

Animal Anatomy and Physiology 1

Course Outcome Summary

Course Information

Organization	Madison Area Technical College
Developers	Dr. Robert Taylor
Development Date	4/20/2004
Revised By	Dr. Robert L. Taylor
Revised Date	11/25/2008
Course Number	10-091-140
Instructional Level	Associate Degree
Instructional Area	Veterinary Technician and Laboratory Animal Techni
Division	Agriscience, Apprenticeship, Technical, Industrial
Department	Veterinary Technician and Laboratory Animal Techni
Potential Hours of Instruction	108
Total Credits	4

Description

Covers terminology, functions, location, identification and organization of anatomical structures that are parts of body systems. Students dissect and study cadavers and tissue specimens from common domestic species.

Target Population

Veterinary Technician Program and Laboratory Animal Technician Program students

Types of Instruction

Instruction Type	Contact Hours	Credits
Classroom Presentation	36	4
On-Campus Lab	72	

Textbooks

Colville, Thomas and Bassert, Joanna. *Clinical Anatomy & Physiology for Veterinary Technicians*. Mosby-Elsevier. 2008. **Edition:** 2nd. **Unit Price:** \$65. **Pages:** 543. **ISBN:** 978-0-323-04685-5. **Source:** Mosby-Elsevier.

Colville, Thomas and Bassert, Joanna. *Clinical Anatomy & Physiology Laboratory Manual for Veterinary Technicians*. Mosby-Elsevier. 2008. **Edition:** 1st. **Unit Price:** \$65. **Pages:** 486. **ISBN:** 978-0-323-04684-8. **Source:** Mosby-Elsevier.

Learner Supplies

Laboratory Smock. **Manufacturer:** various. **Quantity:** 1. **Price:** %30. **Source:** MATC Auto Parts store.

Safety glasses or goggles. **Manufacturer:** various. **Quantity:** 1 pair. **Price:** \$10.00. **Source:** MATC auto parts store.

Invisible Horse, Cow or Dog Kit. **Manufacturer:** SkilCraft. **Quantity:** 1. **Price:** \$15-20. **Source:** various suppliers.

Prerequisites

Occupational Preparation: An Introduction to Veterinary Technician (10-091-105) or equivalent or concurrent

enrollment

Animal Biology (806-105) or equivalent or instructor consent

and Veterinary Medical Terminology (10-091-170) or equivalent or concurrent enrollment

Competencies

A. Use a common veterinary medical language

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you distinguish between axial and appendicular skeleton
2. you use selected anatomical terms
3. you explain the principle of Homeostasis including the mechanisms the body uses to maintain homeostasis
4. you summarize levels of organization found within the body
5. you contrast the planes of reference
6. you distinguish between anatomical directional terms to locate body parts (medial vs lateral, cranial vs caudal, anterior vs posterior, palmar vs plantar, dorsal vs. ventral, proximal vs distal, deep vs superficial)
7. you explore the movements of a joint using the terms flexion and extension, abduction and adduction, circumduction and rotation

B. Explore cell biology concepts

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you explore the characteristics of a living cell
2. you distinguish between hypertonic, isotonic, hypotonic solutions and their effects on a cell
3. you explore the function of and formation of ATP
4. you explore organelles within a cell
5. you explain the functions of a cell
6. you apply knowledge of cell structure and function to higher level physiology
7. you explain the organization of a cell
8. you compare and contrast cell differentiation and functions
9. you explain how the structure of a cell membrane is related to its function
10. you summarize the structure and function of cytoplasmic organelles including cell membrane, nucleus, mitochondria, golgi apparatus, endoplasmic reticulum (rough & smooth), lysosomes, vesicles, vacuoles, and ribosomes

C. Examine how cells are organized into higher functional units

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you examine tissue types
2. you examine the types of epithelium identifying the organ in which each is found.
3. you explain the general characteristics and functions of nerve tissue
4. you distinguish between the three types of muscle tissue with regards to structure, function, and location within the body
5. you examine the general characteristics of connective tissue including the major functions and

locations of each type of connective tissue

6. you apply knowledge of the tissues to the normal organization of the body
7. you explore healing of various tissue types based on your knowledge of their structure and function

D. Explore the function of the integument and its accessory glands and structures

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you examine types of membrane including where each type is found within the body
2. you explore the layers, growth, and functions of the cutaneous membrane
3. you examine the function and location of a serous membrane
4. you examine the function and location of a synovial membrane
5. you examine the function and location of a mucous membrane
6. you explore a hair follicle including hair growth
7. you summarize wound healing
8. you examine the function and location of a sebaceous gland including sebaceous cysts
9. you examine a mammary gland
10. you distinguish between nails and hoofs

E. Examine the anatomy and physiology of "bone" a living organ

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you summarize the functions of bone
2. you identify bones upon radiograph
3. you identify bones based upon palpation of live animals
4. you examine types of tissue bone including effects on its physiology
5. you classify bones
6. you use terms related to bone as you locate each (epiphysis; diaphysis; periosteum; compact {cortical} bone; spongy {cancellous} bone; epiphyseal disk; red marrow; yellow marrow; osteocyte; osteoblast; osteoclast)
7. you name and locate all the bones in the body
8. you distinguish the bones of various species
9. you examine methods of bone formation
10. you explain bone repair
11. you examine fracture types including length of healing for different fractures
12. you summarize factors that affect bone growth and development
13. you explain simple bone pathology, Ca deficiency, fractures, dysplasia, osteosarcoma
14. you examine the chemical make-up of bone and pathologic states (i.e., milk fever, eclampsia, Ca deficiency in the diet)

F. Examine how bones come together within the skeletal system

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you examine the movements of joints
2. you classify synovial joints providing examples of each
3. you examine the motion possible for each synovial joint in the body

4. you examine the function and location of synovial joints including the joint capsule, synovial fluid, articular cartilage, ligaments, menisci, bursa and synovial sheath
5. you explore the structural classification of joints
6. you summarize pathological states of joints including OCD, hip dysplasia, arthritis, cruciate ligament tear, artificial hip replacement, injections into joint spaces
7. you explore laparoscopic surgery
8. you identify all joints on a radiograph
9. you use anatomically correct terms for all joints of the body of various species
10. you identify all joints relative to each other using anatomical directional terms
11. you recognize all joints identifying them upon palpation of a live animal

G. Distinguish between muscle at different levels in the body

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you examine the muscle contraction at the cellular level
2. you examine the function and location of three types of muscle
3. you examine the function of the "motor end plate"
4. you explore the functions of muscle relating each to homeostasis
5. you explain the relationship of terms "origin," "insertion," and "belly" to muscle
6. you explore the pathologic states of muscle (botulism, cramps, tetanus, rigor mortis)
7. you explain the cellular components of muscle
8. you explain the organizational arrangement of muscle
9. you explain actin, myosin, myofibril
10. you identify the muscles of the extrinsic forelimb on dissection and live animal
11. you identify the intrinsic muscles of the forelimb on dissection and in the live animal
12. you examine the origin, insertion and function of each of the above muscles
13. you summarize the function of antagonistic muscle pairs giving examples of them
14. you identify the muscles of the antebrachium by function on dissection and live animals
15. you the muscles of the pelvic limb as designated by the laboratory objectives on dissection and live animal

H. Relate the importance of the circulatory system to homeostasis

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you explore the four chambers of a mammalian heart
2. you examine the flow of blood through the heart including the vessels, valves and chambers through which it passes
3. you explain how the atrioventricular, aortic and pulmonary semilunar valves prevent blood from flowing backward
4. you summarize how the coronary arteries fill and how blood is circulated through the coronary system
5. you explore an MI or heart attack
6. you examine a coronary bypass
7. you explain the events of the cardiac cycle relating these to the EKG and auscultation
8. you distinguish between a heart murmur and an arrhythmia
9. you distinguish between veins, arteries and lymphatics
10. you explain the anatomical cardiovascular structures in species

11. you locate the cardiac structures upon dissection
12. you summarize pathologies including heartworm, CHF, MI, High Mountain Disease, right-sided vs. left-sided heart failure
13. you identify various WBC and RBC listing their functions possible elevation of numbers
14. you explore the modification necessary for fetal circulation
15. you summarize the characteristics of the formed elements in blood and the fluid portion of blood
16. you explore the clotting mechanisms and certain pathologies, thrombocytopenia, Vit. K relationship, hemophilia, erythrolytic syndrome in horses
17. you explain the process that influences lymphatic fluid formation, define chylothorax
18. you explain the processes that regulate the flow of blood

I. Explore the function of the respiratory system and its role in homeostasis

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you identify designated thoracic structures in a dissected animal
2. you examine the membranes of the thoracic cavity
3. you explore the function of the thymus
4. you summarize the functions of the respiratory system and how they affect homeostasis
5. you identify the major airways
6. you differentiate between the mechanisms of inspiration and expiration
7. you summarize the respiratory normals for the species used at MATC
8. you explain the factors that affect respiratory rate
9. you differentiate between tidal volumes, vital capacity, expiratory reserve volume, inspiratory reserve volume, residual volume, total lung capacity
10. you explore gas exchange at the alveoli level
11. you explain how oxygen and carbon dioxide are transported via the circulatory system
12. you differentiate between pathologic states, apnea, pneumonia, obstruction, CO poisoning

J. Explore the functions of the digestive system and how they relate to homeostasis

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you identify all designated structures listed on lab performance objectives
2. you differentiate between simple stomach and compound stomach
3. you differentiate between foregut fermentor and hindgut fermentor
4. you differentiate between ruminant and nonruminant
5. you differentiate between herbivore, carnivore and omnivore
6. you compare and contrast the species differences in digestion
7. you recognize the organs of the digestive tract on a radiograph
8. you compare and contrast the process of digestion and absorption for different species
9. you explore the position and function of the major salivary glands
10. you compare and contrast the function of saliva in different species
11. you explain the function of HC1 and digestive enzymes including where each is made
12. you differentiate between the major functions of the pancreas, liver, lacteals
13. you differentiate between the common pathologies of the digestive system, vomiting, regurgitation, diarrhea, malabsorption vs. maldigestion, colic, GDV
14. you examine the dental lab and teeth learning plan
15. you differentiate between the normal and spatial arrangement of the digestive organs including

the relationship to each other in the abdominal cavity

K. Investigate how dental health is important in all aspects of animal husbandry

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you examine the dental formula for the adult dog, cat, horse
2. you investigate what is looked at when aging an animal by its teeth (horse, dog, cat, sheep)
3. you differentiate between incisor, canine, premolar, molar teeth
4. you differentiate between the following surfaces of a tooth: lingual, buccal=vestibular, occlusal=masticatory, contact (rostral vs. caudal)
5. you use the following terms appropriately: enamel, cementum, dentin, pulp, crown, neck, root, gingiva, alveoli, periodontal membrane
6. you summarize the following pathologies: overshot jaw=prognathia malocclusion, undershot jaw=brachygnathia periodontal disease, periodontal disease, relationship of periodontal disease with heart murmurs

L. Explore the normal physiology of the urinary system and how it relates to homeostasis

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you identify all designated structures in lab
2. you recognize the organs of the urinary system on radiograph
3. you differentiate the urinary system in specified species
4. you name the organs involved in the urinary system and give the function of each
5. you trace the flow of blood and urine through the kidney
6. you describe how the kidney functions to remove metabolic waste, control the rate of RBC formation, regulate blood pressure
7. you explore the process of glomerular filtration
8. you investigate the process of tubular secretion and reabsorption
9. you compare the composition of glomerular filtrate and blood plasma
10. you use the following terms: anuria, diuresis, hematuria, polyuria, glucosuria, dysuria, oliguria
11. you examine common pathologies of the urinary system: FUS, cystitis, hydronephrosis, CRF, FLUTD, calculi, ARF
12. you explore the nephron

M. Examine how the nervous system functions and integrates information to maintain homeostasis

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you differentiate the function and location of the central nervous system, the peripheral nervous system, the spinal cord, and the brain
2. you explore a neuron and its parts
3. you explain impulse transmission at a cellular and hormonal level
4. you differentiate between a synapse and neurotransmitters
5. you differentiate between preganglionic and postganglionic fibers
6. you differentiate between myelinated and nonmyelinated nerve fibers
7. you examine the designated parts of the brain (see lab objectives) through dissection

8. you examine the spinal cord, the dorsal vs. ventral roots, central canal including how impulses are relayed through the spinal cord
9. you differentiate between spinal and cranial nerves
10. you differentiate between the autonomic nervous system, sympathetic and parasympathetic including how the neurotransmitters used
11. you explore the cranial nerves
12. you explain the formation, constitution and function of CSF
13. you explore common pathology of the nervous system including rate of nerve healing, herniated brain stem, and cerebellar hypoplasia

N. Explore how the endocrine system is a direct outcome of its varied functions to maintain homeostasis

You will demonstrate your competence:

1. on a written exam
2. by completing lab assignments

Your performance will be successful when:

1. you explore the location, function and regulation of the hypothalamus
2. you explore the location, function and regulation of the thyroid
3. you explore the location, function and regulation of the thymus
4. you explore the location, function and regulation of the ovary
5. you explore the location, function and regulation of the kidney
6. you explore the location, function and regulation of the pituitary
7. you explore the location, function and regulation of the parathyroid
8. you explore the location, function and regulation of the adrenals
9. you explore the location, function and regulation of the testicle
10. you explore the location, function and regulation of the liver
11. you explain the hormonal feedback loops involved in regulation of each of the above endocrine systems
12. you explore a hormone, explaining its chemical properties and how it travels through the body