

JEFFERSON COLLEGE

COURSE SYLLABUS

BIO207

VERTEBRATE ANATOMY

4 Credit Hours

Prepared by:
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Ms. Linda Abernathy, Division Chair, Math, Science & Business
Ms. Shirley Davenport, Dean, Arts & Science Education

BIO207 Vertebrate Anatomy

I. CATALOG DESCRIPTION

- A. Course pre-requisites/co-requisites:
- High School Biology and Chemistry or equivalent to BIO101 (Introduction to Biology) with a grade of “C” or better within the previous 5 years of registration date
 - Reading proficiency.
- B. 4 semester credit hours
- C. Vertebrate Anatomy compares members of the vertebrate classes in taxonomy, anatomy, and evolutionary relationships. All major organ systems are examined, as are many special modifications for specific life styles. Laboratory time is required. (F)
- D. Curricular alignment:
- Fulfills part of Natural Sciences (Biological Sciences) with lab for select AAS degree general education requirement, NOT part of MOTR CORE 42.
 - Elective course applies toward AA or AAT degree.
 - Fulfills AAS – Veterinary Technology degree requirement.

II. EXPECTED LEARNING OUTCOMES/CORRESPONDING ASSESSMENT MEASURES

| Expected Learning Outcomes | Assessment Measures |
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| Be able to analyze a phylogenetic tree; differentiate between the phylogeny of vertebrates; be able to explain a phylogenetic tree comparing vertebrates; be able to arrange vertebrates according to their classes and order | Classroom lecture and discussion, homework assignments, quizzes, and exams |
| Be able to distinguish between the major stages of early vertebrate embryonic development; reconstruct the processes causing each stage of development; relate the embryonic tissue that leads to the development of adult tissues and organs | Classroom lecture and discussion, homework assignments, quizzes, and exams |
| Differentiate between the four major biological molecules; be able to diagram the structure of enzymes; be able to explain the activity of enzymes | Classroom lecture and discussion, homework assignments, quizzes, and exams |
| Be able to construct a model of a eukaryotic cell; be able to differentiate between the different organelles of eukaryotic cells; identify how genes are expressed in eukaryotic cells | Classroom lecture and discussion, homework assignments, quizzes, and exams |

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| <p>Examine the four types of animal tissue; classify the four types of animal tissues; be able to match each of the animal tissues their corresponding cell and matrix structure; categorize each tissue by its predominate types of biological molecules</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Discriminate between the layers of the integument; classify layers of the integument based on their major cell and tissue structure; identify epidermis and dermis by their layers and cells; illustrate the structure of the hair follicle anatomy; illustrate the structure of the epidermal glands; compare and contrast the structures of claws, hoofs and horns</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, and exams</p> |
| <p>Distinguish between the functions and types of skeletal systems; connect the development of the skeletal system from embryonic tissues; explain the cell and matrix structure of the bone; memorize the anatomy of the skeletal system; analyze the endocrine system's regulation of bone metabolism; identify the unique characterizes of ungulate limb anatomy</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Explain the functions of the muscular system; categorize the types of muscle tissues based on function and anatomy; describe the cellular structure of muscle tissue; memorize the gross anatomy of the cat muscular system</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Explain the functions of the anatomy of a vertebrate nervous system; be able to identify major parts of the brain as well as major nerves of the animal; describe the cellular anatomy of nervous tissue; identify the structure of the nerve and its neural pathways; discriminate between the structure of the central nervous system, peripheral nervous system and somatic nervous system and divisions of the autonomic nervous system</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Differentiate between the characteristics of the endocrine organs, such as thyroid, stomach, testes, ovary and kidney; describe the structure of the endocrine hormones; identify the anatomy of the hypothalamic-pituitary system; connect the adrenal cortex, adrenal medulla and the pancreas to their structure, regulation and activities</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |

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| <p>Identify the gross anatomy of the digestive system, including the buccal cavity, pharynx, esophagus, stomach, small intestine, large intestine and associated organs; contrast the exocrine glands the digestive system, including the pancreas and liver; describe the structure and function of the rumen; describe the structure and function of the cecum of the horse</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Summarize the meanings of respiration; be able to compare the histology of the respiratory system; identify the gross anatomy of the respiratory system including nasal cavity, pharynx, trachea, bronchi, bronchioli, alveoli; relate the cellular anatomy of the respiratory surface to its function</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Outline the components of the cardiovascular system; identify the anatomy of the heart, including the heart and surrounding cavities, the thoracic cavity (pleural and mediastinum), the tissues of the heart and the cavities and the valves of the heart; identify the anatomy of the blood vessels in the circulatory system; distinguish between the major pathways of cranial and caudal arteries and veins of the circulatory system; compare the blood to other body fluids; analyze the chemical characteristics and components of blood</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Explain the functions of the urinary system; identify the gross anatomy of the urinary system; illustrate and identify the morphology of the nephron, renal corpuscle and filtration membranes</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |
| <p>Identify the anatomy of the lymphatic system; explain the process of hematopoiesis; describe the functions of the various immune system cells; differentiate between the innate and adaptive immune system; differentiate between passive and active immunity; explain the process of a primary and secondary immune response</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, and exams</p> |
| <p>Identify the anatomy and describe the anatomy of the female reproductive organs; relate the terms to twinning and cloning to modern reproductive technologies</p> | <p>Classroom lecture and discussion, homework assignments, quizzes, exams, and laboratory activities</p> |

III. COURSE OUTLINE

- A. Classification of vertebrates
 - 1. Phylogeny of vertebrates
 - 2. Common characteristics of the class and order of vertebrates

- B. Development
 - 1. Major states in early embryonic development
 - 2. Processes causing the various stages of development
 - 3. Embryonic tissues and the path to adult tissues and organs

- C. Biological molecules
 - 1. Four types of biological molecules
 - 2. Monomers that form the four types of biological molecules
 - 3. Structure and function of enzymes

- D. Cells
 - 1. Mitosis and meiosis
 - 2. Structure of the plasma membrane
 - 3. Routes of movement across the plasma membrane
 - 4. Structure and function of organelles
 - 5. DNA synthesis and gene expression

- E. Tissues
 - 1. Four major tissue types
 - 2. Cellular junctions between epithelial cells
 - 3. Structure of the basement membrane
 - 4. Characteristics used to classify the four types of tissues
 - 5. Differentiate between types of connective tissues
 - 6. Stages of healing
 - 7. Characteristic biological molecules of the types of tissues

- F. Integument system
 - 1. Functions
 - 2. Layers of integument system
 - 3. Layers of the epidermis
 - 4. Cell types and their functions that comprise the epidermal tissue
 - 5. Layers of the dermis and the function of each
 - 6. Structures that comprise the hypodermis
 - 7. Anatomy of hair follicle
 - 8. Types of hairs
 - 9. Anatomy of glands
 - 10. Structure of claws, hoof, antler, and horns

- G. Skeletal system
 - 1. Function
 - 2. Cell types that comprise bone and their functions
 - 3. Structure of both cancellous and compact bone

4. Steps in endochondral bone formation and growth
5. Steps in intramembranous bone formation
6. Bone shapes
7. Identification of bones of the axial and appendicular skeleton
8. Terms used to describe shapes and surface features of bone
9. Identification of surface features of bones
10. Describe three classifications of joints
11. Differentiate between types of synovial joints
12. Differentiate between red and yellow bone marrow
13. Endocrine regulation of bone metabolism

H. Muscular system

1. Functions
2. Three types of muscle and characteristics of each
3. Structure and function of tendons, ligaments, and aponeuroses
4. Cellular anatomy of muscle
5. Microscopic anatomy of three muscle types
6. Describe the structure of muscle, from gross to microscopic
7. Differentiate between antagonistic and synergistic
8. Differentiate between prime mover and fixator muscle
9. Identification of muscles

I. Nervous system

1. Functions
2. Structure of a neuron and neuroglia
3. White matter and gray matter
4. Afferent and efferent nerves
5. Components of the central nervous system
6. Components of the peripheral nervous system
7. Autonomic and somatic nervous system
8. Structure and function of brain anatomy
9. Connective tissue layers surrounding the brain and spinal cord
10. Function of cerebrospinal fluid
11. Location and function of the twelve cranial nerves
12. Identification of structures of the nervous system
13. Types of reflexes
14. Components of the reflex arc
15. Special senses
16. Structures of the eye, conjunctiva, and eyelids
17. Structure and function of the components of the ear
18. General types of sensory receptor stimuli
19. Visceral senses

J. Endocrine system

1. Major endocrine glands
2. Hormones produced by the major endocrine glands
3. Hormones produced by other organs of the body
4. Anatomy of major endocrine glands
5. Anatomy of the hypothalamic-pituitary system
6. Identification of endocrine glands

- K. Digestive system
1. Function
 2. Gross anatomy
 3. Salivary glands
 4. Structure of teeth
 5. Distinguish between teeth of carnivores and herbivores
 6. Structures of monogastric stomach
 7. Structures of the rumen
 8. Structure of the cecum of the horse
 9. Exocrine glands of the digestive system
- L. Respiratory system
1. Function
 2. Histology
 3. Gross anatomy
 4. Cellular anatomy of respiratory surface
- M. Cardiovascular system
1. Function
 2. Gross anatomy
 3. Heart wall
 4. Chambers and heart valves
 5. Systemic and pulmonary blood flow
 6. Systole and diastole
 7. Electrical impulse pathway
 8. Fetal circulation
 9. Events responsible for heart sounds
 10. Structure of arteries, capillaries, and veins
 11. Major arteries and veins involved in systemic circulation
 12. Name and location of common veins used in venipuncture
 13. Chemical and cellular composition of blood
 14. Structure of hemoglobin
- N. Urinary system
1. Function
 2. Gross anatomy
 3. Anatomy of the nephron
 4. Main blood vessels associated with the kidney
- O. Immune system
1. Function
 2. Antigens
 3. Antibodies
 4. Innate immune system
 5. First line of defense
 6. Hematopoiesis

7. Cells of the immune system
8. Cytokines
9. Complement system
10. Phagocytosis
11. Inflammatory response
12. Adaptive immune system
13. Lymphatic system
14. B-lymphocytes
15. Humoral response
16. T-lymphocytes
17. Cell mediated response
18. Primary and secondary response
19. Active and passive immunity
20. Hypersensitivities
21. Autoimmune disease
22. Immunodeficiency

P. Reproductive System

1. Function
2. Gross anatomy of male reproductive system
3. Gross anatomy of female reproductive system
4. Ovarian cycle
5. Stages of estrous
6. Reproductive technologies

IV. METHODS OF INSTRUCTION

- A. Lecture
- B. PowerPoint presentations
- C. Textbook assignments
- D. Class discussions
- E. Laboratory exercises

V. REQUIRED TEXTBOOKS

Colville, T. P., & Bassert, J. M. *Clinical anatomy and physiology for veterinary technicians* (current edition). St. Louis, MO: Mosby Elsevier.

VI. REQUIRED MATERIALS

No materials required

VII. SUPPLEMENTAL REFERENCES

No supplemental reference required

VIII. METHODS OF EVALUATION

A. Distribution of final grade

Students are evaluated by quizzes, five hourly exams, a comprehensive final exam, laboratory practicum

B. Assignment of final letter grades

90-100% = A

80-89% = B

70-79% = C

60-69% = D

Below 60% = F

C. Attendance policy

Student attendance is mandatory. There are no excused absences. If a student misses more than 15% of the total time (including lecture and laboratory) that the class meets in a semester, the student may be prohibited from attending the class by the instructor. In such cases, the student must officially withdraw from the course by the designated withdrawal date in order to reduce the possibility of receiving an "F" for the course.

No make-up exams will be given, however students are allowed to drop their lowest grade on one of the hourly tests, therefore, if a student is absent on a test day, the missed test is automatically dropped. Students arriving more than 10 minutes late will not be allowed to take the test, and that test grade will be dropped. Any additional missed tests/late arrivals will result in a grade of zero, and the test grade will not be dropped. The final exam is mandatory and cannot be made up.

Students arriving late to lab will not be allowed to participate in the laboratory activity and will receive a grade of zero. Students who leave lab before the successful completion of the lab will also receive a grade of zero. Laboratory exercises cannot be made up.

IX. ADA AA STATEMENT

Any student requiring special accommodations should inform the instructor and the Coordinator of Disability Support Services (Library; phone 636-481-3169).

X. ACADEMIC HONESTY STATEMENT

All students are responsible for complying with campus policies as stated in the Student Handbook (see College website, <http://www.jeffco.edu>).

XI. ATTENDANCE STATEMENT

Regular and punctual attendance is expected of all students. Any one of these four options may result in the student being removed from the class and an administrative withdrawal being processed: (1) Student fails to begin class; (2) Student ceases participation for at least two consecutive weeks; (3) Student misses 15 percent or more of the coursework; and/or (4) Student misses 15 percent or more of the course as defined by the instructor. Students earn their financial aid by regularly attending and actively participating in their coursework. If a student does not actively participate, he/she may have to return financial aid funds. Consult the College Catalog or a Student Financial Services representative for more details.

XII. OUTSIDE OF CLASS ACADEMICALLY RELATED ACTIVITIES

The U.S. Department of Education mandates that students be made aware of expectations regarding coursework to be completed outside the classroom. Students are expected to spend substantial time outside of class meetings engaging in academically related activities such as reading, studying, and completing assignments. Specifically, time spent on academically related activities outside of class combined with time spent in class meetings is expected to be a minimum of 37.5 hours over the duration of the term for each credit hour.