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### Animal Science

The Animal Science program is a part of the School of Agricultural Sciences. SIU Carbondale's nationally known animal science faculty is dedicated to teaching and to student development. Animal Science teachers at SIU Carbondale represent the range of topics in animal agriculture. There are specialists in animal genetics, reproductive physiology, nutrition and management for each of the species, international food programs, and veterinary medicine. The animal science teachers bring their exciting experience with them into every class they teach. The combination of the visionary and the practical makes a strong and vital faculty for students who want the best professional education they can get.

The program offers three specializations leading to a B.S. degree: production, equine science, and science and pre-veterinary. The latter allows qualified students to transfer to accredited colleges of veterinary medicine prior to receiving the Bachelor of Science degree in Animal Science.

Most of the students' courses for the major will be in animal science, but students can also select courses from horticulture, forestry, agricultural education, agribusiness economics, biology, plant biology, microbiology, zoology, chemistry, geography, geology, physics, physiology, and fermentation. Other classes help the student meet basic University requirements in a way that will strengthen their abilities to think, understand, and communicate about the social, physical, and natural sciences important to animal scientists. Other programs offer supplemental coursework in physiology, genetics, nutrition, animal behavior, and other topics that many animal science students find valuable.

The animal science major is backed up with extensive facilities for several species of livestock, and every student has the opportunity to get involved in work, research, or observation at the University Farm. The core of our animal science program is the 2,000-acre farm system, which includes centers for beef, dairy, equine, and swine.

Hundreds of distinct occupations exist within the animal agriculture field. There are opportunities in animal production work at farm operations, ranches, feedlots, stables, and zoos. There are opportunities in feed and meatpacking industries, equipment suppliers, government and international agencies, veterinary medicine, and numerous other supporting industries that serve producers. Within each of these areas, animal science graduates are employed in such jobs as sales, service, education, communication, finance, and business management. There may be extra expenses for field trips, manuals, or supplies in some courses.

### Bachelor of Science (B.S.) in Animal Science Degree Requirements

Degree Requirements	Credit Hours
University Core Curriculum Requirements	39
To include MATH 108 or higher; CHEM 140A or higher; ZOOL 118; ABE 204.	
Requirements for Major in Animal Science - Core Requirements	35

Degree Requirements	Credit Hours
ANS 121, ANS 122, ANS 215, ANS 315, ANS 331, ANS 332, ANS 337, ANS 381, ANS 431, plus one course from ANS 409, ANS 430, ANS 465, or ANS 485 <sup>1</sup>	28
CALPS electives, excluding ANS <sup>2</sup>	7
Specialization Requirements - Fulfill the requirements of one of the following specializations: Production, Equine Science, or Science and Pre-Veterinary.	46
Total	120

<sup>1</sup> ANS 409 is required for the Equine Science specialization.

<sup>2</sup> Any subject in CALPS that is not Animal Science and not required for the major.

### B.S. Animal Science - Equine Science Specialization Degree Requirements

Degree Requirements	Credit Hours
CHEM 140A or higher (to account for UCC requirement)	1
CHEM 140B or higher	4
ZOOL 118 (to account for UCC requirements)	1
ABE 350 or ABE 351	3
ANS 219, ANS 309, ANS 314, ANS 419, ANS 490 <sup>1</sup>	22
4 credit hours from ANS 112, ANS 212, ANS 312, or ANS 412	4
CALPS Electives	1
ANS Electives 3xx/4xx level course	10
Total	46

<sup>1</sup> ANS 409 is a required managerial course counted in major block.

### B.S. Animal Science - Production Specialization Degree Requirements

Degree Requirements	Credit Hours
CHEM 140A or higher (to account for UCC requirement)	1
CHEM 140B or higher	4

Degree Requirements	Credit Hours
ZOOL 118 (to account for UCC requirement)	1
ANS 415 and one additional course from ANS 409, ANS 430, ANS 465, or ANS 485	8
ANS 300- or 400-level courses	9
ABE 350 or ABE 351	3
CAPLS Electives	4
Electives	16
Total	46

### **B.S. Animal Science - Science and Pre-Veterinary Specialization Degree Requirements**

Degree Requirements	Credit Hours
ZOOL 118 (to account for UCC requirement)	1
Substitute CHEM 200, CHEM 201, CHEM 202 for CHEM 140A	2
MATH 109	3
CHEM 210, CHEM 211, CHEM 212, CHEM 340, CHEM 341, CHEM 350	13
PHYS 203A,B and PHYS 253A,B	8
BIOL 211	4
MICR 301	4
ANS electives, 3xx/4xx level course	8
CALPS Electives	1
Electives	2
Total	46

### **Animal Science Minor**

The minor in Animal Science requires 16 credit hours, of which at least 12 credit hours must be earned at Southern Illinois University Carbondale. The Animal Science minor consists of set tracks related to Animal Science and is approved by the advisor/faculty members. An advisor within the program must be consulted before selecting this field as a minor. This minor is not awarded to students who have a major in Animal Science.

## Equine Studies Minor

The minor in Equine Studies requires 16 credit hours, of which at least 12 credit hours must be earned at Southern Illinois University Carbondale. Equine Studies minor consists of ANS 219, ANS 309, ANS 409 and 5 additional ANS courses approved by the Animal Science advisor or faculty member. An advisor within the program must be consulted before selecting this field as a minor. This minor is not awarded to students who have a major in Animal Science.

## Companion Animal Nutrition Non-Degree Diploma

The non-degree diploma program is intended to enhance the marketability and training of students who wish to pursue careers in Animal and Veterinary management and sciences. Enrollment in the Animal Science major is not required to complete the program. While the diploma itself does not lead to a degree, courses can be counted in the Animal Science specializations as electives. Student not wishing to pursue a baccalaureate must complete the unclassified undergraduate application.

Requirements for non-degree diploma in Companion Animal Nutrition: 18 credit hours.

Courses: ANS 115, ANS 215, ANS 316, ANS 365, ANS 445, ANS 481.

## Capstone Option for Transfer Students

The SIU Carbondale Capstone Option may be available to eligible students who have earned an associates degree or the equivalent. The Capstone Option reduces the University Core Curriculum requirements from 39 to 30 hours, therefore reducing the time to degree completion. See the Capstone Option section for more information on this option.

## Technology Fee

The College of Agricultural, Life, and Physical Sciences assesses undergraduate majors a technology fee of \$4.58 per credit hour up to 12 credit hours. The fee is charged Fall and Spring semester.

## Animal Science Courses

**ANS112 - Introduction to Horsemanship** Designed for students with little or no horse riding experience. A holistic approach to handling and riding horses using natural laws governing horses and balance. Class time is primarily hands-on work with some classroom time. Students must be able to lead, groom, tack, mount and ride a horse. Horses are restricted to carrying 250 pounds. Facilities/Riding Fee: \$300. Credit Hours: 2

**ANS115 - Introduction to Companion Animal Nutrition** Focus on the basic science of companion animal nutrition and the nutrient needs of dogs and cats, rabbits, birds, aquarium fish, rodents and reptiles. Students will also learn the different types and forms of pets food, how to evaluate pets food, and regulations of pets food and labeling. Credit Hours: 3

**ANS121 - Introduction to Animal Science** [IAI Course: AG 902] A general overview of dairy, meat animals (swine, beef, sheep), poultry, and horse industries with emphasis on how meat, milk, and poultry products are produced and distributed. The general application of genetic, physiologic, and nutrition principles for the improvement of animal production to further serve people. Credit Hours: 3

**ANS122 - Livestock Production Laboratory** [IAI Course: AG 902] Livestock facilities, demonstration of management practices of animals for human use and the processing of animal products. Laboratory fee: \$40. Credit Hours: 1

**ANS123A - Livestock Practicum-Beef** Provides students with limited previous livestock experience an opportunity to participate in the routine care and management procedures at one of the University's livestock centers. This practicum course is custom designed for the individual student and requires instructor consent. Credit Hours: 1-2

**ANS123B - Livestock Practicum-Dairy** Provides students with limited previous livestock experience an opportunity to participate in the routine care and management procedures at one of the University's livestock centers. This practicum course is custom designed for the individual student and requires instructor consent. Credit Hours: 1-2

**ANS123C - Livestock Practicum-Horse** Provides students with limited previous livestock experience an opportunity to participate in the routine care and management procedures at one of the University's livestock centers. This practicum course is custom designed for the individual student and requires instructor consent. Lab fee: \$50. Credit Hours: 1-2

**ANS123D - Livestock Practicum-Swine** Provides students with limited previous livestock experience an opportunity to participate in the routine care and management procedures at one of the University's livestock centers. This practicum course is custom designed for the individual student and requires instructor consent. Credit Hours: 1-2

**ANS200 - Companion Animal Care and Management** Principles and practice of proper feeding and care of companion animals, with emphasis on dogs and cats. Nutrition, digestive systems, reproduction, and health care will be discussed. Credit Hours: 2

**ANS210 - Livestock Products & Processing** Processing and distribution of meat and dairy products. Consumption, nutritional value, cooking and serving of these products. Nomenclature and identification of meat cuts. Breeds, classes, and evaluation of meat and dairy animals. Fee: \$10. Credit Hours: 3

**ANS211 - Animal Selection and Evaluation. Livestock, Horses, Dairy.** Selection and evaluation of breeding and/or market animals including livestock (beef, sheep, swine and goats); horses; or dairy cattle. Includes competitive judging, but participation on SIUC Intercollegiate Livestock, Horse, or Dairy Judging Teams is not a required part of this course. Special approval needed from the instructor. Credit Hours: 1-2

**ANS212 - Intermediate Horsemanship** Designed for intermediate riders to improve their horse riding skills using primarily mounted exercises following the natural laws governing horses and balance, emphasizing independent use of the rider's natural aids. Students must be able to lead, groom, tack, mount and ride a horse. Horses are restricted to carrying 250 pounds. Course is repeatable up to 4 times during the student's academic career. Prerequisite: ANS 112 or consent of instructor (tryouts required). Facilities/Riding fee: \$300. Credit Hours: 2

**ANS215 - Introduction to Nutrition** (Same as HND 215) An up-to-date study of the principles of nutrition including classification of nutrients (physical and chemical properties) and their uses in order to provide the student a working knowledge of nutrition in today's environment. Credit Hours: 2

**ANS219 - Introductory Horse Management** Designed for the beginning science student or non-science majors with an interest in horses. Information on topics related to horse selection and care coupled with laboratory experience provide essential information for the care of horses owned for pleasure. Fee: \$35. Credit Hours: 4

**ANS250 - Human Values in Livestock Production** Improvements in livestock production technology have resulted from research. These technologies contribute to the welfare of a growing population of humans. However, the application of new technologies often interact with a public perception of animals as exploited species in a manner conflicting with human values. These conflicts are discussed from a scientific and philosophic viewpoint. Credit Hours: 3

**ANS309 - Equine Evaluation and Performance** This course explores the conformation and functional anatomy of the athletic horse, particularly as it relates to locomotion. Gaits and movement will be studied. Methods to influence movement will be considered and how these impact athletic ability or potential. Fee: \$25. Credit Hours: 3

**ANS312 - Advanced Horsemanship** Classroom, ground and mounted work explore communication and balance of the horse and rider combination. Feel, timing and balance are emphasized while working with

horses needing further education. Time outside class required. Students must be able to lead, groom, tack, mount and ride a horse. Horses are restricted to carrying 250 pounds. Course is repeatable up to 4 times during the student's academic career. Prerequisite: ANS 212 or consent of instructor (tryouts required). Facilities/Riding fee: \$300. Credit Hours: 2

**ANS314 - Forages: An Introduction to Grassland Agriculture** An introduction to grassland agriculture encompassing characteristics of forage species, forage/grazing management, and forage utilization with an emphasis in livestock systems. Laboratory/Field trip fee: \$15. Credit Hours: 3

**ANS315 - Feeds and Feeding** Principles of applied animal nutrition. Ration formulation to meet specific nutrient needs of livestock. Feedstuff evaluation, including cost will be discussed. Credit Hours: 3

**ANS316 - Rations for Feeding Companion Animals** This course will describe the basic characteristics of common feeds used in companion animal diets and the principles of utilizing these to meet animal requirements for maintenance and throughout the life-cycle. Prerequisite: ANS 215 or concurrent enrollment. Credit Hours: 3

**ANS319 - Horse Handling and Horsemanship** Students will learn principles of communicating tasks to horses using aids natural to horse behavior. Many different groundwork exercises are practiced. Prerequisite: ANS 112, 212, 312 or consent of instructor. Credit Hours: 2

**ANS331 - Growth and Developmental Physiology of Animals** A comparative study of domestic animal function is presented using an organ system approach. How cell, tissue and organ structure is related to physiological function is emphasized. The mechanism of animal growth and development will be discussed. Credit Hours: 4

**ANS332 - Animal Genetics** Principles of molecular genetics, Mendelian genetics, population genetics and quantitative genetics and their application to animal improvement. Prerequisite: ANS 121, MATH 108 or above. Credit Hours: 3

**ANS333 - Animal Genetics Laboratory** One three-hour lab per week. Laboratory course provides experiences with genetic laboratory experimentation and interpretation of data. Prerequisite: Completion of, or concurrent enrollment in ANS 332. Lab fee: \$35. Credit Hours: 1

**ANS337 - Animal Health** Principles of prevention and control of infectious, nutritional and parasitic disease of farm animals. Restricted to junior or senior standing. Course features occasional lab visits to University Farms. Prerequisites: ZOOL 118 and ANS 331 or consent of instructor. Lab fee: \$30. Credit Hours: 3

**ANS359 - Intern Program** Work experience program in animal production units and agricultural agencies of the government or agribusiness. Restricted to junior standing. Special approval needed from the chair. Credit Hours: 2-3

**ANS365 - Canine and Feline Nutrition** Focus on nutrients requirement and the feeding during the life cycle (maintenance, growth, gestation, lactation, seniors and performance) of cats and dogs. Nutrients digestion and metabolism, energy balance, and food processing, evaluation and labeling will be explored. Maximum enrollment is 15. Prerequisite: ANS 215 or concurrent enrollment. Credit Hours: 3

**ANS380 - Field Studies in Foreign and Domestic Animal Agriculture** A travel course to observe and study the operation and management of farms, ranches, and feedlots as well as agribusiness firms supporting animal production such as food processors, feed manufacturers, and housing or equipment companies in either the United States or foreign countries. A written report is required. The travel fee charged to the student will depend on the nature and the length of the course. Credit Hours: 1-6

**ANS381 - Animal Science Seminar** Discussion of problems and recent development in animal science. Prerequisite: ANS 121. Restricted to junior standing. Credit Hours: 1

**ANS390 - Special Studies Animal Science** Assignment involving research and individual problems. Restricted to juniors and seniors only. Special approval needed from the chair. Credit Hours: 1-4

**ANS409 - Equine Science** Designed for students interested in the more scientific aspects of equine physiology and management. The class will take a more advanced look at anatomy and physiology of

the systems of the equine and consider how they relate to selection, use and management. Lecture and laboratory. Prerequisite: ANS 219 and 331. Fee: \$50. Credit Hours: 4

**ANS412 - Horsemastership** This course involves the advanced equestrian in the evaluation and resolution of special problems in horse training. Students will work with a single horse during the semester to master an individual training goal set in consulting with the instructor. Emphasis will be placed on the use of non-violent training techniques. Course is repeatable up to 4 times during the student's academic career. Not for graduate credit. Prerequisite: ANS 312 or consent of instructor. Facilities/riding expenses are \$300 per class minimum. Credit Hours: 2

**ANS415 - Advanced Animal Nutrition** Advanced principles and practices associated with digestion, absorption, and metabolism of nutrients as related to domestic monogastrics, ruminants and horses. Prerequisite: ANS 215 and 315. Credit Hours: 4

**ANS419 - Stable Management** Designed for the advanced equine student planning a career in the horse field. Mastery of in-depth management techniques on an applied basis is emphasized. Farm, animal and personnel management are practiced. Extensive out-of-class practice time is expected. Prerequisite: ANS 409 with a grade of C or better. Lab fee: \$90. Credit Hours: 4

**ANS420 - Companion Animal Behavior-Animals at Work** This course focuses on the behavior of dogs and horses and will incorporate hands-on training techniques as well as pack/herd observation. Students will understand the difference between classical and operant conditioning, negative and positive reinforcement and will have the opportunity to observe social behavior, reproductive behavior, eating behaviors as well as dominant and submissive behaviors. Key features of the course include a study of the work that dogs and horses perform for man as well as a history of how those working relationships developed. All students with a passion for animals are encouraged to enroll. Lab fee: \$50. Credit Hours: 3

**ANS421 - International Animal Production** A study of world animal production practices with emphasis on the developing countries. Adaptability of animals to environmental extremes and management practices employed to improve productivity. Prerequisite: ANS 121. Restricted to junior standing. Credit Hours: 2

**ANS422 - Nutritional Management of Zoo Animals** The class will provide students with the most recent information on nutrients requirements and feeding of zoo animals. Students will also learn about zoo animals digestive system and physiology, feeding behavior, nutrition disorders and diseases. Field trips to local zoos. Prerequisite: ANS 215 and ANS 315 with grades of C or better. Credit Hours: 4

**ANS425 - Biochemical Aspects in Nutrition** (Same as HND 425) The interrelationship of cell physiology, metabolism and nutrition as related to energy and nutrient utilization, including host needs and biochemical disorders and diseases requiring specific nutritional considerations. Prerequisite: ANS 215 or HND 320, CHEM 140B, PHSL 201 and 208. Credit Hours: 3

**ANS426 - Comparative Endocrinology** (Same as PHSL 426, ZOOL 426) Comparison of mechanisms influencing hormone release, hormone biosynthesis, and the effects of hormones on target tissues, including mechanisms of transport, receptor kinetics, and signal transduction. Prerequisites: ANS 331 or ZOOL 220 or PHSL 310 with a minimum grade of C. Laboratory/Field Trip fee: \$15. Credit Hours: 3

**ANS428 - Nutritional Management of Zoo Animals** The class will provide students with the most recent information on nutrient requirements and feeding of zoo animals. Students will also learn about zoo animals' digestive system, feeding behavior, physiology, nutrition disorders, and diseases. Prerequisites: ANS 215 and ANS 315 with grades of C or better. Credit Hours: 4

**ANS429 - Equine Enterprise Management** Study of the diverse horse industry and business management practices involved with the operation of a successful horse enterprise. Analysis of a commercial horse operation will be explored through an in-depth, self-directed farm project. Field trips and guest speakers will inform students for the farm project. An on-campus horse event will be planned and executed as a class project. Prerequisites: ANS 409, ABE 350 or 351. Field trip fee: \$40. Credit Hours: 2

**ANS430 - Dairy Cattle Management** Application of the principles of breeding, physiology, and economics to management of a profitable dairy herd. Breeds of dairy cattle, housing, milking practices, and quality milk production. Prerequisite: ANS 315. Lab/Field trip fee: \$50. Credit Hours: 4

**ANS431 - Reproductive Physiology** Comparative anatomy and physiology of the male and female reproductive system of domestic animals; hormones; reproductive cycles; mating behavior; gestation and parturition; sperm physiology; collection and processing of semen; artificial insemination, pregnancy tests; diseases. Course includes a weekly lab. Prerequisite: ANS 121, ANS 331. Laboratory fee: \$50. Credit Hours: 4

**ANS433 - Introduction to Agricultural Biotechnology** (Same as AGSE 433, CSEM 433, HORT 433, PLB 433, PSAS 433) This course will cover the basic principles of plant and animal biotechnology using current examples; gene mapping in breeding, transgenic approaches to improve crop plants and transgenic approaches to improve animals will be considered. Technology transfer from laboratory to marketplace will be considered. An understanding of gene mapping, cloning, transfer, and expression will be derived. Restricted to senior standing. Credit Hours: 3-7

**ANS434 - Physiology of Lactation** Anatomy and physiology of milk secretion; endocrine control; milk precursors and synthesis; milk composition; physiology and mechanics of milking; lactation-related disorders and diseases; transgenic milk. Prerequisite: ANS 331. Credit Hours: 2

**ANS435 - Agricultural Molecular Biotechnology Seminar** (Same as CSEM 435) Molecular biology is rapidly making important contributions to agricultural science through biotechnology. An appreciation of the techniques of molecular biology and their application to plant improvement is important to all in agriculture and biology. The relationships between plant molecular biology and the biotechnology industry will be discussed. Presentations on particular research problems will be made. Graded P/F only. Credit Hours: 1-4

**ANS445 - Companion Animal Clinical Nutrition** Nutrition and feeding management of canine and feline during obesity, cancer, diabetes, urolithiasis, dental disease, dermatological disease, hepatic and gastrointestinal disorders, mobility and muscular disorders, heart diseases, and critical care. Prerequisite: ANS 215 with a grade of C or better. Credit Hours: 4

**ANS455 - Animal Nutrient Management** Scope and problems associated with animal nutrient management; current regulations and laws on environmental protection. Principles covering waste management technology and current livestock nutrient management systems are presented. Field trips will be scheduled. Restricted to junior standing. Credit Hours: 2

**ANS465 - Swine Management** Swine production systems and management techniques including breeding and selection, reproduction, nutrition, herd health and disease prevention, housing and waste management, marketing, production costs, and enterprise analysis. Field trip. Prerequisite: ANS 315 or consent of instructor. Lab fee: \$50. Credit Hours: 4

**ANS477 - Aquaculture** (Same as ZOOL 477) Production of food, game and bait fishes. Design of facilities, chemical and biological variables, spawning techniques, diseases and nutrition. Two lectures per week and one four-hour laboratory on alternate weeks. Prerequisites: BIOL 200A or BIOL 211 or ZOOL 118 or ANS 121 with grade of C or better. Credit Hours: 3

**ANS481 - Current Topics in Companion Animal Nutrition** This course is designed to develop written communication skills while learning to critique literature concerning current topics in the field of companion animal nutrition. Not for graduate credit. Prerequisite: ANS 115 and ANS 365. Credit Hours: 3

**ANS485 - Beef Cattle Management** Beef cattle production systems and management, breeding and selection, reproduction, nutrition, and herd health with emphasis on the most economical and efficient systems. Prerequisite: ANS 315, ANS 332 or concurrent enrollment. Lab/Field trip fee: \$50. Credit Hours: 4

**ANS490 - Horse Industry Internship** Provides the Equine Science students with the opportunity for diversified, practical experience in their area of career-goal interest. One semester will be spent working in a commercial horse-related industry. Not for graduate credit. Prerequisite: ANS 409, 419. Restricted to senior standing. Special approval needed from the instructor. Credit Hours: 4-8



**ANS495 - Instruction in the Animal Sciences** Acquaints the students with different teaching environments and styles. Students will be expected to participate in instructing animal science courses. Restricted to junior standing. Special approval needed from the instructor. Not for graduate thesis option credit. Credit Hours: 1-6

## **Animal Science Faculty**

**AbuGhazaleh, Amer A.**, Professor, Ph.D., South Dakota State University, 2002.  
**Apgar, Gary A.**, Professor and Distinguished Teacher, Ph.D., Virginia Polytechnic Institute, 1994.  
**Banz, William J.**, Professor, Ph.D., University of Tennessee, 1995.  
**Farrish, John**, Assistant Professor, Ph.D., University of Nevada-Las Vegas, 2010.  
**Gastal, Eduardo L.**, Professor, Ph.D., University of Wisconsin-Madison, 2009.  
**Jones, Karen L.**, Professor, Ph.D., Texas A&M University, 1999.  
**Nair, Jayakrishnan**, Assistant Professor, Ph.D., University of Saskatchewan, 2017.  
**Perry, Erin B.**, Professor, Ph.D., University of Missouri-Columbia, 2010.  
**Speiser, Stephanie A.**, Senior Lecturer, M.S., Southern Illinois University Carbondale, 2000.

## **Emeriti Faculty**

**Hausler, Carl L.**, Associate Professor, Emeritus, Ph.D., Purdue University, 1970.  
**King, Sheryl S.**, Professor, Emerita, Ph.D., University of California at Davis, 1983.  
**Kroening, Gilbert H.**, Professor, Emeritus, Ph.D., Cornell University, 1965.  
**Minish, Gary L.**, Professor, Emeritus, Ph.D., Michigan State University, 2004.  
**Strack, Louis E.**, Associate Professor, Emeritus, D.V.M., University of Illinois, 1961.  
**Young, Anthony W.**, Professor, Emeritus, Ph.D., University of Kentucky, 1969.

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