

Vertebrate Biology – BIOL 208

University Studies Program

Course Outline

COURSE IMPLEMENTATION DATE:	Pre 1998
OUTLINE EFFECTIVE DATE:	September 2019
COURSE OUTLINE REVIEW DATE:	April 2024

GENERAL COURSE DESCRIPTION:

This course covers the evolution and comparative anatomy of cephalochordates, urochordates, fish, amphibians, reptiles, birds, and mammals. The comparative anatomy of major organ systems among fishes, amphibians, birds, and mammals will be studied in the lab via dissection of representative organisms. The lab will emphasize the relationship between structure and function of vertebrate organisms while the lecture will focus on current controversies and discoveries in the scientific study of vertebrate evolution.

Program Information: This course may be used as part of a Bachelor of Science in Biology at some institutions. This course is often a prerequisite for a major program in Zoology, Ecology, and Animal Behaviour. The dissection of representative vertebrate organisms and the focus on comparative anatomy of the skeletal system and mammalian dentition make this course useful for students who are considering applying to medical school, veterinarian school, or dentistry.

Delivery: This course is delivered face to face.

COTR Credits: 3

Hours for this course: 90 hours

Typical Structure of Instructional Hours:

Instructional Activity	Duration
Lecture Hours	45
Seminars / Tutorials	
Laboratory / Studio Hours	45
Practicum / Field Experience Hours	
Other Contact Hours	
Total	90

Practicum Hours (if applicable):

Type of Practicum	Duration
On-the-job Experience	N/A
Formal Work Experience	N/A
Other	N/A
Total	

Course Outline Author or Contact:

Lynnette Kuervers, B.Sc., Ph.D.

Signature

APPROVAL SIGNATURES:

Department Head
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Department Head Signature

Dean Signature

EDCO

Valid from: September 2019 – April 2024

Education Council Approval Date

COURSE PREREQUISITES AND TRANSFER CREDIT

Prerequisites: BIOL 101 and BIOL 102

Corequisites: None

Flexible Assessment (FA):

Credit can be awarded for this course through FA

Yes No

Learners may request formal recognition for flexible assessment at the College of the Rockies through one or more of the following processes: External Evaluation, Worksite Assessment, Demonstration, Standardized Test, Self-assessment, Interview, Products/Portfolio, Challenge Exam. Contact an Education Advisor for more information.

Transfer Credit: For transfer information within British Columbia, Alberta and other institutions, please visit <http://www.cotr.bc.ca/Transfer>

Students should also contact an academic advisor at the institution where they want transfer credit.

Prior Course Number: N/A

Textbooks and Required Resources:

Textbook selection varies by instructor and may change from year to year. At the Course Outline Effective Date the following textbooks were in use:

Pough, Janis and Heiser. 2019. *Vertebrate Life*, 10th Ed.

BIOL 208 – Lab Outlines

Please see the instructor's syllabus or check COTR's online text calculator

<http://go.cotr.bc.ca/tuition/tCalc.asp> for a complete list of the currently required textbooks.

LEARNING OUTCOMES:

Upon the successful completion of this course, students will be able to

- list the four defining characteristics of a vertebrate organism;
- explain the basics of phylogenetic systematics and major types of evolutionary processes that are critical to vertebrate evolution;
- draw a phylogenetic tree of the current classes within the Phylum Chordata;
- describe the derived traits of the classes within the Phylum Chordata including:
 - *Amphioxus*
 - Jawless Fishes
 - Jawed Fishes
 - Amphibians
 - Turtles
 - Reptiles
 - Birds
 - Mammals
- discuss the importance of the derived traits to the success of these animals throughout their evolutionary history;
- list the geologic eras and the periods within them;
- provide a brief description of Burgess Shale in Field, BC and discuss the importance of the finding of *Pikaia*;
- describe the major extinction events between eras including the disappearance of major groups of vertebrates and the theories underlying the extinction of these vertebrate animals;
- describe major evolutionary steps in vertebrate evolution including:
 - The evolution of the jaw
 - The transition from water to land
 - The development of the amniotic egg
 - The evolution of the inner ear
 - The transition from land to water
- describe the discovery of *Tiktaalik* and its importance in understanding the transition from water to land;
- list the differences between the two main orders within clade *Dinosauria* (Ornithischia and Saurischia);
- relate the anatomy of theropod dinosaurs to birds;
- summarize the current theory of the origin of birds;
- differentiate between the different types of feathers including their contribution to flight, position on the body, and paleontological discoveries;

- discuss the biological adaptations that were required to transition from an exothermic to an endothermic lifestyle;
 - compare and contrast the reproductive biology of the three major groups of mammals (monotremes, placentals, and marsupials);
 - compare and contrast the skull and dentition between herbivorous and carnivorous mammals;
 - list the characteristics that define a primate;
 - critique the latest research and discoveries regarding early hominid evolution;
 - compare and contrast the embryological origin, function, and major anatomical features between fishes, amphibians, birds, and mammals of the following major organ systems:
 - Nervous System
 - Skeletal Muscular System
 - Cardiovascular System
 - Respiratory System
 - Digestive System
 - Urogenital System
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COURSE TOPICS:

- Introduction to Evolutionary Concepts
- Geologic Time Scale
- Origin of Chordates
- Aquatic Adaptations
- Early Tetrapods
- Evolution and Comparative Anatomy of:
 - Cephalochordates
 - Urochordates
 - Jawless Fishes
 - Jawed Fishes
 - Amphibians
 - Turtles
 - Early Reptiles
 - Dinosaurs
 - Modern Reptiles
 - Birds
 - Mammals
 - Hominids

See instructor's syllabus for the detailed outline of weekly readings, activities and assignments.

EVALUATION AND ASSESSMENT:

Assignments	% Of Total Grade
Lecture	
Assignments	10%
Midterm(s)	20%
Final Exam	30%
Lab	
Lab Assignments	10%
Comparative Anatomy Paper	20%
Lab Exams	<u>10%</u>
Total	100%

EXAM POLICY:

Students must attend all required scheduled exams that make up a final grade at the appointed time and place.

Individual instructors may accommodate for illness or personal crisis. Additional accommodation will not be made unless a written request is sent to and approved by the appropriate Department Head prior to the scheduled exam.

Any student who misses a scheduled exam without approval will be given a grade of "0" for the exam.

COURSE GRADE:

Course grades are assigned as follows:

Grade	A+	A	A-	B+	B	B-	C+	C	C-	D	F
Mark (Percent)	≥ 90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	< 50

A grade of "D" grants credit, but may not be sufficient as a prerequisite for sequential courses.

ACADEMIC POLICIES:

See www.cotr.bc.ca/policies for general college policies related to course activities, including grade appeals, cheating and plagiarism.

COURSE CHANGES:

Information contained in course outlines is correct at the time of publication. Content of the courses is revised on an ongoing basis to ensure relevance to changing educational, employment, and marketing needs. The instructor will endeavour to provide notice of changes to students as soon as possible. The instructor reserves the right to add or delete material from courses.