and physical sciences and includes all the pre-veterinary and pre-medicine requirements.

Combined Ag & Vet Sci (1299D) - A combined degree program available to students who gain admission to veterinary school prior to completing their bachelor's degree. College of Agriculture and Natural Resources students who have completed at least ninety hours, including all college and university requirements, are awarded a bachelor of science degree upon successful completion of at least thirty semester hours at any accredited veterinary college. Early planning with your advisor is encouraged if you choose this option.

Minimum Grade Policy:

ANSC has a minimum grade policy which states that **ANSC students must earn a "C-" or better in all major required courses, including ANSC courses and required supporting courses in other departments.** Students must also have both a cumulative GPA of at least a 2.0 and a 2.0 cumulative GPA in all major requirements in order to graduate. More information on this policy is available on the ANSC Minimum Grade Policy (https://ansc.umd.edu/undergraduate/current-students/academics-advising/#policies) page.

GRADUATION PLANS

Click here (https://agnr.umd.edu/academics/advising/four-year-plans/) for roadmaps for graduation plans in the College of Agricultural and Natural Resources.

Additional information on developing a graduation plan can be found on the following pages:

- http://4yearplans.umd.edu
- the Student Academic Success-Degree Completion Policy (https://academiccatalog.umd.edu/undergraduate/registration-academic-requirements-regulations/academic-advising/#success) section of this catalog