

**BENEDICT COLLEGE
COURSE OUTLINE
COMPARATIVE VERTEBRATE ANATOMY**

DEPARTMENT: BIOLOGICAL & PHYSICAL SCIENCES
COURSE NUMBER: BIO 341
CREDIT HOURS: 4.0
INSTRUCTOR: DR. SAMIR S. RAYCHOUDHURY
OFFICE LOCATION: ALU 206
CLASS SCHEDULE: LECTURE MWF 9-9:50 AM ALU 216
LAB F 3-5 PM ALU 216

For Appointment: Call 255-1781; or e-mail: raychoudhurys@benedict.edu

REQUIRED TEXTBOOK:

Comparative Anatomy *of the Vertebrates*, Eighth Edition, by George C. Kent and Larry Miller, McGraw-Hill, Inc., New York, USA.

LABORATORY MANUAL:

Students are required to perform selected laboratory experimental exercises as prepared by the instructor. Students will be asked to make their own laboratory reports. No formal lab manual is required. However, the following laboratory guide will be consulted for studying labs of the comparative vertebrate anatomy course:

- 1 Comparative Vertebrate Anatomy, A Laboratory Dissection Guide by Kenneth V. Kardong and Edward J. Zalisko, McGraw-Hill, Inc., New York, USA.
- 2 Laboratory Anatomy of the Vertebrates by Robert B. Chiasson and William J. Radke, McGraw-Hill, Inc., New York, USA.

INTRODUCTION:

Students are expected to attend classes regularly and should read the assigned chapters from the textbook for each unit before and after the classroom lecture period. The students will be asked to write reports on selected topics related to the course. All assignments are due on time as determined by the instructor.

Students are required to keep and maintain a laboratory data notebook. They will be asked to work in assigned groups. Each group will be responsible for its own lab preparations, dissections and set-ups.

COURSE DESCRIPTION:

Comparative Vertebrate Anatomy will focus on the structural, functional and phylogenetic relationships among chordates. A detailed study of protochordates and detailed dissection of the lamprey, shark, salamander and cat are included both in the lecture and laboratory sessions. Relevant clinical and medical issues will be analyzed. Three 1-hour lecture periods and one 2-hour laboratory period. Prerequisite: BIO 242.

GENERAL OBJECTIVES:

The students should achieve the following objectives:

- 1 Understand the language of anatomy through the analysis of terms relevant to the study.
- 2 Understand and compare structures of vertebrates using homologies and subsequently deduce the course of evolution of organisms and the organs.
- 3 Develop the concept of the taxonomic status of vertebrates in the animal kingdom.
- 4 Outline the unique and not-so-unique characteristics of the vertebrates. Some background knowledge on the origin of vertebrate development will be gained.
- 5 Understand some of the basic facts of vertebrate embryonic development.
- 6 Understand the concepts of structure-function relationships in a manner that will allow the students to visualize the eleven organ systems and their role in homeostasis.
- 7 Relate vertebrate anatomy with medicine and associated health sciences.

TEXTBOOK LECTURE TOPICS:

- 1 Introduction - The phylum chordata, the vertebrate body and characteristics. Ch.1, Page 1-12.
- 2 Concepts, Premises and Pioneers. The ontogeny, phylogeny, homology, adaptation, speciation, evolutionary convergence, metamorphosis, and evolutionary selections. Ch.2, Page 13-24.
- 3 Protochordates, and the origin of vertebrates. Ch.3, Page 25-38.
- 4 Parade of the vertebrates in time and taxa, and variation among individuals. Ch.4, Page 39-78.
- 5 Early vertebrate morphogenesis. Ch.5, Page 79-96.
- 6 Integument (skin). Ch.6, Page 97-124.
- 7 Mineralized tissues: an introduction to the skeleton. Ch.7, Page 125-134.
- 8 Vertebrates ribs, and sterna. Ch.8, Page 135-154.
- 9 The skull and visceral skeleton. Ch.9, Page 155-192.
- 10 Girdles, fins, limbs and locomotion. Ch.10, Page 194-227.
- 11 Muscles. Ch.11, Page 228-259.
- 12 Digestive system. Ch.12, Page 260-287.
- 13 Respiratory system. Ch.13, Page 288-309.
- 14 Circulatory systems. Ch.14, Page 310-344.
- 15 Urogenital system. Ch.15, Page 345-379.
- 16 Nervous system. Ch.16, Page 381-418.
- 17 Sense organs. Ch.17, Page 419-445.
- 18 Endocrine organs. Ch.18, Page 446-462.

INTERACTIVE WEB TUTORIAL:

<http://www.nlm.gov/medlineplus/tutorial.html>

OFF-CAMPUS ACTIVITY:

Human cadaver lab at the USC School of Medicine

EVALUATION:

Assessment/evaluation is necessary to see that all seven objectives as outlined above in General Objectives are met. The semester grade will be based on the average score of five tests including the mid-term and the final. There will be one special library assignment on the relevant topic of vertebrate anatomy. However, there will be **no** extra credit given to any student during the course. The laboratory reports and examinations will constitute 40% of the overall grades. The lecture-discussion component of this course constitutes 60% of the final grade. The exams will contain multiple choice and short discussion questions. Study guides with questions will be provided prior to the exam. Advance permission should be requested for a make-up exam. No student will be allowed to take more than one such make-up.

GRADING:

Lecture Exams 600 points [3 exams @ 100 points each (300) Library assignment @ 100 points and 1 Final @ 200 points]+ Laboratory 400 points

Total = 1000 points

Final grades will be determined as follows:

90% or above = A

80% to 89.9% = B

70% to 79.9% = C

60% to 69.9% = D

59.9% or below = F

ATTENDANCE POLICY:

Good attendance is essential in order to accomplish the objective of the course. Students are required to attend class and lab regularly, punctually, and not to leave the class early without the permission of the instructor. Any student leaving early without prior permission will be marked absent. Students who exceed the critical deficiency (i.e., the number of allowable unexcused absences, will be administratively withdrawn from the class (see the class attendance policy management). Absences must be excused by the office of the students affairs.

EXAMINATION POLICY:

Examination will be given only on the day they are scheduled. No make-up tests will be given to students unless an excuse-letter is produced.

ASSIGNMENTS:

Students are required to complete the assignments within the time frame set by the instructor. The instructor is under no obligation to accept the late assignments.

DISABILITIES:

I personally would like to meet the students with disability in the privacy of my office. As soon as I informed by the counselor in the BCCARE, I will make every possible arrangement to accommodate the student in the classroom. During the early part of the semester (preferably in the first week), I would like to make sure that the special need of the students is appropriately accommodated.

CHEATING:

Students who violate college policies on scholastic dishonesty are subject to disciplinary penalties, including the possibilities of failure in the course. Cheating is copying from another student's test; communicating answers with fellow students during tests; using unauthorized printed or hand written materials during tests; and using someone else's research report without acknowledgment.

REFERENCE BOOKS AND JOURNALS:

- Carlson BM. Patten's Foundations of Embryology. ed. 6, New York, 1996, McGraw-Hill.
- Wolpert L. Principles of Development, New York. 1998, Oxford University Press.
- Jarvik E. Basic Structure and Evolution of Vertebrates, Vol. 1, New York, 1980, Academic Press.
- Kalthoff K. Analysis of Biological Development. ed. 2, Boston, 2001, McGraw-Hill.
- Hildebrand M, and others. editors: Functional Vertebrate Morphology, Cambridge, Massachusetts, 1985, Harvard University Press
- Prosser CL editor: Comparative Animal Physiology, ed. 4, Philadelphia, 1990, W.B. Saunders Co.
- Gorbman A, and others: Comparative Endocrinology, ed. 2, New York, 1987, John Wiley and Sons.
- Cell
- Journal of Embryology and Experimental Morphology
- Journal of Mammology
- American Zoologist
- Neurology
- Journal of Morphology
- Quarterly Review of Biology
- Journal of Zoology
- Neurobiology
- Nature
- Science
- American Scientist
- American Naturalist
- Paleobiology
- Journal of Comparative Biological Reviews
- Brain Research
- Trends in Neurosciences
- Current Opinion in
- Journal of Endocrinology
- Endocrinology
- Natural History
- American Journal of Anatomy
- Journal of Experimental Biology