

Veterinary Science Technologies

Primary Career Cluster:	Agriculture, Food, & Natural Resources
Course Contact:	CTE.Standards@tn.gov
Course Code(s):	C18H21
Prerequisite(s):	<i>Large Animal Science Technologies</i> (C18H27)
Credit:	1
Grade Level:	12
Elective Focus - Graduation Requirements:	This course satisfies one of three credits required for an elective focus when taken in conjunction with other Agriculture, Food, & Natural Resources courses. In addition, this course satisfies one credit of laboratory science required for graduation.
POS Concentrator:	This course satisfies one out of two required courses to meet the Perkins V concentrator definition, when taken in sequence in the approved program of study.
Programs of Study and Sequence:	This is the fourth and final course in the <i>Veterinary and Animal Science</i> program of study.
Aligned Student Organization(s):	FFA: http://www.tnffa.org
Coordinating Work-Based Learning:	All Agriculture students are encouraged to participate in a Supervised Agricultural Experience (SAE) program. In addition, teachers who hold an active WBL certificate may offer placement for credit when the requirements of the state board's WBL Framework and the Department's WBL Policy Guide are met. For information, visit https://www.tn.gov/education/educators/career-and-technical-education/work-based-learning.html .
Promoted Tennessee Student Industry Credentials:	Credentials are aligned with postsecondary and employment opportunities and with the competencies and skills that students acquire through their selected program of study. For a listing of promoted student industry credentials, visit https://www.tn.gov/education/educators/career-and-technical-education/student-industry-certification.html .
Teacher Endorsement(s):	(048 and 015), (048 and 016), (048 and 017), (048 and 081), (048 and 126), (048 and 127), (048 and 128), (048 and 129), (048 and 151), (048 and 211), (048 and 212), (048 and 213), (048 and 214), (048 and 414), (048 and 415), (048 and 416), (048 and 417), (048 and 418), (048 and 449), (048 and 951) (150 and 015), (150 and 016), (150 and 017), (150 and 081), (150 and 126), (150 and 127), (150 and 128), (150 and 129), (150 and 151), (150 and 211), (150 and 212), (150 and 213), (150 and 214), (150 and 414), (150 and 415), (150 and 416), (150 and 417), (150 and 418), (150 and 449), (150 and 951), (448 and 015), (448 and 016), (448 and 017), (448 and 081), (448 and 126), (448 and 127), (448 and 128), (448 and 129), (448 and 151), (448 and 211), (448 and 212), (448 and 213), (448 and 214), (448 and 414), (448 and 415), (448 and 416), (448 and 417), (448 and 418), (448 and 449), (448 and 951), (950 and 015), (950 and 016), (950 and 017), (950 and 081), (950 and 126), (950 and 127), (950 and 128), (950 and 129), (950 and 151), (950 and 211), (950 and 212), (950 and 213), (950 and 214), (950 and 414), (950 and 415), (950 and 416), (950 and 417), (950 and 418), (950 and 449), (950 and 951)
Required Teacher Certifications/Training:	None
Teacher Resources:	https://www.tn.gov/education/educators/career-and-technical-education/career-clusters/cte-cluster-agriculture-food-natural-resources.html Best for All Central: https://bestforall.tnedu.gov/

Course at a Glance

CTE courses provide students with an opportunity to develop specific academic, technical, and 21st century skills necessary to be successful in career and in life. In pursuit of ensuring every student in Tennessee achieves this level of success, we begin with rigorous course standards which feed into intentionally designed programs of study.

Students engage in industry relevant content through general education integration and experiences such as career and technical student organizations (CTSO) and work-based learning (WBL). Through these experiences, students are immersed with industry standard content and technology, solve industry-based problems, meaningfully interact with industry professionals and use/produce industry specific, informational texts.

Using a Career and Technical Student Organization (CTSO) in Your Classroom

CTSOs are a great resource to put classroom learning into real-life experiences for your students through classroom, regional, state, and national competitions, and leadership opportunities. Below are CTSO connections for this course, note this is not an exhaustive list.

- Participate in CTSO Fall Leadership Conference to engage with peers by demonstrating logical thought processes and developing industry specific skills that involve teamwork and project management.
- Participate in FFA career and leadership events (CDE/LDE) that align with this course including Agriscience Fair, Agricultural Communications, Agricultural Issues, Dairy Evaluation and Management, Dairy Cattle handlers, Employment Skills, Extemporaneous Speaking, Horse Evaluation, Livestock Evaluation, Meats Evaluation and Technology, Parliamentary Procedure, Poultry Evaluation, Public Speaking, and Veterinary Science.

Using Work-Based Learning (WBL) in Your Classroom

Sustained and coordinated activities that relate to the course content are the key to successful work-based learning. Possible activities for this course include the following. This is not an exhaustive list.

- **Standards 1.1-2.3** | Invite a vet tech or veterinarian to discuss the history and trends within the industry including animal and personal safety.
- **Standards 3.1-3.2** | Interview veterinary health care professionals about veterinary laws and ethics.
- **Standards 4.1-9.5** | Participate in an abbreviated internship to practice approved veterinary care skills.
- **Standards 10.1-10.2** | Participate in an employee orientation at a veterinarian office or clinic to focus on communication and recordkeeping.

Course Description

Veterinary Science is an advanced course in animal science and care for students interested in learning more about becoming a veterinarian, vet tech, vet assistant, or pursuing a variety of scientific, health, or agriculture professions. This course covers principles of health and disease, basic animal care and nursing, clinical and laboratory procedures, and additional industry-related career and leadership knowledge and skills. Upon completion of this course, students will be able to pursue advanced study of veterinary science at a postsecondary institution.

Course Standards

1. Economic, Occupational, and Technological Implications

- 1.1 Career Exploration: Explore and compare **local and regional career opportunities in the veterinary science industry** using information from local job postings and Tennessee labor data. **Describe the knowledge, skills, and abilities necessary for a selected occupation** in veterinary and related careers.
- 1.2 Emerging Technologies: Examine specific **technologies** that have evolved within the veterinary science industry including but not limited to advances in **equipment and procedures** in healthcare, and evaluate the economic and societal implications of each. Explain how these **advances have impacted the veterinary science industry**.

2. Personal and Occupational Health and Safety

- 2.1 Occupational Safety: Compare and contrast the **safety hazards associated with clinical and field settings**. Review safety hazard case studies and recommend research-based practices to prevent the safety hazard in the future.
- 2.2 Safety and Operational Procedures: Review common **laboratory safety procedures for tool and equipment operation** in the veterinary science laboratories, including but not limited to **accident prevention and control procedures**. Demonstrate the ability to follow safety and operational procedures in a lab setting and complete a safety test with 100 percent accuracy.
- 2.3 Personal and Animal Safety: Demonstrate the ability to **follow procedures precisely** for the following areas:
 - a. animal restraint and handling in clinical or field settings;
 - b. sanitation, disinfection, and sterilization procedures to prevent the transfer of zoonotic diseases; and
 - c. Globally Harmonized System (GHS) chemical data sheets interpretation.

3. Veterinary Law and Ethics

- 3.1 Ethical Issues: Gather and compare information on the **philosophical, social, moral, and ethical issues** encountered in the veterinary profession. Debate their implications for practitioners of veterinary science by developing claim(s) and counterclaim(s) supported by reasoning and evidence from research.

- 3.2 Legal Regulations: Research **legislation, local, state, and federal laws** that regulate policies and procedures in veterinary medicine to summarize:
- animal rights and welfare;
 - professional licensing;
 - liability of veterinary staff;
 - U.S. Food and Drug Administration (FDA), U.S. Department of Agriculture (USDA), and U.S. Environmental Protection Agency (EPA) regulations for veterinary drugs and biologicals; and
 - Occupational Safety and Health Administration (OSHA) regulations for workplace safety.

4. Clinical Anatomy and Physiology

- 4.1 Clinical Terminology: Identify common **clinical terminology, abbreviations, and symbols** relating to the diagnosis, pathology, and treatment of animals.
- 4.2 Cellular Homeostasis: Recognize various states of **cellular homeostasis** to identify infections, diseases, and mutations.
- 4.3 Tissue Anatomy: Review fundamental concepts pertaining to **tissue and organ systems** by comparing and contrasting the structure and function of different tissue types, including epithelial, connective, muscle, and nervous tissues. Explain **how cellular differentiation** allows for specialized tissue development.
- 4.4 Body Systems: Identify and research the **major body systems**, including the skeletal, muscular, respiratory, digestive, nervous, integumentary, urinary, and reproductive systems. Develop models to compare and contrast between different **species of small and large domesticated animals**.

5. Clinical Nutrition

- 5.1 Nutritional Assessment: Perform **nutritional assessment techniques**, including body condition scoring and life stage to determine the nutritional status of animals. Apply this information to recommend **balanced rations**, justify the recommendations.
- 5.2 Diseases and Disorder: Research the **relationships of diseases and disorders to digestion, absorption, and metabolic processes**. Assess the impact of various diseases and disorders on the **maintenance of optimum nutrition levels** in the animal's body.

6. Clinical Procedures

- 6.1 Equipment: Correctly identify and describe the **function of common equipment** used in the clinical area of a veterinary practice, including but not limited to examination tools, radiology equipment, ultrasound equipment, surgical equipment, and testing equipment. Develop a checklist including safe use and maintenance for specific equipment.

6.2 Procedures: Demonstrate, in a live setting or in a presentation, **physical examination procedures** in the following areas:

- a. identification of exam purpose, importance, and routine tasks;
- b. completion of new client health history report;
- c. identification and evaluation of factors affecting the physiological state of animals;
- d. identification of characteristics and signs of healthy animals;
- e. demonstration of procedures to accurately obtain and record vital signs; and
- f. identification and evaluation of effects of age, stress, and environmental factors on vital signs.

6.3 Vaccines and Injections: Identify and recommend the optimum timeline for administering different **types of vaccines** suitable for different species. Demonstrate, in a live setting or in a presentation, the ability to:

- a. identify injection methods;
- b. identify appropriate anatomical injection sites; and
- c. administer the injection, including the selection of appropriate equipment.

6.4 Contamination Prevention: Explain the importance of **contamination prevention** as related to the veterinary industry. Demonstrate the ability to explain and follow contamination control procedures relating to the following areas:

- a. principles of sanitation, disinfection, antiseptics, and sterilization;
- b. exam room care and sanitation procedures;
- c. classification of sterilants, antiseptics, disinfectants, and their appropriate applications;
- d. hazardous waste management; and
- e. proper techniques to fill a syringe for a prescribed dosage.

7. Animal Nursing

7.1 Plan of Care: Design a **care plan** by interpreting patient records and treatment plans, and perform basic nursing and patient monitoring tasks.

7.2 Basic First Aid: Outline **basic first aid, wound care, and bandaging procedures** and compare the different procedures in relation to small and large animals. Demonstrate, in a live setting or in a presentation, the ability to follow these procedures precisely, while distinguishing between small and large animals for the following areas:

- a. canine cardiopulmonary resuscitation (CPR) procedures;
- b. assessment and care of common physical injuries such as cuts, abrasions, and contusions;
- c. wound therapies at different phases of healing;
- d. types and purposes of bandages, splints, slings, and casts, and indications for use;
- e. techniques for application and removal of bandages; and
- f. caring of animals during the birthing process.

- 7.3 Pharmaceutical: Research and explain **laws and regulations related to the administration of prescription and over-the-counter medication** within the veterinary industry. Demonstrate the ability to follow **medication administration procedures** precisely, including:
- identification of common medications and their required storage, handling, and disposal;
 - demonstration of administration techniques for topical and oral medications;
 - interpretation of medication label and packaging information; and
 - calculate proper dosages of medications based upon label directions.

8. Laboratory Procedures

- 8.1 Biological Samples: Compare and contrast appropriate **laboratory quality control procedures** such as the proper collection, preparation, handling, and storage of biological samples, and describe their effects on obtaining accurate data from laboratory procedures.
- 8.2 Hematology: Develop a procedural check sheet to aid in conducting **veterinary clinical hematology procedures** such as complete blood count (CBC). Using the check sheet, demonstrate the ability to follow clinical hematology procedures precisely in relation to the following areas:
- sample collection, preparation, and storage,
 - microscopic examination to identify blood cells, and
 - interpretation of normal and abnormal results.
- 8.3 Urinalysis and Fecal Analysis: Explain and justify the need for conducting **urinalysis and fecal analysis** as related to animal health. Outline procedures for conducting clinical urinalysis to include the following:
- sample collection, preparation, and storage;
 - physical, chemical, and microscopic examination procedures; and
 - interpretation of normal and abnormal results.

9. Principles of Disease

- 9.1 Disease Prevention and Control: Compare and contrast the **role of the USDA, state veterinarians, state animal disease laws, and diagnostic labs** in disease prevention and control. Explain the classification of diseases and disease processes, and identify causative factors and agents of disease.
- 9.2 Disease – Signs and Symptoms: Explain how diseases affect the body and **differentiate between clinical signs and symptoms of diseases**. Identify and describe the differences between clinical signs and symptoms of proper health and poor health.
- 9.3 Prevention Methods: Identify symptoms of common **animal diseases and their causative agents**, and summarize **methods of prevention, treatment, and control** by drawing evidence from informational texts or recent medical literature.
- 9.4 Parasite Infections: Describe the clinical signs of an animal with a **parasite infection**. Compare and contrast the symptoms of common internal and external parasite infections

and summarize **methods of prevention, treatment, and control** between small and large animals.

- 9.5 Genomics: Research how **genomics** can be used to reduce animal diseases, citing credible sources. Compare the different approaches genomics have on disease tolerance in both small and large animals.

10. Clinic Management

- 10.1 Front Office Operations: Demonstrate effective **oral and written communication skills** needed in clinical settings, including but not limited to client greeting, telephone answering, appointment scheduling and management, and admission and discharge procedures. Outline the **procedures for euthanasia and post mortem customer care and** role-play appropriate grief counseling services for clients.
- 10.2 Business Operations: Identify the types of **medical, financial records, and recordkeeping platforms** required to ensure a viable veterinary practice. Explain, justify, and demonstrate correct procedures for the completion and filing of veterinary records, required business operational records including inventory management documents, and related documentation in a legal manner to ensure a sound business.

Standards Alignment Notes

References to other standards include:

- SAE for All: [Evolving the Essentials](#): All Agriculture students are encouraged to participate in a Supervised Agricultural Experience (SAE) program to practice and demonstrate the knowledge and skills learned in their agriculture courses.
- AFNR: [National Agriculture, Food, & Natural Resources \(AFNR\) Career Cluster Content Standards](#): Students engaged in activities outlined above should be able to demonstrate fluency in Standards AS.01, AS.02, AS.03, AS.04, and AS.06 at the conclusion of the course.
- P21: Partnership for 21st Century Skills [Framework for 21st Century Learning](#)
 - Note: While not all standards are specifically aligned, teachers will find the framework helpful for setting expectations for student behavior in their classroom and practicing specific career readiness skills.