



BIOL-208 – Vertebrate Evolution and Comparative Anatomy

University Arts and Science

Effective Term & Year: Fall 2025

Course Outline Review Date: 2030-03-01

Program Area: Math and Sciences

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 Methods: On-campus (Face-to-Face)

Credit Type: College of the Rockies Credits

Credits: 3

Course type/s: Lab Sciences, Sciences

Instructional Activity and Hours:

Activity	Hours
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Classroom, Directed Studies or Online Instruction	45
Seminar/Tutorials	
Laboratory/Studio	45
Practicum/Field Experience	
Co-op/Work Experience	
Other	
Total	90

Course Requisites:

- Completed the following:
 - [BIOL102](#) – Introduction to Biology 2 (3)

Prior Learning and Recognition: Yes

Students are able to request formal recognition of their prior learning or experience outside the classroom. Challenge examination, portfolio-assisted assessment, work-based assessment or a combination of assessments that is appropriate to identify, assess, and recognize prior skills, competencies, and knowledge to achieve course credit. Tuition fees apply, refer to Policy [2.5.5 Prior Learning Assessment and Recognition \(PLAR\)](#) or contact an education advisor for more information.

Course Transfer Credit:

For information about receiving transfer credit for courses taken at other BC institutions, please see <http://www.bctransferguide.ca>. All requests for course transfer credit from institutions in BC or elsewhere should go to the College of the Rockies Enrollment Services office.

Textbook 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:

Plough, H. Bemis, W. E., McGuire, B. A. & Janis, C. M. (2023). *Vertebrate Life* (11th edition). Oxford University Press.

Fishbeck and Sebastiani. 2015. *Comparative Anatomy: Manual of Vertebrate Dissection*, 3rd edition. Morton Publishing Company.

Please see the instructor's syllabus or check COTR's online text calculator <https://textbook.cotr.bc.ca/> 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;
 - describe the derived traits of the classes within the Phylum Chordata;
 - discuss the importance of the derived traits to the success of animals within Phylum Chordata;
 - list the geologic eras and the periods within them;
 - 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;
 - 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);
 - summarize the current theory of the origin of birds;
 - 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;
 - discuss the latest research and discoveries regarding early hominid evolution; and
 - compare and contrast the embryological origin, function, and major anatomical features between fishes, amphibians, reptiles, and mammals.
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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 Assessments

Assessment Type: On-Campus (face-to-face)

Assessment Type	% of Total Grade
Assignments	10%
Midterm(s)	20%
Final Exam	30%
Lab Assignments	10%
Comparative Anatomy Assignment	20%
Lab Exam(s)	10%
Total	100%

Grade Scheme

A+	A	A-	B+	B	B-	C+	C	C-	D	F
>=90	89-85	84-80	79-76	75-72	71-68	67-64	63-60	59-55	54-50	<50

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

Exam Attendance:

Students must attend all scheduled exams at the appointed time and place. Instructors may approve an alternate exam to accommodate an illness or personal crisis. Department heads will consider other written requests. Any student who misses a scheduled exam without prior approval will receive a "0" on the exam.

Academic Policies:

College of the Rockies policies related to courses can be found at <https://cotr.bc.ca/about-us/college-policies/> and include the following:

- Policy 2.1.4 Course Audit
 - Policy 2.4.1 Credential Framework
 - Policy 2.4.3 Students with Documented Disabilities
 - Policy 2.4.4 Student Rights, Responsibilities and Conduct
 - Policy 2.4.8 Academic Performance
 - Policy 2.4.9 Student Feedback and Concerns
 - Policy 2.4.11 Storage of Academic Works
 - Policy 2.5.3 Student Appeal
 - Policy 2.5.5 Prior Learning Assessment and Recognition (PLAR)
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Course Changes:

The College of the Rockies updates course outlines regularly to meet changing educational, employment and marketing needs. The instructor will notify students in writing of any updates to this outline during the semester. The instructor reserves the right to revise, add or delete material while meeting the learning outcomes of this course outline.