

VETERINARY SCIENCE

#01067

Description

This course is designed to prepare students for careers in the field of animal science by introducing them to veterinary practices as they relate to both large and small animal species. The student will participate in laboratory and field investigations and demonstrate safety by using critical thinking, scientific reasoning, and problem solving to make informed decisions. They will research and describe the history of veterinary medicine, current topics, the importance of animals in society, and the professional ethics and laws that relate to veterinary medicine. The student will learn to explain the human-animal bond and describe the legal aspects of animal welfare. The student will identify anatomical structures and systems of animals and correct terminology while exploring animal management as it relates to animal identification, animal characteristics, and behavioral temperament (i.e. normal behavior compared to sick.) The student will evaluate animal diseases and identifies internal and external parasites, and can evaluate an animal's health during a clinical examination while safely operating and maintaining equipment used in veterinary science. The student will also learn to determine nutritional requirements and the importance of nutrition in maintaining a healthy animal. The student will thereby be conscious of procedures, skills, and objectives that are included in the job description of an animal care assistant.

Grade 11-12

½ or 1 credit

Max Credit = 1

Standard 1	AGRICULTURE, FOOD, & NATURAL RESOURCES (AFNR) CLUSTER SKILLS	
Topic 1.2	<i>Evaluate the nature and scope of the Agriculture, Food, & Natural Resources Career Cluster and the role of agriculture, food, and natural resources (AFNR) in society and the economy.</i>	
Student Competencies		
	1.2.2	EXAMINE THE COMPONENTS OF THE AFNR SYSTEMS AND ASSESS THEIR IMPACT ON THE LOCAL, STATE, NATIONAL, AND GLOBAL SOCIETY AND ECONOMY.
	1.2.2.1	Identify and summarize the components within AFNR systems (e.g., Animal Systems: health, nutrition, genetics, etc.; Natural Resources Systems: soil, water, etc.).
	1.2.2.2	Define and summarize societies on local, state, national, and global levels and describe how they relate to AFNR systems.
	1.2.2.3	Examine and summarize the components of the agricultural economy (e.g., environmental, crops, livestock, etc.).
	1.2.2.4	Assess components within AFNR systems and analyze relationships between systems.
	1.2.2.5	Assess how people within societies on local, state, national, and global levels interact with AFNR systems on daily, monthly, or yearly basis.
	1.2.2.6	Assess the economic impact of an AFNR system on a local, state, national, and global level.
Topic 1.3	<i>Examine and summarize the importance of health, safety, and environmental management systems in AFNR workplaces.</i>	
Student Competencies		
	1.3.1	IDENTIFY AND EXPLAIN THE IMPLICATIONS OF REQUIRED REGULATIONS TO MAINTAIN AND IMPROVE SAFETY, HEALTH, AND ENVIRONMENTAL MANAGEMENT SYSTEMS.
	1.3.1.1	Research and explain the implications of regulatory, safety, and health standards on AFNR systems (e.g., SDS, bioterrorism, etc.)
	1.3.1.2	Summarize the importance of safety, health, and environmental management in the workplace.
	1.3.1.3	Execute health, safety, and environmental procedures to comply with regulatory and safety standards.
	1.3.1.4	Analyze existing required regulations within an AFNR workplace.
	1.3.1.5	Evaluate how AFNR organizations/businesses promote improved health, safety, and environmental management and determine steps to maintain compliance with regulatory and safety standards in AFNR situations.
	1.3.1.6	Construct and implement methods to evaluate compliance with required safety, health, and environmental management regulations.

	1.3.2	DEVELOP AND IMPLEMENT A PLAN TO MAINTAIN AND IMPROVE HEALTH, SAFETY, AND ENVIRONMENTAL COMPLIANCE AND PERFORMANCE.
	1.3.2.1	Research and identify components required in health and safety performance plans.
	1.3.2.2	Examine and categorize examples of environmental compliance plans from AFNR workplace.
	1.3.2.3	Analyze the effectiveness of health and safety performance plans of an AFNR workplace.
	1.3.2.4	Develop plans to improve environmental compliance and performance within an AFNR system.
	1.3.3	APPLY HEALTH AND SAFETY PRACTICES TO AFNR WORKPLACES.
	1.3.3.1	Research and summarize the purposes and objectives of health and safety policies and procedures relevant to AFNR careers.
	1.3.3.2	Identify emergency response procedures for health and safety issues at AFNR workplaces.
	1.3.3.3	Examine and categorize examples of how to avoid health or safety risks in AFNR workplaces.
	1.3.3.4	Examine and categorize the risk level of contamination or injury as associated with AFNR tasks in the workplace.
	1.3.3.5	Analyze and evaluate the impact of current health and safety practices of AFNR workplaces.
	1.3.3.6	Assess various emergency response plan requirements for an AFNR workplaces and/or facility.
	1.3.3.7	Assess and apply first aid knowledge and procedures relevant to AFNR workplaces.
	1.3.3.8	Assess the safety priorities and select appropriate responses for different levels of contamination or injury at an AFNR workplace.
	1.3.3.9	Create and implement a health and safety policy plan for AFNR workplaces.
	1.3.3.10	Create and implement a plan to communicate appropriate responses for health and safety situations within an AFNR workplace.
	1.3.3.11	Conduct a survey and evaluate results of AFNR workplaces to identify structure of health and safety practices and number of employees certified in first aid training.
	1.3.3.12	Create a plan to mitigate the level of contamination or injury identified as a risk in the workplace.
	1.3.4	USE APPROPRIATE PROTECTIVE EQUIPMENT AND DEMONSTRATE SAFE AND PROPER USE OF AFNR TOOLS AND EQUIPMENT.
	1.3.4.1	Identify and differentiate the appropriate protective equipment for the safe use and operation of specific tools and equipment (e.g. PPE, etc.).
	1.3.4.2	Identify standard tools, equipment and safety procedures related to AFNR tasks.
	1.3.4.3	Read and interpret operating instructions related to operation, storage and maintenance of tools and equipment related AFNR tasks.
	1.3.4.4	Analyze and demonstrate adherence to protective equipment requirements when using various AFNR tools and equipment.
	1.3.4.5	Complete the set up and adjustment for tools and equipment related to AFNR tasks.
	1.3.4.6	Assess and demonstrate appropriate operation, storage, and maintenance techniques for AFNR tools and equipment.

Topic 1.5	<i>Describe career opportunities and means to achieve those opportunities in each of the Agriculture, Food, & Natural Resources career pathways.</i>	
	Student Competencies	
1.5.1	EVALUATE AND IMPLEMENT THE STEPS AND REQUIREMENTS TO PURSUE A CAREER OPPORTUNITY IN EACH OF THE AFNR CAREER PATHWAYS (E.G., GOALS, DEGREES, CERTIFICATIONS, RESUMES, COVER LETTER, PORTFOLIOS, INTERVIEWS, ETC.).	
	1.5.1.1	Identify and summarize the steps to pursue a career in an AFNR pathway (e.g., self-assessment, set goals, etc.).
	1.5.1.2	Examine the educational, training, and experiential requirements to pursue a career in an AFNR pathway (e.g., degrees, certifications, training, internships, etc.).
	1.5.1.3	Research and summarize specific tools (e.g., resumes, portfolios, cover letters, etc.) and processes (e.g., interviews, applications, etc.) needed to pursue a career in an AFNR pathway.
	1.5.1.4	Create a personal plan outlining goals and steps to obtain a career in an AFNR pathway.
	1.5.1.5	Analyze personal skillset and create a plan for obtaining the required education, training, and experiences to obtain a career in an AFNR pathway.
	1.5.1.6	Assess personal goals, experiences, education, and skillsets and organize them to produce the appropriate tools and develop the skills to effectively communicate about one's qualifications for an AFNR career.
1.5.2	EXAMINE AND CHOOSE CAREER OPPORTUNITIES THAT ARE MATCHED TO PERSONAL SKILLS, TALENTS, AND CAREER GOALS IN AN AFNR PATHWAY OF INTEREST.	
	1.5.2.1	Examine and categorize careers in each of the AFNR pathways.
	1.5.2.2	Research and describe careers in each of the AFNR pathways and choose potential careers connecting to personal interests and skills.
	1.5.2.3	Assess personal skills and align them with potential career opportunities in AFNR pathways.
	1.5.2.4	Assemble and analyze examples of careers and related statistics on a local, state, national, and global level.
	1.5.2.5	Interpret and evaluate the results of a personal career assessment and connect them to potential careers in AFNR pathways.
	1.5.2.6	Conduct interviews with career professionals within AFNR pathways and summarize the results.

Standard 3	ANIMAL SYSTEMS	
Topic 3.1	<i>Analyze historic and current trends impacting the animal systems industry.</i>	
	Student Competencies	
	3.1.1	EVALUATE THE DEVELOPMENT AND IMPLICATIONS OF ANIMAL ORIGIN, DOMESTICATION, AND DISTRIBUTION ON PRODUCTION PRACTICES AND THE ENVIRONMENT.
	3.1.1.1	Identify and summarize the origin, significance, distribution, and domestication of different animal species.
	3.1.1.2	Research and summarize major components of animal systems (e.g., livestock, companion animal, etc.).
	3.1.1.3	Evaluate and describe characteristics of animals that developed in response to the animal's environment and led to their domestication.
	3.1.1.4	Describe the historical and scientific developments of different animal industries and summarize the products, services, and careers associated with each.
	3.1.1.5	Evaluate the implications of animal adaptations on production practices and the environment.
	3.1.1.6	Predict trends and implications of future developments within different animal industries on production practices and the environment.
	3.1.2	ASSESS AND SELECT ANIMAL PRODUCTION METHODS FOR USE IN ANIMAL SYSTEMS BASED UPON THEIR EFFECTIVENESS AND IMPACTS.
	3.1.2.1	Identify and categorize terms and methods related to animal production (e.g., sustainable, conventional, humanely raised, natural, organic, etc.).
	3.1.2.2	Research and examine marketing methods for animal products and services (e.g., conventional, niche markets, locally grown, etc.).
	3.1.2.3	Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal systems enterprises (e.g., managing records for animal identification, feeding, breeding, treatment, income/expense, etc.).
	3.1.3	ANALYZE AND APPLY LAWS AND SUSTAINABLE PRACTICES TO ANIMAL AGRICULTURE FROM A GLOBAL PERSPECTIVE.
	3.1.3.1	Distinguish between the types of laws pertaining to animal systems.
	3.1.3.2	Research and summarize sustainability in animal systems.
	3.1.3.3	Analyze the structure of laws governing animal industries, international trade, and animal production policies.
	3.1.3.4	Analyze the local and global impact of sustainable animal agriculture practices on human and environmental systems.

	3.1.3.5	Evaluate the impact of laws pertaining to animal agriculture (e.g., pros, cons, effect on individuals, effect on businesses, etc.) and assess the compliance of production practices with established regulations.
	3.1.3.6	Select, evaluate and defend the use of sustainable practices in animal agriculture.
Topic 3.2	<i>Utilize best-practice protocols based upon animal behaviors for animal husbandry and welfare.</i>	
	Student Competencies	
	3.2.1	DEMONSTRATE MANAGEMENT TECHNIQUES THAT ENSURE ANIMAL WELFARE.
	3.2.1.1	Explain the implications of animal welfare and animal rights for animal systems.
	3.2.1.2	Research and summarize the challenges involved in working with animals and resources available to overcome them (e.g., tools, technology, equipment, facilities, animal behavior signals, etc.).
	3.2.1.3	Distinguish between animal husbandry practices that promote animal welfare and those that do not.
	3.2.1.4	Design programs that assure the welfare of animals and prevent abuse or mistreatment.
	3.2.1.5	Analyze and document animal welfare procedures used to ensure safety and maintain low stress when moving and restraining animals.
	3.2.1.6	Analyze and document animal husbandry practices and their impact on animal welfare.
	3.2.2	ANALYZE PROCEDURES TO ENSURE THAT ANIMAL PRODUCTS ARE SAFE FOR CONSUMPTION (E.G., USE IN FOOD SYSTEM, ETC.).
	3.2.2.1	Identify and categorize tools, technology and equipment used in animal husbandry and welfare to help provide an abundant and safe food supply.
	3.2.2.2	Research and summarize animal production practices that may pose health risks.
	3.2.2.3	Identify and describe animal tracking systems used in animal systems (e.g., livestock, companion animal, exotics, etc.).
	3.2.2.4	Utilize tools, technology, and equipment to perform animal husbandry and welfare tasks.
	3.2.2.5	Analyze consumer concerns with animal production practices relative to human health.
	3.2.2.6	Analyze and summarize the impact of animal trace-back capabilities on producers and consumers.
	3.2.2.7	Select, evaluate and defend the use of specific tools, technology, or equipment used to perform animal husbandry and welfare tasks.
	3.2.2.8	Research and evaluate programs to assure the safety of animal products for consumption.
	3.2.2.9	Evaluate the effectiveness of animal and/or premise identification programs for a given species.
Topic 3.3	<i>Design and provide proper animal nutrition to achieve desired outcomes for performance, development, reproduction, and/or economic production.</i>	
	Student Competencies	
	3.3.1	ANALYZE THE NUTRITIONAL NEEDS OF ANIMALS.
	3.3.1.1	Identify and summarize essential nutrients required for animal health and analyze each nutrient's role in growth and performance.
	3.3.1.2	Differentiate between nutritional needs of animal species.

	3.3.1.3	Differentiate between nutritional needs of animals in different growth stages and production systems (e.g., maintenance, gestation, natural, organic, etc.).
	3.3.1.4	Correlate a species' nutritional needs to feedstuffs that could meet those needs.
	3.3.2	ANALYZE FEED RATIONS AND ASSESS IF THEY MEET THE NUTRITIONAL NEEDS OF ANIMALS.
	3.3.2.1	Compare and contrast common types of feedstuffs and the roles they play in the diets of animals.
	3.3.2.2	Examine the importance of a balanced ration for animals based on the animal's growth stage (e.g., maintenance, newborn, gestation, lactation, etc.).
	3.3.2.3	Examine the purpose, impact and mode of action of feed additives and growth promotants in animal production.
	3.3.2.4	Determine the relative nutritional value of feedstuffs by evaluating their general quality and condition.
	3.3.2.5	Appraise the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements, and performance.
Topic 3.4	<i>Apply principles of animal reproduction to achieve desired outcomes for performance, development, and/or economic production.</i>	
	Student Competencies	
	3.4.1	EVALUATE ANIMALS FOR BREEDING READINESS AND SOUNDNESS.
	3.4.1.1	Identify and categorize the male and female reproductive organs of the major animal species.
	3.4.1.2	Compare and contrast how age, size, life cycle, maturity level, and health status affect the reproductive efficiency of male and female animals.
	3.4.1.3	Summarize the importance of efficient and economic reproduction in animals.
	3.4.1.4	Analyze the functions of major organs in the male and female reproductive systems.
	3.4.1.5	Assess and describe factors that lead to reproductive maturity.
	3.4.1.6	Evaluate reproductive problems that occur in animals.
	3.4.2	APPLY SCIENTIFIC PRINCIPLES TO SELECT AND CARE FOR BREEDING ANIMALS.
	3.4.2.1	Summarize genetic inheritance in animals.
	3.4.2.2	Identify and summarize inheritance and terms related to inheritance in animal breeding (e.g., dominant, co-dominant, recessive, homozygous, heterozygous, etc.).
	3.4.2.3	Identify and summarize genetic defects that affect animal performance.
	3.4.2.4	Identify and summarize different needs of breeding animals based on their growth stages (e.g., newborn, parturition, gestation, gestation lengths, etc.).
	3.4.3	APPLY SCIENTIFIC PRINCIPLES TO BREED ANIMALS.
	3.4.3.1	Identify and categorize natural and artificial breeding methods (e.g., natural breeding, artificial insemination, estrous synchronization, flushing, cloning, etc.).
	3.4.3.2	Analyze the materials, methods and processes of artificial insemination.

	3.4.3.3	Identify and summarize the advantages and disadvantages of major reproductive management practices, including estrous synchronization, superovulation, flushing, and embryo transfer (e.g., cost, labor, equipment, etc.).
Topic 3.5	<i>Evaluate environmental factors affecting animal performance and implement procedures for enhancing performance and animal health.</i>	
	Student Competencies	
	3.5.1	DESIGN ANIMAL HOUSING, EQUIPMENT, AND HANDLING FACILITIES FOR THE MAJOR SYSTEMS OF ANIMAL PRODUCTION.
	3.5.1.1	Differentiate between the types of facilities needed to house and produce animal species safely and efficiently.
	3.5.1.2	Identify and summarize equipment, technology, and handling facility procedures used in modern animal production (e.g., climate control devices, sensors, automation, etc.).
	3.5.2	COMPLY WITH GOVERNMENT REGULATIONS AND SAFETY STANDARDS FOR FACILITIES USED IN ANIMAL PRODUCTION.
	3.5.2.1	Identify and summarize the general standards that must be met in facilities for animal production (e.g., environmental, zoning, construction, etc.).
	3.5.2.2	Distinguish between the types of laws and regulations pertaining to animal systems.
Topic 3.6	<i>Classify, evaluate, and select animals based on anatomical and physiological characteristics.</i>	
	Student Competencies	
	3.6.1	CLASSIFY ANIMALS ACCORDING TO TAXONOMIC CLASSIFICATION SYSTEMS AND USE (E.G. AGRICULTURAL, COMPANION, ETC.).
	3.6.1.1	Explain the importance of the binomial nomenclature system for classifying animals.
	3.6.1.2	Compare and contrast major uses of different animal species (e.g., agricultural, companion, etc.).
	3.6.1.3	Identify and summarize common classification terms utilized in animal systems (e.g., external and internal body parts, maturity, mature male, immature female, animal products, breeds, etc.).
	3.6.1.4	Explain how animals are classified using a taxonomic classification system.
	3.6.2	APPLY PRINCIPLES OF COMPARATIVE ANATOMY AND PHYSIOLOGY TO USES WITHIN VARIOUS ANIMAL SYSTEMS.
	3.6.2.1	Research and summarize characteristics of a typical animal cell and identify the organelles.
	3.6.2.2	Examine the basic functions of animal cells in animal growth and reproduction.
	3.6.2.3	Identify and summarize the properties, locations, functions, and types of animal cells, tissues, organs, and body systems.
	3.6.2.4	Analyze the functions of each animal cell structure.
	3.6.2.5	Analyze the processes of meiosis and mitosis in animal growth, development, health, and reproduction.
	3.6.2.6	Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.

	3.6.2.7	Correlate the functions of animal cell structures to animal growth, development, health, and reproduction.
	3.6.2.8	Apply the processes of meiosis and mitosis to solve animal growth, development, health, and reproductive problems.
	3.6.2.9	Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
3.6.3	SELECT AND TRAIN ANIMALS FOR SPECIFIC PURPOSES AND MAXIMUM PERFORMANCE BASED ON ANATOMY AND PHYSIOLOGY.	
	3.6.3.1	Identify and summarize how an animal's health can be affected by anatomical and physiological disorders.
	3.6.3.2	Evaluate an animal against its optimal anatomical and physiological characteristics.
	3.6.3.3	Research and summarize the use of products and by-products derived from animals.
	3.6.3.4	Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
	3.6.3.5	Compare and contrast procedures to sustainably and efficiently develop an animal to reach its highest performance potential with respect to its anatomical and physiological characteristics.
Topic 3.7	<i>Apply principles of effective animal health care.</i>	
	Student Competencies	
3.7.1	DESIGN PROGRAMS TO PREVENT ANIMAL DISEASES, PARASITES, AND OTHER DISORDERS AND ENSURE ANIMAL WELFARE.	
	3.7.1.1	Identify and summarize specific tools and technology used in animal health management.
	3.7.1.2	Explain methods of determining animal health and disorders.
	3.7.1.3	List and summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
	3.7.1.4	Identify and summarize characteristics of causal agents and vectors of diseases and disorders in animals.
	3.7.1.5	Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).
	3.7.1.6	Describe and demonstrate the proper use and function of specific tools and technology related to animal health management.
	3.7.1.7	Perform simple health-check evaluations on animals and practice basic emergency response procedures related to animals.
	3.7.1.8	Identify and describe common illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders.
	3.7.1.9	Research and analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites, and disorders among animals.
	3.7.1.10	Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures.

	3.7.1.11	Select and use tools and technology to meet specific animal health management goals.
	3.7.1.12	Determine when an animal health concern needs to be referred to an animal health professional.
	3.7.1.13	Treat common diseases, parasites and physiological disorders of animals according to directions prescribed by an animal health professional.
	3.7.1.14	Design and implement a health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments.
	3.7.1.15	Identify and describe surgical and nonsurgical veterinary treatments and procedures to meet specific animal health care objectives.
	3.7.2	ANALYZE BIOSECURITY MEASURES UTILIZED TO PROTECT THE WELFARE OF ANIMALS ON A LOCAL, STATE, NATIONAL, AND GLOBAL LEVEL.
	3.7.2.1	Summarize the importance of biosecurity to the animal industry at multiple levels (e.g., local, state, national, global).
	3.7.2.2	Identify and describe zoonotic diseases including their historical significance and potential future implications.
	3.7.2.3	Analyze procedures at the local, state, and national levels to ensure biosecurity of the animal industry.
	3.7.2.4	Analyze the health risk of different zoonotic diseases to humans and identify prevention methods.
	3.7.2.5	Design and evaluate a biosecurity plan for an animal production operation.
	3.7.2.6	Research and evaluate the effectiveness of zoonotic disease prevention methods and procedures to identify those that are best suited to ensure public safety and animal welfare.
Topic 3.8	<i>Analyze environmental factors associated with animal production.</i>	
	Student Competencies	
	3.8.1	DESIGN AND IMPLEMENT METHODS TO REDUCE THE EFFECTS OF ANIMAL PRODUCTION ON THE ENVIRONMENT.
	3.8.1.1	Identify and summarize the effects of animal agriculture on the environment (e.g., waste disposal, carbon footprint, air quality, environmental efficiencies, etc.).
	3.8.1.2	Assess the effectiveness of methods of reducing the effects of animal agriculture on the environment.
	3.8.2	EVALUATE THE EFFECTS OF ENVIRONMENTAL CONDITIONS ON ANIMALS AND CREATE PLANS TO ENSURE FAVORABLE ENVIRONMENTS FOR ANIMALS.
	3.8.2.1	Research and summarize environmental conditions that impact animals (e.g., weather, sources of water, food resources, etc.).
	3.8.2.2	Identify and summarize methods for ensuring optimal environmental conditions for animals.
	3.8.2.3	Critique the reliability and validity of evidence presented to support claims regarding the effects of environmental conditions on animal populations and performance (e.g., population changes, emerging species, extinction, etc.).
	3.8.2.4	Implement and evaluate the effectiveness of methods to ensure optimal environmental conditions for animals.

Career Ready Practices (CRP)

FFA & SUPERVISED AGRICULTURAL EXPERIENCE

CRP 1	Act as a responsible and contributing citizen and employee.
CRP 2	Apply appropriate academic and technical skills.
CRP 3	Attend to personal health and financial well-being.
CRP 4	Communicate clearly, effectively, and with reason.
CRP 5	Consider the environmental, social, and economic impacts of decisions.
CRP 6	Demonstrate creativity and innovation.
CRP 7	Employ valid and reliable research strategies.
CRP 8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP 9	Model integrity, ethical leadership, and effective management.
CRP 10	Plan education and career path aligned to personal goals.
CRP 11	Use technology to enhance productivity.
CRP 12	Work productively in teams while using cultural/global competence.