**§130.6. Veterinary Medical Applications (One Credit).**

(a)  General requirements. This course is recommended for students in Grades 11-12.

(b)  Introduction.

(1)  Veterinary Medical Applications. To be prepared for careers in the field of animal science, students need to attain academic skills and knowledge, acquire technical knowledge and skills related to animal systems and the workplace, and develop knowledge and skills regarding career opportunities, entry requirements, and industry expectations. To prepare for success, students need opportunities to learn, reinforce, apply, and transfer knowledge and skills and technologies in a variety of settings. Topics covered in this course include, but are not limited to, veterinary practices as they relate to both large and small animal species.

(2)  Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.

(3)  Scientific inquiry. Scientific inquiry is the planned and deliberate investigation of the natural world. Scientific methods of investigation are experimental, descriptive, or comparative. The method chosen should be appropriate to the question being asked.

(4)  Science and social ethics. Scientific decision making is a way of answering questions about the natural world. Students should be able to distinguish between scientific decision-making methods (scientific methods) and ethical and social decisions that involve science (the application of scientific information).

(5)  Science, systems, and models. A system is a collection of cycles, structures, and processes that interact. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.

(c)  Knowledge and skills.

(1)  The student, for at least 40% of instructional time, conducts laboratory and field investigations using safe, environmentally appropriate, and ethical practices. The student is expected to:

(A)  demonstrate safe practices during laboratory and field investigations; and

(B)  demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

(2)  The student uses scientific methods and equipment during laboratory and field investigations. The student is expected to:

(A)  know the definition of science and understand that it has limitations, as specified in subsection (b)(2) of this section;

(B)  know that hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power which have been tested over a wide variety of conditions are incorporated into theories;

(C)  know scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well-established and highly-reliable explanations, but they may be subject to change as new areas of science and new technologies are developed;

(D)  distinguish between scientific hypotheses and scientific theories;

(E)  plan and implement descriptive, comparative, and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology;

(F)  collect and organize qualitative and quantitative data and make measurements with accuracy and precision using tools such as spreadsheet software, data-collecting probes, computers, standard laboratory glassware, microscopes, various prepared slides, animal restraints, stereoscopes, electronic balances, micropipettors, hand lenses, surgical and imagining equipment, thermometers, hot plates, lab notebooks or journals, timing devices, Petri dishes, lab incubators, dissection equipment, and models, diagrams, or samples of biological specimens or structures;

(G)  analyze, evaluate, make inferences, and predict trends from data; and

(H)  communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.

(3)  The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:

(A)  in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;

(B)  communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles, and marketing materials;

(C)  draw inferences based on data related to promotional materials for products and services;

(D)  evaluate the impact of scientific research on society and the environment;

(E)  evaluate models according to their limitations in representing objects or events; and

(F)  research and describe the history of veterinary medicine and contributions of scientists in that field.

(4)  The student learns the employability characteristics of a successful employee. The student is expected to:

(A)  identify career development and entrepreneurship opportunities in the field of veterinary science;

(B)  demonstrate competencies related to resources, information, interpersonal skills, and systems of operation in veterinary science;

(C)  demonstrate knowledge of personal and occupational health and safety practices in the workplace; and

(D)  identify employers' expectations, including appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills.

(5)  The student researches current topics in veterinary medicine, recognizes the importance of animals in society, and discusses professional ethics and laws that relate to veterinary medicine. The student is expected to:

(A)  explain the human-animal bond and how to interact with clients and their animals;

(B)  identify trends, issues, and historical events that have influenced animal use and care;

(C)  describe the legal aspects of animal welfare and animal rights;

(D)  evaluate the principals of veterinary medical ethics; and

(E)  review policies and procedures in veterinary medicine that are considered a reflection of various local, state, and federal laws.

(6)  The student evaluates veterinary hospital management and marketing to determine its importance to the success of veterinary clinics and hospitals. The student is expected to:

(A)  identify skills needed to communicate effectively with clients and pet owners in the community;

(B)  identify vital information and demonstrate effective communication skills necessary to solve problems;

(C)  explain the role and importance of marketing and its effects on the success of a veterinary hospital; and

(D)  develop skills involving the use of electronic technology commonly found in a veterinary hospital.

(7)  The student communicates the importance of medical terminology, evaluates veterinary terms to discover their meanings, and demonstrates the ability to use terms correctly. The student is expected to:

(A)  analyze veterinary terms to discover their meanings and recognize common Greek and Latin prefixes, suffixes, and roots;

(B)  develop appropriate use of directional anatomical terms;

(C)  identify anatomical structures of animals;

(D)  describe the major body systems by using appropriate medical terminology; and

(E)  recognize, pronounce, spell, and define medical terms relating to diagnosis, pathology, and treatment of animals.

(8)  The student explores the area of animal management as it relates to animal identification, animal characteristics, and behavioral temperament. The student is expected to:

(A)  identify a variety of animal species according to common breed characteristics;

(B)  recognize common animal behavioral problems;

(C)  identify correct handling protocols and discuss the relevance to veterinary medical staff; and

(D)  demonstrate appropriate methods of handling a variety of animal behavioral situations.

(9)  The student investigates the body systems and gains a working knowledge of each system's purpose and functions and how each system is affected by disease. The student is expected to:

(A)  identify the parts of the skeletal, muscular, respiratory, circulatory, excretory, reproductive, integumentary, immune/lymphatic, digestive, endocrine, and nervous systems;

(B)  describe the functions of the skeletal, muscular, respiratory, circulatory, excretory, reproductive, integumentary, immune/lymphatic, digestive, endocrine, and nervous systems;

(C)  identify appropriate anatomical sites for injections, measuring vital signs, and collecting blood samples for various animal species; and

(D)  use medical terminology to describe normal animal behavior and vital signs compared to sick animals.

(10)  The student performs mathematical calculations used in veterinary medicine. The student is expected to:

(A)  add, subtract, multiply, and divide whole numbers, fractions, and decimals as related to veterinary medicine;

(B)  apply mathematical skills needed for accurate client assessment such as measurement, conversion, and data analysis;

(C)  find solutions to veterinary problems by calculating percentages and averages;

(D)  convert between English and metric units;

(E)  use scientific calculations to determine weight, volume, and linear measurements;

(F)  solve word problems using ratios and dimensional analysis;

(G)  interpret data using tables, charts, and graphs; and

(H)  use mathematical equations to calculate and prepare chemical concentrations.

(11)  The student evaluates animal diseases and identifies internal and external parasites. The student is expected to:

(A)  identify factors that influence the health of animals;

(B)  identify pathogens and describe the effects that diseases have on various body systems;

(C)  explain the best courses of treatment for common diseases;

(D)  describe the process of immunity and disease transmission;

(E)  identify internal and external parasites using common and scientific names;

(F)  describe life cycles of common parasites;

(G)  explain how parasites are transmitted and their effect on the host;

(H)  conduct parasitic diagnostic procedures; and

(I)  describe types of treatments for diseases and parasites.

(12)  The student evaluates an animal's health during a clinical examination. The student is expected to:

(A)  describe the characteristics and signs of a healthy animal;

(B)  recognize examples of abnormalities and relate them to the associated problems and illnesses;

(C)  take temperature, pulse, and respiration for a variety of animals;

(D)  describe effects of age, stress, and environmental factors on vital signs of animals;

(E)  explain procedures for physical examinations; and

(F)  explain the regional approach to assess an animal's health.

(13)  The student identifies imaging equipment and demonstrates how to safely operate and maintain equipment. The student is expected to:

(A)  identify imaging equipment such as ultrasonograph, endoscope, electrocardiograph, and radiograph;

(B)  explain safety procedures, maintenance, and operation of imaging equipment; and

(C)  demonstrate patient restraint and positioning methods used for imaging purposes.

(14)  The student determines nutritional requirements for ruminant and non-ruminant animals and communicates the importance of animal nutrition in maintaining a healthy animal. The student is expected to:

(A)  identify the anatomy of the digestive system of ruminant and non-ruminant animals;

(B)  describe the process of digestion in ruminant and non-ruminant animals;

(C)  identify types and sources of nutrients and classes of feeds;

(D)  identify feed additives and describe how additives affect the food supply;

(E)  evaluate animal dietary needs, including vitamins, minerals, and water; dietary deficiencies; and feeding factors;

(F)  calculate energy requirements and formulate rations;

(G)  discuss feeding practices and feed-quality issues; and

(H)  analyze the quality of commercially prepared feeds.

(15)  The student examines various aspects of clinical hematology and veterinary pathology. The student is expected to:

(A)  describe laboratory tests and explain the importance of proper laboratory procedures;

(B)  demonstrate the procedures used in collecting, handling, preparing, and examining fecal and urine specimens and blood specimens, including blood cells and plasma;

(C)  discuss normal and abnormal results obtained in complete blood counts;

(D)  explain sensitivity testing and how to read testing results; and

(E)  prepare microscope slides, preserve specimens, and perform several of the most common laboratory tests such as blood types.

(16)  The student identifies hospital procedures, skills, and objectives that are included in the job description of an animal care assistant. The student is expected to:

(A)  explain the care, maintenance, and use of equipment and instruments found in veterinary practice;

(B)  explain appropriate hospital procedures;

(C)  discuss emergency protocols and describe first aid procedures for small and large animals, including cardiopulmonary resuscitation, control of bleeding, and treatment for shock;

(D)  demonstrate animal care skills such as administering medications, nail trimming, bathing, grooming, ear cleaning, expressing anal sacs, dental prophylaxis, enema administration, and identification of animals;

(E)  demonstrate therapeutic care such as patient observation, maintaining and administering fluids, applying bandages, caring for open wounds, and managing hydrotherapy and physical therapy; and

(F)  describe skills involved in the reproductive and genetic evaluation of animals.

(17)  The student identifies and discusses surgical-assisting procedures, skills, and objectives that are included in the job description of an animal care assistant. The student is expected to:

(A)  explain the protocol for pre-surgical and post-surgical care of a patient;

(B)  describe methods used in the sterilization and preparation of small and large animal surgery packs;

(C)  review skills involved in patient and surgical room preparation;

(D)  describe surgical skills such as castration, spaying, dehorning, and docking;

(E)  describe care of newborn, orphan, and recumbent patients; and

(F)  identify and monitor equipment used in surgical procedures.

(18)  The student identifies pharmacology-assisting procedures, skills, and objectives that are included in the job description of an animal care assistant. The student is expected to:

(A)  identify medications according to their classification, form, routes, and methods of administration;

(B)  explain handling and distribution, protocol, and laws for controlled substances;

(C)  calculate dosage using factors such as concentration of drug, weight of animal, and required dosage;

(D)  complete a prescription label with identifiers that are required by the United States Food and Drug Administration; and

(E)  select equipment and instruments used to give medications.

(19)  The student develops an improved supervised agriculture experience program as it relates to agriculture, food, and natural resources. The student is expected to:

(A)  plan, propose, conduct, and evaluate entrepreneurship; placement; exploratory; research, either experimental or analytical; improvement; supplementary; laboratory-based; or other identified, supervised agricultural experience as an experiential learning activity;

(B)  apply proper record-keeping skills as they relate to a supervised experience;

(C)  design and use a customized record-keeping system for the individual supervised experience;

(D)  participate in youth leadership opportunities to create a well-rounded experience program in agriculture; and

(E)  produce a challenging approach for a local program of activities in agriculture.

*Statutory Authority: The provisions of this §130.6 issued under the Texas Education Code, §§7.102(c)(4), 28.002, 28.00222, and 28.025, as that section existed before amendment by House Bill 5, 83rd Texas Legislature, Regular Session, 2013.*

*Source: The provisions of this §130.6 adopted to be effective August 23, 2010, 34 TexReg 5914; amended to be effective August 25, 2014, 38 TexReg 9030.*