

LAST REVIEW: 2008-09
(i.e. 2003-2004)

NEXT REVIEW: 2013-14
(i.e. 2008-2009)

STATUS: A
(A, I, D)

COURSE TITLE: Comparative Vertebrate Morphology and Physiology Laboratory

COMMON COURSE NUMBER: Z004713L

CREDIT HOURS:

CONTACT HOUR BREAKDOWN

(per 16 week term)

CLOCK HOURS:
(Voc. Course ONLY)

Lecture: Lab: **48**

Clinic: Other:

PREREQUISITE(S):

COREQUISITE(S) ZOO4731

PRE/COREQUISITE(S):

COURSE DESCRIPTION The course is the accompanying laboratory course to PCB 4273. The 3 hours of Laboratory per week complements the lecture topics which include evolutionary relationships among the vertebrate groups, and a comparison of major physiological systems; nerve, muscle, respiration, circulation, osmoregulation, excretion, temperature regulation and energy metabolism

UNIT TITLES

1. Introduction to Protochordates and Chordates
2. Early Vertebrates
3. Integumentary System
4. Musculoskeletal System
5. Digestive System
6. Respiratory System
7. Urinary System
8. Reproductive and Endocrine Systems
9. Circulatory and Lymphatic Systems
10. Nervous System

EVALUATION:

Please provide a brief description (250 characters maximum) that details how students will be evaluated on the course outcomes.

Common Course Number: ZOO4713

UNITS

Unit 1 Introduction to Protochordates and Chordates

General Outcome:

- 1.0 The student shall: compare and contrast the phylogeny and characteristics of the Protochordate and Chordate groups using slides, models and dissections**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 1.1** Compare the phylum Hemichordates to the phylum Chordata and identify the characteristics shared by these phyla through the use of slides and mounted specimens
- 1.2** Understand how chordates are classified; including both the traditional evolutionary system and the cladistic system
- 1.3** Outline the phylogeny of the Protochordate and Chordate groups, listing some of the morphological characteristics in each group. Discuss the concept of homologous vs. homoplastic
- 1.4** Completely classify the specific species to be dissected in lab
- 1.5** Detail anatomical and directional terms that apply to chordates and the various body plans found in that phylum

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Unit 2 Non-vertebrate Chordates and Early Vertebrates

General Outcome:

- 2.0 The student shall: Understand the evolutionary development and anatomical features of the non-vertebrate Chordates as well as the early vertebrates using slides, models and dissections**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 2.1** Discuss the non-vertebrate subphylums of Chordata: Urochordata and Cephalochordata
- 2.2** Identify the evolutionary adaptations and anatomical features of the tunicates – a representative Urochordate
- 2.3** Identify the evolutionary adaptations and anatomical features of the Ampioxus – a representative Cephalochordate
- 2.4** Trace the evolutionary developments of the Agnathans including the “jawless” mouth feeding system and true gills and recognize the Agnathans as a probable early phylogenetic link to the protochordates
- 2.5** Identify the anatomical features of the Lamprey as a representative Agnathan – both larva and adult

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Unit 3 Integumentary System

General Outcome:

- 3.0 The student shall: use slides, models and dissections to understand the gross and microscopic features and functions of the integument and epidermal derivatives in representative vertebrate species**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 3.1** Discuss the vertebrate integument as a complex organ and list its various functions
- 3.2** Learn the functions and structures of epidermal derivatives found in vertebrates, including scales, hair, feathers, claws, antlers and horns, glands, and pigments
- 3.3** Locate the skin and epidermal derivatives found in representative vertebrate species through the use of slides, models, and dissected specimens

Common Course Number: : ZOO4713

Unit 4 Musculoskeletal System

General Outcome:

- 4.0 The student shall: understand the gross and microscopic features and functions of the musculoskeletal systems in representative vertebrate species using slides, models and dissections**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 4.1** Describe the different tissues found in the skeletal system; bone and cartilage
- 4.2** List and locate the basic divisions of the tetrapod skeletal system; axial skeleton (skull, vertebral column, sternum, ribs) and appendicular skeleton (appendages and their girdles)
- 4.3** Identify the anatomical features and evolutionary adaptations of skulls found in various vertebrate groups
- 4.4** Distinguish different types of teeth from the vertebrates. Understand the heterodont dentition found in mammals
- 4.5** Locate the anatomical features and evolutionary adaptations of the vertebral column, ribs and sternum found in select vertebrate groups
- 4.6** Identify the anatomical features of the pectoral and pelvic girdles and appendages found in select vertebrate groups. Describe the evolutionary changes that occurred to form fins and wings as well as the girdle and limb adaptations necessary for flight or locomotion on land
- 4.7** List the 3 different muscle types – skeletal, cardiac, and smooth – including their histological appearance and functions
- 4.8** Learn the names and actions of the major muscles found in select vertebrate species

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Unit 5 Digestive System

General Outcome:

- 5.0 The student shall: understand the gross and microscopic features and functions of the digestive system in representative vertebrate species using slides, models and dissections**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 5.1** Describe the different body plans found in vertebrate and list the membranes that line the internal cavities
- 5.2** Locate and describe the basic structures and functions of the digestive system in vertebrates
- 5.3** Discuss the evolutionary adaptations of the digestive tract found in various vertebrate groups
- 5.4** Identify the digestive system anatomy of select vertebrate species

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Unit 6 Respiratory System

General Outcome:

- 6.0 The student shall: use slides, models and dissections to understand the gross and microscopic features and functions of the respiratory system in representative vertebrate species with emphasis on the adaptations necessary for respiration in water and on land**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 6.1** Identify the basic structures and functions of the respiratory system in vertebrates
- 6.2** Locate and describe the adaptations necessary for respiration in water and on land
- 6.3** Locate the gross anatomical features of the respiratory system of select vertebrate species

Common Course Number: : ZOO4713

Unit 7 Urinary System

General Outcome:

- 7.0 The student shall: use slides, models and dissections to understand the gross and microscopic features and functions of the urinary system in representative vertebrate species with emphasis on the adaptations necessary for osmoregulation in different vertebrate environments**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 7.1** Identify the basic function and structure of urinary systems in vertebrates
- 7.2** Locate and describe the adaptations necessary for osmoregulation in different vertebrate environments
- 7.3** Identify the urinary system anatomy of select vertebrate species

Common Course Number: : ZOO4713

Unit 8 Reproductive and Endocrine Systems

General Outcome:

- 8.0 The student shall: understand the gross and microscopic features and functions of the reproductive and endocrine systems in representative vertebrate species using slides, models and dissections**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 8.1** Identify the basic structures and functions of the reproductive system in vertebrates
- 8.2** Locate the evolutionary adaptations of the reproductive system found in various vertebrate groups and describe variations in sex determination
- 8.3** Locate the gross anatomical features of the reproductive system anatomy of select vertebrate species
- 8.4** Identify the structure and function of the major endocrine glands and hormones found in vertebrates
- 8.5** Describe the gross and microscopic anatomy of the endocrine glands in select vertebrate species

Common Course Number: : ZOO4713

Unit 9 Circulatory and Lymphatic Systems

General Outcome:

- 9.0 The student shall: understand the gross and microscopic features and functions of the circulatory and lymphatic systems in representative vertebrate species using slides, models and dissections**

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 9.1** Locate the basic components of the circulatory system; blood, the heart, and vasculature
- 9.2** Identify the various components of blood including nucleated vs. non-nucleated red blood cells
- 9.3** Locate and describe the evolutionary changes which occurred in the heart, single vs. double circulatory systems as well as various configurations of the hearts found in vertebrates
- 9.4** List the adaptations of vascular patterns in various vertebrates, including the evolutionary changes of the aortic arches
- 9.5** Identify the functions and structure found in the lymphatic system of vertebrates
- 9.6** Locate and describe the basic anatomical structures and their functions in the circulatory and lymphatic systems in select vertebrate species

Common Course Number: : ZOO4713

Unit 10 Nervous System

General Outcome:

10.0 The student shall: use slides, models and dissections to understand the gross and microscopic features and functions of the nervous system and sense organs in representative vertebrate species

Specific Measurable Learning Outcomes:

Upon successful completion of this unit, the student shall be able to:

- 10.1** Identify the structure and function of the different cells in the nervous system as well as the neuronal circuits found in all vertebrates
- 10.2** Describe the evolutionary changes in the brain, meninges, and spinal cord as well as locate their anatomy in various vertebrates
- 10.3** List the functions of the autonomic nervous system in vertebrates
- 10.4** Identify the evolutionary changes in structure and function of receptors and sense organs, including olfaction, vomeronasal organs, gestation, lateral line system, equilibrium, audition, eyes, and thermoregulation
- 10.5** Identify the anatomy of the nervous system and sense organs in select vertebrate species