

# Animal Science (ANSC)

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Department of Animal Science Website (<http://animal-science.uark.edu/>)

## Degrees Conferred:

M.S., Ph.D. (ANSCMS, ANSCPH)

**Areas of Study:** Graduate studies in subject matter areas of genetics, nutrition, parasitology, meats and physiology may be pursued. Beef cattle, swine, sheep, and laboratory animals are available for research programs in the Animal Science Department.

**Primary Areas of Faculty Research:** Animal nutrition; animal physiology; animal breeding (genetics); meat science (muscle biology); parasitology.

## M.S. in Animal Science

**Prerequisites to Degree Programs:** The student pursuing a program for a Master of Science degree must meet all general requirements of the Graduate School. In addition, the student must have completed the B.S. degree, preferably in a college or university with a major or equivalent in one of the areas of the Animal Science Department. Applicants must submit three letters of recommendation. All applicants must submit scores on the Graduate Record Examinations.

**Requirements for the Master of Science Degree:** (Minimum 30 hours.)

**Thesis Option.** The thesis option requires a minimum of 24 hours of graduate course work, plus six hours of thesis research credit. The student and adviser will prepare a program of work that may include additional undergraduate basic courses and at least 24 semester hours of studies plus the successful completion and defense of a thesis and submission of one research paper suitable for submission to a peer reviewed professional journal. The defense of the thesis will consist of an oral defense administered by the graduate adviser and the thesis committee. Any deficiencies in undergraduate major requirements or prerequisites for advanced courses may be included in the student's program in addition to the 24 hours.

**Non-thesis Option.** The non-thesis option requires the completion of the plan of study outlined below, and successful performance on a final exam, but does not require the preparation of a thesis.

## Requirements for application and admission to the non-thesis option:

- Applicants must meet the admission requirements of the University of Arkansas Graduate School. All applicants must submit scores on the GRE.
- An undergraduate B.S. degree in Animal Science or a closely related field of study, OR

- B.S. degree in another field with strong emphasis in the area of biological sciences (deficiency courses in addition to the prescribed 30 hour plan of study may be required).
- B.S. applicants without a strong background in biological sciences may be considered for admission to the program, but will be required to complete deficiency courses, as determined by the graduate admissions committee, in addition to the prescribed 30 hour plan of study.

Students must be accepted by a graduate adviser to begin the non-thesis program. The graduate adviser and the student's graduate committee will administer the non-thesis program. Degree requirements will be completed when the student has satisfactorily completed course work that meets the requirement for the non-thesis degree as listed below, and has satisfactorily completed a final exam. Students must have a final GPA # 2.85 to graduate from the program.

**Non-Thesis M.S. Program Requirement:** 30 hours minimum

**Core Courses: 18-19 hours**

### Basic Program Core: 4 Hours

ANSC 5901	Seminar	1
AGST 5023	Principles of Experimentation	3
STAT 5003 & STAT 5001L	Statistical Methods and Statistics Methods Laboratory	4
ESRM 5393	Statistics in Education and Health Professions	3
ESRM 6403	Educational Statistics and Data Processing	3

OR, any graduate level statistics course approved by the advisory committee.

### Animal Science Core Courses: 8-9 Hours

#### Genetics: 3 hours

ANSC 5123 Advanced Animal Genetics

#### Nutrition: 3 hours

Any 5000 level or higher nutrition class in ANSC

#### Physiology: 2-3 Hours

ANSC 5923	Brain & Behavior
ANSC 5932	Cardiovascular Physiology of Domestic Animals
ANSC 5943	Endocrine Physiology of Domestic Animals
ANSC 5952	Respiratory Physiology of Domestic Animals
ANSC 5962	Gastrointestinal/Digestive Physiology of Domestic Animals
ANSC 5972	Renal Physiology
ANSC 6833	Reproduction in Domestic Animals

### ANSC Electives: 9 Hours

Any graduate-level course in ANSC

### General Electives: 9 Hours

CHEM 3813	Elements of Biochemistry	3
(Note: Graduate School approval is required.)		
GRSD 5003	The Professoriate: Teaching, Learning and Assessment	3

Any 5000 or 6000 level course in departments within AFSL or in BIOL, CHEM, ESRM, or STAT

Or any graduate-level course approved by the graduate advisory committee.

### Other program requirements

No more than two credit hours of seminar can be included in the 30 credit hour total.

At least 15 credits of ANSC courses must be at the 5000 level or above.

Non-thesis programs may include no more than three (3) hours of special problems in the minimum 30-credit hour requirement.

No more than six (6) hours of 4000-level graduate courses may be counted toward the 30-credit hour requirement.

Students are expected to meet with the graduate mentor at least once per semester.

Students are required to complete the annual graduate student progress report.

**Transition Between M.S. Programs:** A student can transition from the non-thesis to a thesis program with the approval of the graduate adviser and the department head. A student desiring to transition from the thesis to the non-thesis program must have the approval of the graduate adviser, the M.S. thesis committee, the department head, and the graduate dean. In addition, no credit will be granted for thesis hours, and a maximum of six hours of course work completed at the time of transition can be counted in the non-thesis degree program. Students in the non-thesis option are not eligible for departmental assistantships.

Students should also be aware of Graduate School requirements with regard to master's degrees (<http://catalog.uark.edu/graduatecatalog/degree requirements/#mastersdegreestext>).

## Ph.D. in Animal Science

**Prerequisites to Degree Program:** For acceptance into a course of study leading to the Ph.D. degree, a grade-point average of 3.00 on all previous graduate work and three letters of recommendation are required. All applicants must submit scores on the Graduate Record Examinations. Students accepted into the Ph.D. program without a M.S. must have a 3.20 cumulative grade-point average on all undergraduate work. The student will have a minimum of 24 hours post-baccalaureate work and 18 hours of dissertation at the end of the program.

**Requirements for the Doctor of Philosophy Degree:** In addition to the general requirements of the Graduate School, the requirements will consist of a program of research, appropriate course work and seminars as specified by the student's graduate committee, as well as a dissertation and two research papers acceptable to the dissertation committee.

Students should also be aware of Graduate School requirements with regard to doctoral degrees (<http://catalog.uark.edu/graduatecatalog/degree requirements/#phdandedddegrestext>).

## Graduate Faculty

**Coffey, Ken**, Ph.D. (University of Missouri-Columbia), M.S. (University of Kentucky), B.S. (University of Tennessee), Professor, 1996, 2003.

**Gadberry, M. Shane**, Ph.D., M.S., B.S. (University of Arkansas), Professor, 2006, 2019.

**Huang, Yan**, Ph.D. (University of Wyoming), M.S. (Dankook University), B.S. (China Agricultural University), Assistant Professor, 2015.

**Jennings, John A.**, Ph.D. (University of Missouri), M.S. (University of Arkansas), B.S. (Southwest Missouri State University), Professor, 1998.

**Kegley, Beth**, Ph.D., M.S. (North Carolina State University), B.S. (Virginia Polytech Institute and State University), Professor, 1996, 2007.

**Kutz, Bryan Richard**, M.S. (Western Kentucky University), B.S. (Oklahoma State University), A.S. (Northern Oklahoma College), Instructor, 1997.

**Littlejohn, Brittni P.**, Ph.D. (Texas A&M University), Assistant Professor, 2019.

**Looney, Charles R.**, Ph.D. (Louisiana State University), Professor, 2019.  
**Looper, Michael L.**, Ph.D. (Oklahoma State University), M.S., B.S. (University of Arkansas), Professor, 2011.

**Maxwell, Charles**, Ph.D. (University of Wisconsin-Madison), M.S., B.S. (University of Georgia), Professor, 1996.

**Philipp, Dirk**, Ph.D. (Texas Tech University), M.S., B.S. (University of Leizig, Germany), Associate Professor, 2007, 2015.

**Pohlman, Fred W.**, Ph.D. (Kansas State University), M.S. (University of Tennessee), B.S. (University of Missouri-Columbia), Professor, 1997, 2009.

**Powell, Jeremy G.**, Ph.D. (University of Arkansas), D.V.M. (Oklahoma State University), B.S. (University of Arkansas), Professor, 2009, 2013.

**Rivera, Daniel J.**, Ph.D. (New Mexico State University), M.S. (West Texas A&M University), Associate Professor, 2021.

**Rorie, Rick**, Ph.D. (Louisiana State University), M.S., B.S. (University of Arkansas), Professor, 1989, 2003.

**Rumley, Elizabeth R.**, LL.M. (University of Arkansas), J.D. (University of Toledo), B.A. (Michigan State University), Instructor, 2012.

**Russell, Mark**, Ed.D. (Texas Tech University), M.S., B.S. (Colorado State University), Assistant Professor, 2010.

**Thomas, Lauren**, D.V.M. (Oklahoma State University), B.S. (University of Arkansas), Teaching Assistant Professor, 2016.

**Vierck, Kelly**, Ph.D. (Texas Tech University), M.S. (Kansas State University), B.S. (Oklahoma State University), Assistant Professor, 2020.

**Ward, Heidi**, Ph.D. (University of Oklahoma), D.V.M. (Oklahoma State University), B.S. (University of Oklahoma), Assistant Professor, 2015.

**Yazwinski, Tom**, Ph.D. (North Carolina State University), M.S. (University of Maine), B.S. (University of Vermont), University Professor, 1977, 2004.

**Zhao, Jiangchao**, Ph.D. (University of Wisconsin-Madison), M.S., B.S. (China Agricultural University), Associate Professor, 2015, 2019.

## Courses

### ANSC 500V. Special Problems. 1-6 Hour.

Work in special problems of animal industry. (Typically offered: Fall, Spring and Summer) May be repeated for up to 6 hours of degree credit.

### ANSC 5013. Domestic Animal Energetics. 3 Hours.

Physical, physiological and biochemical aspects of energy metabolism of domestic animals and their applications to livestock production. Lecture 3 hours per week. Prerequisite: Graduate standing. (Typically offered: Spring Odd Years)

### ANSC 5023. Legal Issues in Animal Agriculture. 3 Hours.

An issues-oriented course focusing on the legal issues involved in the production of poultry, swine and livestock. Emphasis will center on the laws, regulations and policy arguments involved in animal confinement, antibiotic use, humane slaughter and veterinary medicine, along with other related issues. The wide range of regulation- from local to state to federal, depending on the issue- will be studied and discussed. Graduate degree credit will not be given for both ANSC 4123 and ANSC 5023. (Typically offered: Spring Odd Years)

### ANSC 5052. Cow-Calf Management. 2 Hours.

Systems of cow-calf management including the practical application of the principles of breeding, feeding, and management to commercial and purebred beef cattle under Arkansas conditions. Graduate degree credit will not be given for both ANSC 4252 and ANSC 5052. (Typically offered: Fall)

### ANSC 510V. Special Topics in Animal Sciences. 1-4 Hour.

Topics not covered in other courses or a more intensive study of specific topics in animal sciences. Prerequisite: Graduate standing. (Typically offered: Irregular) May be repeated for degree credit.

**ANSC 5123. Advanced Animal Genetics. 3 Hours.**

Specialized study of animal genetics. Lecture 3 hours per week. Prerequisite: ANSC 3123. (Typically offered: Fall Even Years)  
This course is cross-listed with POSC 5123.

**ANSC 5143. Biochemical Nutrition. 3 Hours.**

Interrelationship of nutrition and physiological chemistry; structure and metabolism of physiological significant carbohydrates, lipids, and proteins; integration of metabolism with provision of tissue fuels; specie differences in regulatory control of tissue and whole body metabolism of nutrients. Prerequisite: CHEM 3813. (Typically offered: Fall Even Years)  
This course is cross-listed with POSC 5143.

**ANSC 5152. Protein and Amino Acid Nutrition. 2 Hours.**

Students will be introduced to the basic processes of protein digestion, amino acid absorption, transport, metabolism, and utilization along with how biochemical function of proteins and their dynamic state affect nutritional status for animals and man. Prerequisite: CHEM 3813. (Typically offered: Spring Even Years)  
This course is cross-listed with POSC 5152.

**ANSC 5163. Companion Animal Nutrition. 3 Hours.**

This course is designed to focus on the digestive anatomy, physiology, and nutrient metabolism of non-herbivorous companion animals, primarily dogs and cats. Topics discussed will also include an overview of the pet food industry, its regulations and commonly utilized ingredients. Students will gain a deeper understanding of nutrition as it relates to life stages and various disease states that can affect both dogs and cats. This course will require a Saturday trip to one or two off campus facilities. Prerequisite: ANSC 3143 or POSC 4343. (Typically offered: Spring)  
This course is cross-listed with POSC 5163.

**ANSC 5262. Swine Production. 2 Hours.**

Methods in producing purebred and commercial swine with specific emphasis on the management programs needed for profitable pork production in Arkansas. Graduate degree credit will not be given for both ANSC 4262 and ANSC 5262. (Typically offered: Fall Even Years)

**ANSC 5272. Sheep Production. 2 Hours.**

Purebred and commercial sheep management emphasizing the programs of major importance in lamb and wool production in Arkansas. Graduate degree credit will not be given for both ANSC 4272 and ANSC 5272. (Typically offered: Spring)

**ANSC 5283. Horse Production. 3 Hours.**

Production, use and care of horses and ponies including breeding, feeding, handling, and management. Lecture 2 hours, laboratory 3 hours per week. Graduate degree credit will not be given for both ANSC 4282 and ANSC 5283. Corequisite: Lab component. (Typically offered: Spring)

**ANSC 5452. Milk Production. 2 Hours.**

Principles of breeding, feeding, and management of dairy cattle will be studied. Graduate degree credit will not be given for both ANSC 4452 and ANSC 5452. (Typically offered: Fall Odd Years)

**ANSC 5482. Companion Animal Management. 2 Hours.**

The study and application of principles of domestication, nutrition, reproduction, parasitology, diseases, behavior, and husbandry management to companion animals. Dogs, cats, and exotic animals will be the species of primary interest. Practical problems of care and management of these species will be solved. Graduate degree credit will not be given for both ANSC 4482 and ANSC 5482. Prerequisite: BIOL 1543 or equivalent or consent of instructor. (Typically offered: Spring)

**ANSC 5553. Forage-Ruminant Relations. 3 Hours.**

Advanced chemical, physical, and botanical characteristics of forage plants, the dynamics of grazing, intake and digestion, and techniques of measuring forage utilization and systems analysis at the plant-animal interface. Lecture 3 hours per week. CSES 1203 recommended. Corequisite: Lab component. Prerequisite: ANSC 3143. (Typically offered: Fall Even Years)

**ANSC 5613. Muscle Growth and Development. 3 Hours.**

This is a graduate level course offering detailed insights into skeletal muscle morphological, physiological, cellular and molecular factors affecting muscle structure and function, with special emphasis on cellular and molecular regulation of muscle growth and development, such as myo-, fibro-, and adipo-genesis. And the relationship between the properties of skeletal muscle and meat quality. Graduate students will focus on the scientific reading, problem solving, and generating research ideas. ANSC 3033, CHEM 3813 or ANSC 5143 or an equivalent course are recommended as a prerequisite. (Typically offered: Fall)  
This course is cross-listed with POSC 5613.

**ANSC 5652. Stocker-Feedlot Cattle Management. 2 Hours.**

Production and management systems for stocker and feed-lot cattle including practical applications of forage systems, feeding, health management and economics of production of these livestock. Graduate degree credit will not be given for both ANSC 4652 and ANSC 5652. (Typically offered: Fall)

**ANSC 5662. Comparative Studies in Panamanian and US Agricultural Practices. 2 Hours.**

An experiential-learning course with an embedded trip to Panama designed to give students an overview of the agricultural industry and the impact of Panamanian history, culture and geography on agriculture and how this contrasts with practices in the US. Students will participate in a study tour to Panama where they will engage in learning experiences that explore the agriculture, history, and culture of this country. They will have the opportunity to visit and learn from successful producers of livestock and agricultural staples as well as tour the Panama canal and learn about Panamanian culture and history. Prerequisite: Instructor consent and approval from Study Abroad office. (Typically offered: Spring)

**ANSC 5743L. Advanced Analytical Methods in Animal Sciences Laboratory. 3 Hours.**

Introduction into theory and application of current advanced analytical techniques used in animal research. Two 3-hour laboratory periods per week. (Typically offered: Fall)  
This course is cross-listed with POSC 5743L.

**ANSC 5853. Advanced Meats Technology. 3 Hours.**

An intensive study of processed meats, relating the science, technology, and quality of further processed meat and poultry products. Product development, sensory and chemical analysis, microbiology, nutritional aspects, and product labeling are covered. Prerequisite: POSC 4314 or ANSC 3613. (Typically offered: Spring Even Years)

**ANSC 5901. Seminar. 1 Hour.**

Critical review of the current scientific literature pertaining to the field of animal science. Oral reports. Lecture 1 hour per week. Prerequisite: Senior standing. (Typically offered: Fall)

**ANSC 5923. Brain & Behavior. 3 Hours.**

Covers cellular through neural systems, major brain functions and comparative neuroanatomy. Topics include ion channels, membrane and action potentials, synaptic integration, neurotransmitters, major brain regions of mammals and birds, sensory systems and the autonomic nervous systems, neuroendocrine system, and control by the brain of critical functions and behavior. Lecture 3 hours per week. Prerequisite: (ANSC 3033 or POSC 3033) or PSYC 2003 or BIOL 2213 or BIOL 2443 or BIOL 2533. (Typically offered: Fall)  
This course is cross-listed with POSC 5923.

**ANSC 5932. Cardiovascular Physiology of Domestic Animals. 2 Hours.**

Cardiovascular physiology, including mechanisms of heart function and excitation, and blood vessel mechanisms associated with the circulatory system in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC 3033 or ANSC 3033. (Typically offered: Fall)  
This course is cross-listed with POSC 5932.

**ANSC 5943. Endocrine Physiology of Domestic Animals. 3 Hours.**

Endocrine physiology, including mechanisms of hormone secretion, function, and regulation. Mechanisms associated with the endocrine system will be discussed for domestic animals and poultry. Prerequisite: POSC 3033 or ANSC 3033. Pre- or Corequisite: CHEM 3813. (Typically offered: Spring Even Years)

**ANSC 5952. Respiratory Physiology of Domestic Animals. 2 Hours.**

Respiratory physiology, including mechanisms of lung function and gas exchange. Mechanisms associated with the interaction of the respiratory system with other bodily systems in domestic animals and poultry will be discussed. Lecture 3 hours; drill 1 hour per week for first 8 weeks of semester. Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC 3033 or ANSC 3033. (Typically offered: Spring)

This course is cross-listed with POSC 5952.

**ANSC 5962. Gastrointestinal/Digestive Physiology of Domestic Animals. 2 Hours.**

Gastrointestinal and hepatic physiology, including mechanisms of digestion, absorption of nutrients with emphasis on cellular control mechanisms in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC 3033 or ANSC 3033. (Typically offered: Fall)

This course is cross-listed with POSC 5962.

**ANSC 5972. Renal Physiology. 2 Hours.**

Renal physiology, including mechanisms of renal clearance with emphasis on cellular control mechanisms in domestic animals and poultry. Lecture 3 hours; drill 1 hour per week (for second 8 weeks of semester). Pre- or Corequisite: CHEM 3813. Corequisite: Drill component. Prerequisite: POSC 3033 or ANSC 3033. (Typically offered: Spring)

**ANSC 600V. Master's Thesis. 1-6 Hour.**

Master's Thesis. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.

**ANSC 6143. Minerals in Animal Nutrition. 3 Hours.**

Mineral nutrients, their sources and functions, as related to nutrition of domestic animals. Lecture 3 hours per week. Prerequisite: ANSC 3143 or POSC 4343. (Typically offered: Fall; Spring Even Years)

**ANSC 6243. Ruminant Nutrition. 3 Hours.**

Anatomy and physiology of the rumen. The nutrient requirements of microbial organisms and the relation of microbial digestion in the rumen to the nutrition of cattle, sheep and other ruminants. Lecture 3 hours per week. Prerequisite: Graduate standing. (Typically offered: Fall Odd Years)

**ANSC 6343. Vitamin Nutrition and Metabolism. 3 Hours.**

The vitamins required for humans and domestic animals for a healthy life with emphasis on absorption, transport, metabolism, biopotency, mechanism of action, tissue retention and turnover. Prerequisite: CHEM 3813. (Typically offered: Fall Odd Years)

This course is cross-listed with FDSC 6343, POSC 6343.

**ANSC 6833. Reproduction in Domestic Animals. 3 Hours.**

Comprehensive review of current theory of reproductive function in domestic animals. Lecture 3 hours per week. Prerequisite: ANSC 3433. (Typically offered: Spring Even Years)

**ANSC 700V. Doctoral Dissertation. 1-18 Hour.**

Doctoral Dissertation. Prerequisite: Graduate standing. (Typically offered: Fall, Spring and Summer) May be repeated for degree credit.