GENERAL COURSE DESCRIPTION:

This course covers the biology of fish, amphibians, reptiles, birds, and mammals, including anatomy, function and behaviour. The comparative anatomy of major organ systems among fishes, amphibians, birds, and mammals will be studied. The relationship between structure and function of vertebrate organisms will be emphasized. Current controversies and discoveries in the scientific study of vertebrate evolution are also examined.

Program Information: This course may be used as a required course needed for a science degree in biology at some institutions. This course is often a prerequisite for related third and fourth year courses at the university level.

Delivery: This course is delivered face to face.

COTR Credits: 3

Hours for this course: 90 hours

<table>
<thead>
<tr>
<th>Typical Structure of Instructional Hours:</th>
<th>Practicum Hours (if applicable):</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructional Activity</strong></td>
<td><strong>Type of Practicum</strong></td>
</tr>
<tr>
<td>Lecture Hours</td>
<td>On-the-job Experience</td>
</tr>
<tr>
<td>Seminars / Tutorials</td>
<td>Formal Work Experience</td>
</tr>
<tr>
<td>Laboratory / Studio Hours</td>
<td>Other</td>
</tr>
<tr>
<td>Practicum / Field Experience Hours</td>
<td></td>
</tr>
<tr>
<td>Other Contact Hours</td>
<td>Total</td>
</tr>
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</table>

Total 90
Course Outline Author or Contact:
Lynnette Kuervers, B.Sc., Ph.D.

APPROVAL SIGNATURES:

Department Head
Ildi Walkley
E-mail: walkley@cotr.bc.ca

Dean of Business and University Studies
Darrell Bethune
E-mail: bethune@cotr.bc.ca

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Valid from: September 2017 – April 2022

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:


BIOL 208 – Lab Outlines

*Please see the instructor’s syllabus or check COTR’s online text calculator http://www.cotr.bc.ca/bookstore/cotr_web.asp?IDNumber=164 for a complete list of the currently required textbooks.*

LEARNING OUTCOMES:

Upon the successful completion of this course, students should 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 at least one of the following major organ systems:
  o Nervous System
  o Skeletal Muscular System
  o Cardiovascular System
  o Respiratory System
  o Digestive System
  o Urogenital System

Note: Biology 208 is a vertebrate zoology course which lays the framework for further study of the individual groups of vertebrates. An invertebrate course would provide the rest of the base of knowledge in zoology.

COURSE TOPICS:

• Introduction to Evolutionary Concepts
• Geologic Time Scale
• Origin of Chordates
• Jawless Fishes
• Jawed Fishes
• Aquatic Adaptations
• Early Tetrapods
• 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:

<table>
<thead>
<tr>
<th>Assignments</th>
<th>% Of Total Grade</th>
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<tbody>
<tr>
<td>Lecture</td>
<td></td>
</tr>
<tr>
<td>Assignments</td>
<td>10%</td>
</tr>
<tr>
<td>Midterm(s)</td>
<td>20%</td>
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<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Lab</td>
<td></td>
</tr>
<tr>
<td>Lab Assignments</td>
<td>5%</td>
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<tr>
<td>Comparative Anatomy Paper</td>
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<tr>
<td>Lab Exams</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>A+</th>
<th>A</th>
<th>A-</th>
<th>B+</th>
<th>B</th>
<th>B-</th>
<th>C+</th>
<th>C</th>
<th>C-</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mark</td>
<td>≥ 90</td>
<td>89-85</td>
<td>84-80</td>
<td>79-76</td>
<td>75-72</td>
<td>71-68</td>
<td>67-64</td>
<td>63-60</td>
<td>59-55</td>
<td>54-50</td>
<td>&lt; 50</td>
</tr>
</tbody>
</table>

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.