

## Department of Biology Course Outline

SC/BIOL 4350 4.00 Comparative  
Chordate Anatomy Winter 2017

### Course Description

A comparative study of the biology of chordate animals in which the evidence of their evolutionary relationships is emphasized. Three lecture hours, three laboratory hours. One term. Four credits.

### Prerequisites

SC/BIOL 2030 4.00

### Course Instructors and Contact Information

Dr. Carol Bucking  
Office: 431A Life Sciences Building  
[cbucking@yorku.ca](mailto:cbucking@yorku.ca)

### Schedule

**Lectures:** Mondays, Wednesdays, Fridays at 10:30 – 11:30 pm

**Labs:** Tuesdays, Wednesdays, or Thursdays at 2:30 – 5:30 pm. You will be assigned a specific lab day. Please see your schedule for this information. Lab switches can be made, however **if the section is full it is your responsibility to find someone willing to switch with you.**

### Evaluation

Laboratory: 30%  
Lecture Participation and in-class quizzes: 9%  
Midterm Test 1: 16%  
Midterm Test 2: 16%  
Final Exam: 29%

Your laboratory grade will consist of 5 lab exams worth 6 % each. The lowest mark will be dropped and the total grade for lab exams will be 24%. A laboratory assignment (6%) will make up the rest.

You will receive a lecture participation (3%) and quiz (6%) mark worth 9% of your final grade. A progress report on your participation mark will be posted to Moodle mid-semester. This will not be your final participation mark and everyone will have a chance to improve. Participation and quizzes, will be monitored in class using clicker answers so make sure you bring your clicker to class. Quizzes (4 total, 2% each, drop lowest one) will be based on lecture material only.

Midterms /Exams will include material from the lectures and any other assigned material.  
**The final exam will be cumulative.**

## Important Dates

Important dates of Tests/Exams, Due Dates of Major Assignments, First class, last class, drop date, etc. will be announced through Moodle.

NOTE: for additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website at <http://www.yorku.ca/yorkweb/cs.htm>

## Resources

The **mandatory** lab manual (De Iuliss and Pulera, The dissection of vertebrates) is available in the Bookstore and online. The textbook (Kardong, Vertebrates: Comparative anatomy, function, evolution) is **mandatory**, and available at both the bookstore and library. A dissection kit is required for the laboratory component, as well as a lab coat and safety goggles.

Clickers are **mandatory** as well for the participation and quiz mark.

**Course Website:** Moodle

Please check Moodle often. Announcements may be posted on Moodle before they are communicated in class. Moodle will also be where you can view your grades; do not email the instructor/TAs about grades – they will be posted as soon as possible. Lecture notes will be posted to Moodle. Due to copyright and accessibility issues not all material presented in class will be posted.

## Learning Outcomes

Upon successful completion of this course students should be able to:

- Identify major features of the integumentary, musculoskeletal, respiratory, circulatory, digestive, urogenital, and endocrine systems in representative chordate taxa.
- Discuss relationships between form and function of major anatomical features.
- Describe the morphological and physiological changes that have occurred through evolution of the chordates. The influence of the environment on these changes should be known.
- Use comparative anatomy and physiology to distinguish between primitive and derived character states and explain evolutionary transitions.
- Evaluate purported phylogenies using evidence from comparative studies of chordate anatomical systems.
- Describe adaptations that accompanied the water-land transition in vertebrates.
- Communicate information and analyses in comparative anatomy and physiology, accurately, in written and oral forms.

Upon successful completion of the laboratory component of this course students should be able to:

- Use dissection to display and identify major anatomical features.
- Identify major features of the integumentary, musculoskeletal, respiratory, circulatory, digestive, urogenital, and endocrine systems in representative animals.

*This term the animals used for dissection will be pigeon, dogfish shark, frog and cat. Display material will include skeletons and cross-sections of many fish, reptiles (birds) and mammals. They are all required learning. **It is up to you to use critical deduction to determine which structures to know and how best to dissect them.** We will guide you but it is part of your learning to incorporate lecture material into the labs.*

- Verbally discuss the importance of the major anatomical features,
- Verbally discuss how structures compare across the vertebrate phyla and how the lecture material relates to them

## Course Content

The major emphasis of lectures will be on the evolution of vertebrates and the major changes in anatomy during key events that have taken place. Within this context the focus will be on gaining an understanding of the anatomy vertebrate animals, with an emphasis on anatomical, physiological and mechanical design. Current evolutionary relationships between chordates will be studied based on morphology (form and function), inferred phylogenetic relationships and evolutionary histories of major taxa. The major emphasis of the labs will be on dissecting vertebrate organisms and learning anatomical structures that are part of the systems learned in lecture. The labs represent a large portion of your grade befitting their important role in the study of comparative anatomy.

### Lecture Topics

The course will proceed in the following order:

1. What is a chordate? General concepts including development and cladistics.
2. Integument (skin and scales)
3. Skull Evolution
4. Skeletal system
5. Musculature
6. Respiratory System
7. Circulatory System
8. Digestive system
9. Urogenital system
10. Endocrine Systems (if time)

All of these topics will be discussed in evolutionary and developmental terms. The implications of structural changes on function will be explored and emphasized.

Week 1 – 4: I anticipate covering topics 1 to 3, however this pace is adjustable.

Week 5: **Midterm exam 1.** The midterm will cover everything discussed up to and including the preceding Friday's class.

Week 5-7: Topics 4-6, however this pace is adjustable.

Week 8: Is reading week (no classes).

Week 9 – 10: Will cover topics 7 – 8, however this pace is adjustable.

Week 10: **Midterm exam 2.**

Weeks 11-13: Remaining lecture material.

This material is designed for use as part of (BIOL4350) at York University and is the property of the instructor unless otherwise stated.

Third party copyrighted materials (such as book chapters and articles) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law.

Copying this material for distribution (e.g. uploading material to a commercial third-party website) can lead to a violation of Copyright law.

### Experiential Education and E-Learning

Independent laboratory training will give students experiential learning.

### Other Information

### Course Policies

#### What if I cannot write the lab exam that day?

- There will be no make-up lab exams. If you miss a lab exam, that exam will receive a zero and count towards your lowest mark that you are allowed to drop.

#### What if I cannot attend the lab that day?

- There are independent study times that you must use to make up for the missed day as well as complete the lab assignment.

#### What if I hand in my lab assignment late?

- There is a 10% a day penalty up to 30%. Thereafter you will receive a zero

#### What if I cannot write the exam/midterm that day?

- First, you must fill out an appropriate accommodation form as outlined above and according to the undergrad handbook/registrars office. For example the Attending Physician's statement in case of illness.
- Additionally, for unplanned (emergency) circumstances please contact me as soon as possible after the midterm/exam, and ***no later than 3 days after***. For medical issues you must submit an "Attending Physician's Statement", available from the Registrar's office. **No** accommodations will be made

after 3 days, unless extreme circumstances occur.

- **There will be NO make-up tests for the midterm.** If you cannot attend the midterm **AND** you have valid reasons for missing the test your marks will be redistributed to the final. If there are no valid reasons you will receive a zero.
- ALL students who miss the FINAL EXAM MUST PETITION to their home faculty, via An official petition, if they are seeking deferred standing. *No student will be granted deferred standing by the instructor via a Deferred Standing Agreement Form.* It will be the Petition Committee's decision whether deferred standing is granted; if it is, the committee will also set the deadline for writing the deferred exam. Denied petitions will result in a zero on the final exam.
- Midterms/Exams will not be returned. Dates and times for viewing will be announced through Moodle.

**Academic dishonesty will not be tolerated in any form. Any suspicion of a breach of academic integrity policies will result in an immediate and non-negotiable referral to the Associate Dean of Student Affairs. Please see below (University Policies) for more information.**

You must maintain civility in class, the lab, and in discussions with your peers on Moodle.

Audio lecture recordings are permitted, however they may not be accompanied by any visual recordings of the lecture material due to strict copyright infringement policies set by the university.

## University Policies

### Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>

### Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Counselling & Disability Services at Glendon - <http://www.glendon.yorku.ca/counselling/personal.html>

York Accessibility Hub - <http://accessibilityhub.info.yorku.ca/>

### Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human

participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

#### **Religious Observance Accommodation**

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at

[http://www.registrar.yorku.ca/pdf/exam\\_accommodation.pdf](http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf) (PDF)

#### **Student Conduct in Academic Situations**

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-and-or-harassing-behaviour-in-academic-situations-senate-policy/>