

Animal Sciences Undergraduate Assessment
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1) Has your program developed learning outcomes? If yes, please list.

Students will:

1. Know and understand the basic principles of applied animal biology.
2. Understand the fundamental tenets of animal science disciplines including genetics, growth and development, meat science and muscle biology, comparative nutrition, feeds and feeding, anatomy, basic and environmental physiology, endocrinology and reproduction.
3. Apply this knowledge to the basic understanding and application of appropriate husbandry best practices to animals of economic value.
4. Read and be able to analyze scientific or technical papers critically.
5. Communicate clearly both orally and in writing.
6. Develop problem-solving skills for lifetime learning.
7. Understand the importance of good citizenship in both personal and professional habits.
8. Understand the scientific method and design of experiments to test hypotheses and as such experience the process of discovery.
9. Explore the relationship between applied animal biology and society, including contemporary ethical issues raised by animal research, the use of animals by humans, and the role and impact of animal agriculture and applied animal biology on the planet.

2) If your program has learning outcomes, where are they published (e.g., department web page)?

Student learning objectives are provided on a course by course basis in the syllabus.

3) Do your faculty list course learning outcomes on their syllabi?

Student learning objectives are provided on a course by course basis in the syllabus.

4) Does your program have a curriculum map that links course outcomes to program outcomes? If so, please include.

1. Applied animal biology starts with a strong background in the basic sciences including chemistry, physics and biology. The basic knowledge obtained is applied to animal biology throughout the courses offered in the department.
2. Fundamental tenets of animal science disciplines provide the basic structure of the curriculum, with courses offered focusing on the different disciplinary areas.
3. Knowledge is applied to husbandry practices in the livestock and aquaculture production courses, and in the internship course.
4. In the senior year students are expected to read and analyze scientific papers (reproduction, meat science and muscle biology, etc.) and technical papers (production courses and internship).
5. Written communication is emphasized in writing intensive courses offered at each level of the curriculum. Oral communication is learned throughout the curriculum in many courses which require oral presentations or other oral work. At this time the major does not have an "O" focus course, but is planning to develop such a course from the

“Journal Clubs” which are currently offered in ANSC 499.

6. Problem solving is learned throughout the curriculum. An example is the internship class, in which students develop their own learning objectives, actions to attain them, time-lines, and assessment.
7. Good citizenship is learned in the general education core (global and multicultural perspectives), in the internship experience, and in extracurricular and service activities (e.g. Pre Vet Club). The ability to build effective interpersonal relationships is learned in many team products throughout the curriculum.
8. The scientific method is learned in the required statistics class and through reading articles in peer-reviewed journals. The process of discovery is experienced in the many laboratories and projects within the curriculum.
9. Issues and ethics are introduced at the 200 level through the course Humans, Animals and Agriculture, and explored in greater depth in the E focus course on Humans, Food and Animals: Ethics, Issues and Controversies.

Course Objectives

ANSC 200 Humans, Animals, and Agriculture

Introduction to animal agriculture, animal science, and the use of animals by humans. Ethics and importance of human use of animals in agriculture are emphasized.

1. Introduce the student to the field of Animal Science and expose the student to current issues relating to the human and animal interaction especially in animal agriculture. [1,9]
2. Improve the written communication skills of students. [5]
3. Introduce the students to career options in Animal Science and other related fields. [9]

ANSC 201 Principles and Practices of Animal Science

Breeds, their origin, distribution/evaluation; management practices for food, fiber, work, pleasure. Beef, dairy, sheep, swine, poultry, horses, aquatic species emphasized.

The aim of the class is to expose students to the principles and practices in food animal production as well as to role of the livestock industry in the economy. [1,3] Students will also be exposed to the issues confronting livestock production and agriculture. [9] Animals emphasized are limited to those of economic importance i.e. which the human race has developed husbandry practices. In most cases, these are animal production units to meet the demand for milk, meat and eggs. In some cases, animals for recreation and companionship would be discussed. The principals for animal care and well being are important and applied across all species to achieve productivity, good health and performance.

ANSC 244 Comparative Nutrition

Digestive systems and nutrient functions, interrelationships and metabolism are compared among animal species, including humans. An intermediate, general nutrition course for Food Science and Human Nutrition and Animal Science majors.

1. To gain an understanding of the basic principles of nutrition; and recognize the role of nutrition in disease prevention, improvement of health, and animal/human performance. [2]
2. To learn the components of the alimentary (digestive) tract of domestic animals, man and some aquatic species, and their function(s) in digestion and absorption of nutrients. [2]
3. To learn the essential nutrients, their functions, mechanisms of action, interrelationships

- and deficiency and/or toxicity symptoms. [2]
4. To know how the physiological state of the animal/man (i.e., maintenance, growth, pregnancy and lactation - various stages of life cycle) affects its nutrient requirements and the problems associated with determining these requirements. [2]
 5. To understand why certain classes of animals are able to use fibrous feedstuffs and non-protein nitrogen effectively while others cannot. [2]
 6. To learn the major classes of foods and feedstuffs, the characteristics of each class/type, how feed nutrients are quantified/described (terminology), and the schemes used to separated and quantify the various nutrient components in feeds and foods. [2]
 7. Understand what factors most influence food choices, and what lifestyle changes one could make to improved chances of enjoying good health. [9]
 8. To become active learners and implement all styles of communication (verbal, written, listening, team working and computers) [5]

ANSC 301 Anatomy of Agricultural Animals

Micro and gross anatomical arrangements of tissues and organ systems of domestic animals.

No objectives listed.

The student will:

1. Use correct terminology for cell, tissue and organ systems. [2]
2. Describe cell and tissue structure and properties. [2]
3. Describe the organ systems of the body, their anatomical arrangement, and structure. [2]
4. Relate anatomical structures and functions. [2]
5. Read and interpret scientific papers and analyze them critically. [4]
6. Organize and synthesize scientific concepts in writing. [5]

ANSC 321 Applied Animal Nutrition

Application of principles of nutrition to feeding of farm animals, composition and nutritional values of feed stuffs, nutritional requirements of beef cattle, dairy cattle, horses, poultry, and swine.

Enable the students to:

1. Identify the needs, opportunities and importance of livestock, aquaculture and pet and companion animal feeding; and become familiar with feed management practices and terminology. [3]
2. Learn how to identify and classify feedstuffs, determine their chemical composition and nutrient availability, and how to assess their economic value and potential usefulness as a diet ingredient. [2]
3. Review the nutrients and their functions, and gain an understanding of how to determine the nutrient requirements for the various classes of livestock and the changes in these nutrient needs during the various stages of the life cycle. [2,3]
4. Learn how the uniqueness of the digestive systems of the various species influences types of rations that can be fed, animal's voluntary dry matter consumption, and efficiency of nutrient digestion and utilization. [2]
5. Gain an understanding of the importance of feed laws and regulations, and the diversity of the various feed processing, mixing, storing and feeding methods/systems. [3]
6. Learn how to balance rations for various classes of livestock, and understand the importance of both proper feed processing and the use of computers in ration formulatio. [3]

7. Become better writers, more critical thinkers and ultimately better prepared for pursuing their chosen careers through written, oral and practical exercises or case studies, and other laboratory learning experiences. [5,6]

ANSC 350 Humans, Food, and Animals: Ethics, Issues and Controversies

Ethical issues and other controversies related to human and animal needs; their impact on resource sustainability and quality of life are explored from scientific perspectives.

The primary objective of this course is to contribute to the development of informed and responsible citizens who are able to think critically and to analyze complicated science-related issues. By learning how to apply ethical principles within a cohesive ethical framework, students will become more adept at dealing with moral dilemmas that ask *why*, *should*, *must*, and *ought* of current scientific controversies.

During this course, the student will:

1. Define ethics, both as a variety of theoretical frameworks and as a personal framework for making decisions about science-related issues. [9]
2. Explore a variety of controversial issues at the intersection(s) of two or more of the following: humans, animals, and their foods. [9]
3. Improve her/his oral and written communication skills, both as an individual and as member of working groups. [5]
4. Develop and practice using ethically- and scientifically-valid frameworks for reaching decisions about controversial science-based issues. [6,7]
5. Learn about organizations, businesses, government agencies, and individuals in the community which are involved with the causes and solutions of these issues. [9]

ANSC 353 Horses and Horsemanship

Origin of species, breeds, nutrition, care, management. Lab on management practices with work on light horses.

This course will provide students with:

1. An understanding and appreciation of the horse, its evolution, history, and uses in our society. [3]
2. The ability to identify horses by age, breed characteristics, and gender. [3]
3. The ability to evaluate equine conformation in comparison to the "ideal" or desired characteristics for attributes such as speed, strength, agility, intelligence, and tractability. [3]
4. The ability to develop and implement optimal equine feeding guidelines. [3]
5. The ability to identify and evaluate the quality of horse forages and grains. [3]
6. The ability to plan and execute effective equine breeding programs. [3]
7. The ability to develop and implement effective equine health care programs for the maintenance of optimal equine health and disease prevention. [3]
8. The ability to understand the basics of equine behavior as a means of planning effective and successful training and conditioning programs for performance horses in the various disciplines. [3]
9. The ability to design and evaluate horse facilities with respect to fences, buildings, equipments, and layout. [3]
10. The ability to develop cost-effective and successful barn management procedures. [3]

ANSC 431 Beef Production

Principles of economic beef production, including beef breeds, selection, breeding, management systems, feeding, and marketing under tropical conditions.

The objective of this course is to introduce the student to beef cattle production in the United States. A primary goal of the course is to tie together the various disciplines in Animal Science in relation to beef cattle production and management. A secondary goal is to introduce the student to some practical hands on experiences. **[3]**

ANSC 432 Swine Production

Principles of efficient pork production, including comparative breed evaluation, breeding, feeding, management, marketing and business aspects. Problems and practices associated with tropical environment emphasized.

1. Students will integrate and apply scientific principles of genetics, environmental physiology, nutrition, health and reproduction to swine production and management. **[3]**
2. Students will combine science and practical considerations in planning swine production systems, including breeding, reproduction, growth, feeding, housing, health, and their relationship to quality pork and profitability. **[3]**
3. Students will develop a written swine production technical plan. The course is writing intensive. **[5]**
4. Students will use creativity, problem-solving and critical thinking skills. **[6]**

ANSC 433 Tropical Dairying

Principles involved in economical milk production in the tropics, including management, recordkeeping, breeds, breeding, selection, culling, feeding, housing, milking, quality control, and raising young animals.

1. Provide a global perspective of trade and challenges in the milk and agriculture **[9]**
2. Assist students to learn to communicate: written and oral **[5]**
3. Assist students to develop critical thinking skills and systematic rationale to tackle problems **[6]**
4. Assist students to understand the diversity in agriculture production and the linkages **[1]**
5. Gain an ability to plan and perform data analyses (dairy records) **[3]**

ANSC 445 Genetics and Animal Breeding

Review and application of generic principles to livestock, poultry, companion, aquatic, and laboratory research animals. Current practices and future developments.

The objective of this course is to introduce the student to animal breeding and genetics, how it is used to improve animals and why it works (or doesn't). Modern animal breeding is dependent upon using knowledge about the genetic composition of an animal (parent) and making informed decisions to make the best selection and mating decisions to improve the progeny. **[2]** It is expected that the student upon completion of this course will have an understanding of the relationships between genetics, phenotype, improvement and mating designs for modern farm species. Some effort will be made to cover companion animals and aquaculture species, but most of the examples and information will be directed toward cattle, pigs, sheep and horses. **[3]**

ANSC 446 Genes and Animal Biology

An understanding of animal biology at the level of genes and their regulations; emphasis on gene structure, recombinant DNA, transgenic animals and functional genomics being used for

agricultural, nutritional and biomedical sciences.

This course focuses on understanding of animal biology at the level of genes and their regulations. It will cover the basic science of molecular techniques and current developments in functional regulation of the genes that are important to animal agriculture and nutritional sciences. The goal of this course is to stimulate learning interests in integration of current knowledge of genes and their regulations into animal biology. [2]

ANSC 450 Aquaculture Production

Theory and practice of aquaculture: reproduction, yield trials, management, economics and business case studies of fish, crustaceans, and molluscs. Field classes held at commercial farm and hatchery.

No objectives listed.

1. Students will use correct terminology to describe aquaculture species and systems. [3]
2. Students will integrate and apply scientific principles of genetics, environmental physiology, nutrition, health and reproduction to aquaculture production and management. [3]
3. Students will combine science and practical and business considerations in describing aquaculture production systems, including breeding, reproduction, growth, feeding, housing, health, and their relationship to quality and profitability. [3]
4. Students will describe the diverse sectors of aquaculture production. [3]

ANSC 451 Physiology of Domestic Animals

Functions and relationships of organs and organ systems of domestic animals excluding reproduction and lactation. Problem-based learning and case studies are emphasized.

Physiology is the study of the normal function of the body at the organ, tissue, cell and molecular level, and the interrelationship(s) among them. The overall goal of the course is to develop exciting learning experiences in domestic animal physiology, and to practice the fundamental knowledge of physiological regulation and function of the body. This course is designed to provide the background information to help students:

1. Gain a basic understanding of the physiology of domestic animals. [2]
2. Study the basic cellular physiology and the essential physics and chemistry required for its understanding. [2]
3. Discuss the body's internal environment, the nature of biological control systems, and the properties of the major specialized cell types. [2]
4. Study in depth the organ systems of the body, their anatomical arrangement, structure, function and regulation. [2]
5. Illustrate physiological facts and principles through, demonstrations, discussion and write up of data obtained from previous experiments, and through interactive video (CD) exercises. [2]
6. Read and interpret the scientific literature about animal physiological research and veterinary application with emphasis on the most important domestic animal species. [4]
7. Become better writers, more critical thinkers and ultimately better prepared for pursuing their chosen careers through written, oral and practical exercises or other learning experiences. [5,6]
8. Become active learners and implement all styles of communication (verbal, written, listening, team working and computers), and gain a better understanding of their own

physiological systems/processes. [5]

ANSC 453 Animal Diseases and Their Control

Disease problems of livestock, poultry, and companion animals; their economic significance, causes, public health implications, and control.

1. Learn about the nature of diseases, including the causes of disease and how the body reacts to disease. [2]
2. Learn how to prevent disease by sanitation, disinfection, vaccination, immunization and other measures. [3]
3. Learn the characteristics of common animal diseases and how they relate to the body organ systems. [2]
4. Learn the characteristics of uncommon animal diseases of importance (foreign animal diseases, etc.). [2]
5. Learn the characteristics of common parasites affecting animals. [2]
6. Learn the characteristics of poisonous plants and diseases caused by toxins. [2]
7. Learn how to develop a herd health program for various livestock species. [3]

ANSC 454 Meat Science and Muscle Biology

Development, growth, function, carcass evaluation of muscle tissue.

The aim of this course is to provide students with the scientific principles involved in the conversion of muscle to meat and meat products, [2] and to help students develop ability to connect these principles to real life situations in their everyday life or profession. At the end of the course, it is hoped that you have a better understanding of how to prepare, store, cook and use meat to maximize the taste and nutritional contribution of meat to human life. [3]

The approach will be that those principles introduced and materials provided in the class will help students with their attempts for further investigation of any specific areas of interest. The first 30% of the course will introduce the anatomical, physiological, developmental and biochemical aspects of muscle as a basis for understanding its conversion to meat. [2] The latter 70% of this course will cover aspects of fresh and processed meat technology, meat preservation, and meat microbiology. In addition, current issues in meat science area will be discussed. [3]

ANSC 454L Meat Science and Muscle Biology Lab

Livestock and poultry slaughter, carcass evaluation, meat chemistry, muscle physiology and biochemistry, meat microbiology, and meat processing.

The purpose of this course is to expose students to the application of meat science principles to laboratory practices. Students will perform proximate analysis of meat and meat products, observe properties and functionality of fresh meat, and participate in the transformation of live animal to carcass and field trips to meat science related industry. [3]

ANSC 460 Biology and Culture of Shrimp and Prawns

Aspects of the biology and culture of the freshwater prawn *Macrobrachium rosenbergii* and marine shrimp *Panaeus*(sp) species. Scientific research results and case studies presented and analyzed.

No objectives listed.

1. Students will use correct terminology to describe shrimp and prawn species and

- systems. [3]
2. Students will integrate and apply scientific principles of genetics, environmental physiology, nutrition, health and reproduction to shrimp and prawn production and management. [3]
 3. Students will combine science and practical and business considerations in describing shrimp and prawn production systems, including breeding, reproduction, growth, feeding, housing, health, and their relationship to quality and profitability. [3]
 4. Students will describe the diverse sectors of shrimp and prawn production. [3]

ANSC 462 Reproduction and Artificial Insemination

Introductory exploration of anatomy, development, and physiology of reproduction of domestic animals and artificial insemination.

The course in reproduction and artificial insemination is designed to provide the background information necessary to:

1. Plan and carry out routine reproductive management of livestock; [3]
2. Read and interpret the literature in basic and applied reproductive physiology; [4]
3. Compare reproductive patterns among domesticated and other mammalian species; [2]
4. Understand the basic endocrine functions involved in reproduction; [2]
5. Understand the roles of genetic and environmental factors, which affect fertility and reproduction; [2]
6. Understand the principles and practices involved in artificial insemination, embryo transfer, breeding soundness examinations and other applied reproductive techniques. [3]

ANSC 465L Aquaculture Production Laboratory

Field trips and laboratory study of the life cycles of marine shrimp, freshwater prawns, molluscs and fish. Creating and maintaining spawning and culture systems for aquaculture animals and their food organisms.

The student will:

1. Become familiar with the external anatomy of the freshwater prawn, *Macro brachium rosenbergii*, the marine shrimp, *Litopenaeus vannemei*, the rainbow trout, aquacultured Salmon, a warm water fish, an oyster and perhaps other molluscs. [2]
2. Be able to identify the life cycle stages of all the major aquaculture animal groups. [2]
3. Be able to maintain alive in an aquarium a life form of one or more of the animals above. [3]
4. Be able to describe the major aquaculture production technologies. [3]
5. Be able to estimate the growth rate in the laboratory of one or more of the life forms of the animals above. [3]
6. Be able to maintain accurate laboratory records of adult, juvenile and larvae behavior of one or more of the animals groups above. [3]
7. Be able to accurately report in writing and orally the activities of the semester. [5]

ANSC 472 Endocrinology of Domestic Animals

Physiology of secretion and actions of hormones of pituitary, thyroid, adrenal, pancreas, parathyroid, thymus, other endocrine organs excluding reproduction.

No objectives listed. [2]

ANSC 490 Aquaculture Business Planning and Entrepreneurship

Practical aspects of planning and developing an aquaculture business from conceptualization to a final business plan. Topics include species/technology, project planning, business structuring, permitting, contracts, production plans, financial planning and analysis, market/competition analysis, capital acquisition, intellectual property and legal issues.

No objectives listed. [3]

ANSC 491 Topics in Animal Science

Study and discussion of significant topics, problems. Offered by visiting faculty and/or for extension programs.

Objectives vary by instructor and year.

ANSC 492 Internship

Integration and application of academic knowledge and critical skills emphasizing professional development. Placement with an approved cooperating supervisor/employer.

1. To acquire work experience in food, nutrition, animal science or veterinary areas. [7]
 - a. Practice working with a variety of people.
 - b. Develop personal contacts with professionals.
 - c. Identify the influence of culture on professional interactions with others.

2. To integrate and apply knowledge and skills from the academic program to practical work responsibilities. [5, 6]
 - a. Use computer skills.
 - b. Expand writing capability.
 - c. Practice oral communication skills.
 - d. Apply appropriate techniques in field settings.
 - e. Determine appropriate information for field setting.
 - f. Develop practical skills.

3. To obtain experience in setting and achieving career-related goals and objectives. [6]
 - a. Develop, monitor and evaluate learning objectives and timelines through communication and negotiation with field supervisor and instructor.
 - b. Identify personal strengths and weaknesses.
 - c. Evaluate potential career options.

ANSC 499 Directed Study or Research

No description.

Objectives vary by instructor and year.

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Student Learning Objectives	Courses
1. Know and understand the basic principles of applied animal biology.	200, 201, 433
2. Understand the fundamental tenets of animal science disciplines including genetics, growth and development, meat science and muscle biology, comparative nutrition, feeds and feeding, anatomy, basic and environmental physiology, endocrinology and reproduction.	244, 301, 321, 445, 446, 451, 453, 454, 462, 465L, 472
3. Apply this knowledge to the basic understanding and application of appropriate husbandry best practices to animals of economic value.	201, 321, 353, 431, 432, 433, 450, 453, 454, 454L, 460, 462, 465L, 490
4. Read and be able to analyze scientific or technical papers critically.	301, 451, 462
5. Communicate clearly both orally and in writing.	200, 244, 301, 321, 350, 432, 433, 451, 465L, 492
6. Develop problem-solving skills for lifetime learning.	321, 350, 432, 433, 451, 492
7. Understand the importance of good citizenship in both personal and professional habits.	350, 492
8. Understand the scientific method and design of experiments to test hypotheses and as such experience the process of discovery.	NREM 310
9. Explore the relationship between applied animal biology and society, including contemporary ethical issues raised by animal research, the use of animals by humans, and the role and impact of animal agriculture and applied animal biology on the planet.	200, 201, 244, 350, 433