

# ANIMAL AND POULTRY SCIENCES (APSC)

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## **APSC 1454 - Introduction to Animal and Poultry Science (3 credits)**

Survey of systems of livestock and poultry production including: concepts and terminology pertaining to management and marketing; types and breeds of livestock and poultry; and an introduction to nutrition, genetics, physiology, and management of beef cattle, horses, sheep, swine and poultry.

**Corequisite(s):** APSC 1464

**Instructional Contact Hours:** (3 Lec, 3 Crd)

## **APSC 1464 - Animal and Poultry Science Laboratory (1 credit)**

Management practices and concepts related to efficient livestock and poultry production and marketing are taught through demonstrations and hands-on experience.

**Corequisite(s):** APSC 1454

**Instructional Contact Hours:** (3 Lab, 1 Crd)

## **APSC 1504 - Animal and Poultry Sciences First Year Experience (1 credit)**

Orientation course for freshman and transfer APSC students providing skills, resources and fundamental knowledge to enhance learning experiences and support success. Skills, resources, opportunities, curriculum, and career planning. Emphasis on inquiry, problem-solving skills, critical thinking and integration of ideas and experiences to encourage life-long learning.

**Instructional Contact Hours:** (1 Lec, 1 Crd)

## **APSC 1524 - Beginning Equitation (1 credit)**

Introduction to modern forward seat equitation. No previous experience necessary. Familiarization with parts of the horse, tack, gaits. Control at walk, trot, canter, including trot work over rolling terrain.

**Instructional Contact Hours:** (4 Lab, 1 Crd)

## **APSC 1984 - Special Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

## **APSC 2004 - Animal and Poultry Sciences Seminar (1 credit)**

Identification of primary and secondary career objectives for Animal and Poultry Science majors; planning for completion of a capstone learning experience in the major. Identification of curricular and extracurricular activities to increase career opportunities. Improvement of professional and technical writing skills applicable to the animal sciences field.

**Prerequisite(s):** APSC 1504

**Instructional Contact Hours:** (1 Lec, 1 Crd)

## **APSC 2025 - Introduction to Neuroscience (3 credits)**

Introduction to the fundamental principles of neuroscience. 2025: Structure and function of central nervous system in humans and other animals, signal processing and transmission, development of neural and brain circuits, encoding and transmission of sensory and perceptual information, motor control/movement. 2026: Complex brain processes including learning, memory, emotion, decision making, social behavior, and mental and functioning.

**Prerequisite(s):** BIOL 1105 or BIOL 1005

**Instructional Contact Hours:** (3 Lec, 3 Crd)

## **APSC 2026 - Introduction to Neuroscience (3 credits)**

Introduction to the fundamental principles of neuroscience. 2025: Structure and function of central nervous system in humans and other animals, signal processing and transmission, development of neural and brain circuits, encoding and transmission of sensory and perceptual information, motor control/movement. 2026: Complex brain processes including learning, memory, emotion, decision making, social behavior, and mental health, and functioning.

**Prerequisite(s):** APSC 2025

**Instructional Contact Hours:** (3 Lec, 3 Crd)

## **APSC 2104 - Poultry Laboratory (1 credit)**

Anatomy and physiology of birds including species-specific specializations in anatomical structure and body composition, musculoskeletal, respiratory, reproductive, endocrine, digestive and urinary systems. Relationship of these concepts to growth and egg production. Includes handling live birds.

**Prerequisite(s):** APSC 1454 and APSC 1464

**Corequisite(s):** ALS 2304

**Instructional Contact Hours:** (3 Lab, 1 Crd)

## **APSC 2114 - Livestock Management and Handling (1 credit)**

Safety in livestock handling; animal behavior; care, housing, and managerial practices related to beef cattle, sheep, and swine taught through experiential activities.

**Prerequisite(s):** APSC 1454 and APSC 1464

**Instructional Contact Hours:** (3 Lab, 1 Crd)

## **APSC 2124 - Horse Management Laboratory (1 credit)**

Principles of safe horse handling practices and applied horse management skills, taught through experiential activities.

**Prerequisite(s):** APSC 1454 and APSC 1464

**Instructional Contact Hours:** (2 Lab, 1 Crd)

## **APSC 2164 - Companion and Laboratory Animal Care and Handling (1 credit)**

Brief history of companion and laboratory animals. Outline of the major anatomical and physiological characteristics, first aid and basic care. Principles of husbandry and handling techniques. Institutional Animal Care and Use Committee training.

**Prerequisite(s):** APSC 1454 and APSC 1464

**Instructional Contact Hours:** (2 Lab, 1 Crd)

## **APSC 2424 - Introduction to the Equine Industry (3 credits)**

Introduction to the horse and equine industry. Survey of breeds and conformation; breeding, management, equipment, facilities, and marketing of the successful horse operation.

**Instructional Contact Hours:** (3 Lec, 3 Crd)

## **APSC 2464 - Introduction to Companion Animals (2 credits)**

Appropriate care and resulting well-being of dogs, cats, and other animals that are used primarily for companionship and recreation require knowledge of their evolution, natural habitats, species and breed characteristics, behavior, breeding, feeding, housing and training. This course integrates these topics to promote a symbiotic human-animal relationship. Information regarding the scope and impact of the companion animal industry will be discussed along with a survey of associated careers.

**Prerequisite(s):** BIOL 1106

**Instructional Contact Hours:** (2 Lec, 2 Crd)

**APSC 2524 - Intermediate Equitation (1 credit)**

Intermediate work in horseback riding with special emphasis on development of the forward seat and skills required for jumping. Elementary dressage movements. Equitation Fee: \$1,240.

**Prerequisite(s):** APSC 1624

**Instructional Contact Hours:** (4 Lab, 1 Crd)

**APSC 2624 - Beginning Equitation Over Fences (1 credit)**

Introduction of jumping skills for the unskilled as well as review of jumping skills for experienced riders. Rider should have skills at trot and canter. Equitation Fee: \$1,240.

**Prerequisite(s):** APSC 2524

**Instructional Contact Hours:** (4 Lab, 1 Crd)

**APSC 2824 - Equine Conformation and Biomechanics (2 credits)**

Evaluation of equine conformation as related to locomotion, athletic performance and soundness. Basic understanding of breed standards, gaits, and rules and regulations pertaining to various equine sports disciplines, from both domestic and global perspectives. Investigation of current scientific literature regarding equine conformation and biomechanics.

**Instructional Contact Hours:** (1 Lec, 2 Lab, 2 Crd)

**APSC 2964 - Field Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 2974 - Independent Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 2984 - Special Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 2994 - Undergraduate Research (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 3064 - Companion and Laboratory Animal Science (3 credits)**

Comparative aspects of companion and laboratory animals including physiology, anatomy, nutrition, genetics and reproduction. Normal behaviors along with techniques of behavior modifications.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 3134 - Animal Agriculture and the Environment (3 credits)**

Environmental issues associated with animal agriculture. Nutrient contamination of water resources, odor emission from livestock farms, environmental regulations affecting animal agriculture, and management practices to reduce the impacts of livestock farms on air and water quality.

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**Course Crosslist:** DASC 3134

**APSC 3214 - Principles of Meat Science (3 credits)**

Muscle biology and biochemistry, fresh meat processing, meat merchandising, processed meats, food safety, meat cookery, and regulations.

**Prerequisite(s):** ALS 2304 and CHEM 1036

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**Course Crosslist:** FST 3214

**APSC 3224 - Meat Science Laboratory (1 credit)**

Harvesting of livestock, carcass fabrication into wholesale and retail cuts, fresh meat processing and cookery. Handling, processing and displaying fresh and processed beef, pork, and lamb. Applications of Hazard Analysis Critical Control Point (HACCP) and food safety concepts to meat processing environments.

**Corequisite(s):** APSC 3214

**Instructional Contact Hours:** (3 Lab, 1 Crd)

**APSC 3254 - Animal Products (3 credits)**

Products obtained from animals (meat, eggs, dairy, by-products). Effect of production and processing of food animals upon product safety and quality.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (2 Lec, 2 Lab, 3 Crd)

**APSC 3304 - Embryology (3 credits)**

Normal and teratological embryology are intensively examined from ovulation through hatching or birth. Environmental, nutritional and genetic factors affecting embryogenesis. Even years.

**Prerequisite(s):** ALS 2304 or BIOL 3404

**Instructional Contact Hours:** (2 Lec, 3 Lab, 3 Crd)

**APSC 3334 - Animal Welfare and Bioethics (3 credits)**

Historical overview of animal welfare and bioethics. Animal welfare issues in farm and companion animals with respect to their use and treatment in the United States and in the global community. The influences of animal protection organizations, consumer groups, politicians, the scientific community, and other stakeholders on the development and enforcement of policies. Pre: Junior Standing.

**Prerequisite(s):** APSC 1454 and ALS 2304

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 3434 - Host Microbe Interactions (3 credits)**

Microbes and their physiology in animal production. Host-microbe interactions at a cellular/system level. Microbial pathogenesis, microbiome, and metabolism in animal health. Cellular responses to microbe colonization of its animal host. Relate microbial metabolism with diet and animal growth and development. Examine the underlying mechanism behind disease or health resulting from microbe interactions.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 3504 - Poultry Science and Health (3 credits)**

Avian embryology and physiological systems, poultry genetics, microbiome, diseases, biotechnology, health and welfare. Social and economic issues facing the poultry industry.

**Prerequisite(s):** APSC 1454 and APSC 1464

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 3524 - Intermediate Equitation Over Fences (1 credit)**

Establishment of sound jumping skills. Continuation of more advanced flat work. Study of hunter courses and cross country jumping. Equitation Fee: \$1,240.

**Prerequisite(s):** APSC 2624

**Instructional Contact Hours:** (4 Lab, 1 Crd)

**APSC 3624 - Advanced Equitation Over Fences (1 credit)**

Advanced methods and techniques for jumping and precision riding. Equitation Fee: \$1,240.

**Prerequisite(s):** APSC 3524

**Instructional Contact Hours:** (4 Lab, 1 Crd)

**APSC 3684 - Special Topics in Animal and Poultry Sciences (1,2 credits)**

An advanced, variable-content course which explores a topic in the animal sciences such as a significant contemporary issue; an emerging research area of interest to undergraduates; or a semester-long project involving a small group of students. May be repeated for up to three credits, no more than two credits per term.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (1,2 Lec, 1,2 Crd)

**Repeatability:** up to 3 credit hours

**APSC 3724 - Applied Equine Evaluation (2 credits)**

In-depth analysis of equine conformation and performance. Emphasis on knowledge of breed standards, critical thinking skills, and oral justification of decisions. Equivalent experience may be substituted for the pre-requisite APSC 2824 with instructor approval.

**Prerequisite(s):** APSC 2824

**Instructional Contact Hours:** (1 Lec, 3 Lab, 2 Crd)

**APSC 3754 - Principles of Livestock Evaluation (2 credits)**

Selection of market and breeding animals based on subjective and objective methods of evaluation. Basic understanding of evaluation principles, form-to-function, expected progeny differences, and performance records of beef cattle, swine, and sheep. Involves accurate decision making and oral reason presentations.

**Prerequisite(s):** APSC 1454

**Instructional Contact Hours:** (6 Lab, 2 Crd)

**APSC 3764 - Livestock Merchandising (2 credits)**

A comprehensive study of the principles and activities involved in successfully promoting and merchandising livestock. A livestock auction (Hokie Harvest Sale) is held at the conclusion of the course to provide experiences in advertising, salesmanship, livestock photography, facility development, sale management, and budgeting. Pre: Junior standing or consent.

**Instructional Contact Hours:** (2 Lec, 2 Crd)

**APSC 3824 - Equine Training and Marketing (2 credits)**

Application of fundamental behavioral concepts and principles to the training of horses in routine handling and groundwork. Preparation, marketing and presentation of horses for show and sale.

**Prerequisite(s):** APSC 2124

**Instructional Contact Hours:** (1 Lec, 3 Lab, 2 Crd)

**APSC 3954 - Study Abroad (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 3984 - Special Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 4004 - Contemporary Issues in the Animal Sciences (3 credits)**

Applying critical thinking, ethical reasoning and problem solving in order to make ethical decisions in regard to important contemporary issues in animal agriculture and other areas of the animal sciences; discourse through oral and written communication.

**Prerequisite(s):** APSC 2004

**Pathway Concept Area(s):** 1A Discourse Advanced, 10 Ethical Reasoning

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 4054 - Genomics (3 credits)**

A contemporary analysis of the development, utility and application of high-resolution methods for the study and manipulation of the complete genomes of organisms. The use of new techniques for genomic, metabolic and protein engineering (functional genomics), including high-throughput methods and nanotechnology, will be emphasized.

**Prerequisite(s):** BCHM 3114 or BCHM 4116 or BIOL 3774

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**Course Crosslist:** BCHM 4054

**APSC 4064 - Issues in Companion Animal Management (3 credits)**

Comparative aspects of companion animals including physiology, anatomy, nutrition, genetics, reproduction and well-being. Normal and aberrant behaviors along with techniques of behavior modification and pharmacological intervention. Critical evaluation of current legal and ethical issues in the companion animal industry. Limited to dogs, cats and caged birds. Pre-requisite: Junior Standing required Pre-requisites may be waived with permission of instructor.

**Prerequisite(s):** APSC 2464 and ALS 3104 and ALS 2304

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 4124 - Equine Health and Disease (4 credits)**

Application of principles needed to effectively monitor and manage equine herd health. Focus on information synthesis, situation assessment and decision-making skills to develop preventative care protocols and treat illness. Practical application of horse health care techniques for routine and minor emergency situations.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (2 Lec, 4 Lab, 4 Crd)

**APSC 4204 - Advanced Equine Nutrition and Feeding (3 credits)**

Analysis, formulation, and improvement of diets fed to horses in different physiological stages and metabolic statuses. Nutrient digestion, absorption, and utilization of nutrients. Computer-based ration formulation for horses. Applying economic principles to ration formulation and communicate equine nutrition concepts.

**Prerequisite(s):** ALS 3204

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 4224 - Equine Exercise Physiology (3 credits)**

Comprehensive study of conditioning the equine athlete using the principles of exercise physiology, energetics, kinetics, and sports medicine. Anatomy and physiology as it relates to exercise, conditioning and fitness assessment; exercise intolerance; performance nutrition; and medical practices used to support equine athletics.

**Prerequisite(s):** ALS 2304 and APSC 2124

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 4304 - Principles and Practices of Bovine Reproduction (2 credits)**

Principles and techniques in reproductive physiology and herd management related to health, record keeping, estrus detection and synchronization, uterus and ovary condition. Ovarian function and superovulation, semen handling, artificial insemination and pregnancy detection are also considered.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (1 Lec, 3 Lab, 2 Crd)

**Course Crosslist:** DASC 4304

**APSC 4324 - Equine Reproduction and Neonatal Care (4 credits)**

Principles and techniques in equine reproductive physiology and endocrinology. In-depth examination of equine reproduction strategies combined with practical techniques leading to synthesis and evaluation of breeding decisions. Anatomy and physiology of the mare and stallion, estrus detection and manipulation, artificial insemination, semen handling and processing, parturition and early care of neonates will be covered. Other topics will include selection of breeding stock and mating decisions.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (2 Lec, 4 Lab, 4 Crd)

**APSC 4404 - Commercial Poultry Enterprise Management (4 credits)**

Production, management, and reproduction of meat- and egg-type chickens and turkeys. Emphasis is on the application of basic poultry science principles as they relate to commercial poultry enterprises. Advanced topics of economic analysis, program management, and problem solving used in decision making processes in integrated poultry operations.

**Prerequisite(s):** APSC 2104 and ALS 3104 and ALS 3204 and ALS 3304

**Instructional Contact Hours:** (3 Lec, 3 Lab, 4 Crd)

**APSC 4414 - Beef and Sheep Production and Industry (4 credits)**

Study of the commercial and purebred beef cattle and sheep industries. Principles and applications for successful and profitable beef and sheep production.

**Prerequisite(s):** APSC 2114 and ALS 3104 and ALS 3204 and ALS 3304

**Instructional Contact Hours:** (3 Lec, 3 Lab, 4 Crd)

**APSC 4424 - Horse Production and Management (4 credits)**

Reproduction, genetics, nutrition, herd health, planning and economics of private and commercial horse farms, and current issues in the horse industry.

**Prerequisite(s):** APSC 2124 and APSC 2424 and ALS 3104 and ALS 3204 and ALS 3304

**Instructional Contact Hours:** (3 Lec, 3 Lab, 4 Crd)

**APSC 4444 - Swine Production (3 credits)**

Principles for commercial and seedstock swine production; current management practices, housing and marketing; issues and challenges in the swine industry. Experience in husbandry, research, and other management techniques obtained during laboratory.

**Prerequisite(s):** APSC 2114 and ALS 3104 and ALS 3204 and ALS 3304

**Instructional Contact Hours:** (2 Lec, 3 Lab, 3 Crd)

**APSC 4464 - Companion and Laboratory Animal Health and Management (4 credits)**

Animal health, management, well-being, and government regulation in the maintenance, use and enjoyment of companion and laboratory animals.

**Prerequisite(s):** APSC 2164 and APSC 3064 and ALS 3104 and ALS 3204 and ALS 3304

**Instructional Contact Hours:** (3 Lec, 2 Lab, 4 Crd)

**APSC 4514 - Animal Growth and Development (3 credits)**

Meat animal growth and development processes, micro and gross anatomy, stem cell biology and growth, body and carcass composition with application to animal and carcass evaluation.

**Prerequisite(s):** ALS 2304 and ALS 3204

**Instructional Contact Hours:** (3 Lec, 3 Crd)

**APSC 4554 - Advanced Livestock Enterprise Management (3 credits)**

Application of principles needed to manage profitable and sustainable beef cattle, sheep, and swine enterprises. Use of techniques to develop and evaluate strategies resulting in sound livestock enterprise management decisions. Focus on advanced animal management protocols, enterprise analysis, resource allocation, marketing options and risk management.

**Prerequisite(s):** APSC 4414 or APSC 4444

**Instructional Contact Hours:** (2 Lec, 2 Lab, 3 Crd)

**APSC 4624 - Topics in Equine Science (2 credits)**

Review and critique of scientific literature related to equine science. Focus on creative and critical thinking. Principles and practice of information analysis, synthesis and evaluation through discourse and technical writing. Practical application of research and communication skills.

**Prerequisite(s):** ALS 2304

**Instructional Contact Hours:** (2 Lec, 2 Crd)

**APSC 4954 - Capstone Experience in Animal and Poultry Sciences (1-19 credits)**

Student-defined learning experience that utilizes knowledge and skills already learned to acquire new skills, synthesize information and solve problems in the animal sciences. Requires approval from the department before commencement of the experience, and a final report at its conclusion. Open to APSC majors only. Completion of 75 credits towards the APSC degree required.

**Prerequisite(s):** APSC 2004

**Instructional Contact Hours:** Variable credit course

**APSC 4964 - Field Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 4974 - Independent Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 4974H - Independent Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 4984 - Special Study (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 4994 - Undergraduate Research (1-19 credits)**

**Instructional Contact Hours:** Variable credit course

**APSC 4994H - Undergraduate Research (1-19 credits)**

**Instructional Contact Hours:** Variable credit course