



Animal Science Program Student Handbook

Last Updated February 2024

Mission Statement:

The Animal Science Program provides instruction at the graduate level in the animal sciences in a comprehensive program delivering quality advanced instruction in Animal Nutrition, Reproductive Physiology, Animal Selection and Breeding, Meat Science, and Animal Production.

Visit the [Animal Science program webpage](#) to learn more.

Universities Participating:

- Clemson University
- North Carolina State University
- North Dakota State University
- Oklahoma State University
- South Dakota State University*
- University of Georgia

**offers a graduate certificate in Animal Science. All other partners offer coursework.*

Student Learning Objectives:

Upon successful completion of the courses in the Animal Science Program, students will have met the following learning outcomes.

- Demonstration of a comprehensive knowledge at the graduate level of all basic disciplinary aspects of animal science including nutrition, reproductive physiology, animal selection and breeding, and meat science.
- Identification of the relationship of their selected area of emphasis with production and care of farm animals.
- Define issues and problems, retrieve scientific literature, apply relevant scientific principles, synthesize information, apply higher order thinking skills, and utilize effective communication skills relative to animal science.



Description of the Animal Science Degree Program:

Each institution defines degree program requirements differently. The base graduate Certificate in Animal Science consists of four required courses (12 credit hours total). Substitutions can be approved at each local participating university. The program requirement of the base graduate Certificate in Animal Science is as follows:

1. Advanced Animal Nutrition Course: (one of the following)
 - a. Applied Ruminant Nutrition
 - b. Advanced Non-Ruminant Nutrition
 - c. Advanced Equine Nutrition
2. Advanced Reproductive Physiology of Farm Animals
3. Advanced Growth, Development and Selection of Domestic Animals: (one of the following)
 - a. Animal Growth and Development
 - b. Selection of Domestic Animals
4. Advanced Animal Production Science: (one of the following)
 - a. Advanced Beef Production
 - b. Advanced Meat Science

Courses Offered and Course Descriptions:

See when courses are offered using our interactive [Course Planner](#).

Advanced Beef Production (3 credits)

Principles of farm and ranch land acquisition and management, along with: breeding, nutrition, reproduction, health and disease prevention, life cycle management of the calf crop, as well as marketing alternatives for the producer. Retained ownership of the calf crop past weaning through the stocker and/or feedlot phase is covered and evaluated financially. New and emerging technologies are also discussed.

Advanced Equine Nutrition (3 credits)

This course explores concepts in equine nutrition including digestive physiology of horses, nutrient requirements for different classes of horses and feed management. Ration evaluation and balancing, as well as problem solving will be a core component to this course.

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Advanced Non-Ruminant Nutrition (3 credits)

Digestion, absorption, utilization and metabolism of macro and micro nutrients, and nutrient interrelationship in poultry, swine, and other non-ruminant species.



Applied Ruminant Nutrition (3 credits)

Digestive physiology of the ruminant animal with an emphasis on the mechanisms of rumen fermentation and postruminal nutritional biochemistry relating these processes to the utilization of proteins, lipids, and fibrous and nonfibrous feed ingredients. New developments in feeding systems, feed additives, and the prevention and treatment of metabolic disorders will be presented. Prerequisite: Animal Nutrition course and background knowledge of Ruminant Animal Management.

Animal Growth and Development (3 credits)

Introduction to the basic concepts of growth with emphasis on domestic mammals. Growth of the major classes of animal tissues and regulation by endogenous and exogenous factors. Relationship to efficiency of animal production.

Evaluation & Use of Breeds in Livestock (3 credits)

Evaluation of breeds of cattle, sheep, and swine with emphasis on breed comparison research and breed history. Examination of appropriate use of existing breed resources and development of new breeds.

Meat Science (3 credits)

Physiology, anatomy, and biochemistry of tissue growth; muscle protein and lipid organization, structure, and function; techniques used to measure muscle composition; and antemortem and postmortem factors affecting meat quality and palatability in meat animals.

Reproductive Physiology of Farm Animals (3 credits)

Physiological, endocrine, cellular, and molecular mechanisms regulating mammalian reproduction, including the examination of current reproductive biotechnologies and ethical issues associated with the application of reproductive biotechnologies.

Selection of Domestic Animals (3 credits)

Quantitative and population genetic theory of sound breeding programs for domestic animals including, variation, heredity, selection, estimation of breeding values, systems of mating, and performance testing.

Academic Advisor:

A faculty member at your home institution will serve as your academic advisor when enrolling in courses in the Animal Science program and when pursuing the Certificate in Animal Science. The academic advisor will assist students in understanding the course material covered in each course and selecting the correct course in accordance with the student's interest.

Where to Turn for Assistance:

In addition to faculty involved in the animal science program, the [campus coordinators](#) can assist students navigating through Great Plains IDEA/AG IDEA information and provide assistance. Generally, the campus coordinator serves as a first point of reference for general questions and information regarding the following:

- Enrollment processes
- General policy information at the home institution
- Information about the Great Plains IDEA/AG IDEA policies and procedures
- Assistance in the student learning management system at their local institution
- Identification of individuals at other institutions who can be of assistance when questions arise
- Any other general questions

