

Department of Biology Course Outline

SC/BIOL 4710 3.00 Integrative Environmental Physiology
Winter 2022

Course Description

This course explores the influence of the environment on the physiology of animals, from the gene level to the population level, with an emphasis on evolutionary adaptations. Experimental design and data analysis will be stressed. Group work accounts for a large proportion of the grade (15% directly, group work is also used for an additional 36% of individual assignments). To ensure appropriate group work responsibilities are met you will be graded on your participation. Two lecture classes per week (90 min). One term. Three credits.

Prerequisites

SC/BIOL 2030 4.00; and one of SC/BIOL 2070 4.00 or SC/BIOL 2050 4.00; and one of SC/BIOL 3170 4.00 or 3110 3.00 or 3060 4.00.

Course Instructors and Contact Information

Dr. Carol Bucking
Office: Farquharson Life Sciences Building
cbucking@yorku.ca

Office hours will be held on-line via zoom or similar at a time TBD.

Schedule

Lectures: Lectures will be provided both as pre-recorded and in person formats.

Class time is scheduled for Mondays/Wednesdays 11:30 – 1:00 pm. See schedule on eClass for detailed dates of In person and pre-recorded classes.

In person classes will be recorded and made available through eClass. As a majority of the in person classes will be discussion based, posting class participation is not possible.

Technology Requirements

You must have access to reliable high-speed internet connection (wi-fi) and a computer in order to take this course, including access to audio (including microphone) and a web cam. Further you must be able to record and produce videos. Some aspects of the course will

involve video conferencing software (e.g. Zoom). Reliable access to eClass and ability to stream videos from eClass are required.

High speed internet, camera, audio capability (microphone), ability to stream online lectures, ability to support video conferencing software, ability to record and produce videos, are all required.

Evaluation

22% Midterm (Essay format, In person or via eClass if necessary)

20% Final (Essay, via eClass and TurnItIn)

23% Assignments and Evaluations (peer evaluations, group evaluations, participation in group work, brochure, newspaper article; via via eClass/TurnItIn/PeerScholar as appropriate)

15% Oral Presentations (5%, 10%)

20% Written Paper (via eClass/TurnItIn)

Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles as is required by the University.

Important Dates

Presentation Dates will be announced in class and on eClass.

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

NOTE: for drop deadlines and additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website:
<https://registrar.yorku.ca/enrol/dates/fw21>

Resources

There is no mandatory textbook. Reading material will consist of journal articles via the library.

Helpful textbooks include:

Environmental Physiology of Animals (Wilmer, Stone, Johnston)

Environmental and Metabolic Animal Physiology (Prosser).

Course Website: eClass

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

Learning Outcomes

Demonstrate an understanding of the influence of the surrounding environment on integrative physiology
Describe adaptation from gene to population levels
Demonstrate critical analysis and application of research literature
Demonstrate critical thinking and problem-solving skills
Demonstrate an understanding of experimental design, execution, and analysis
Demonstrate communication skills, both verbal and written
Demonstrate detailed knowledge of course topics
Prepare a written paper including clear and appropriately formatted figures and tables

Course Content

This course will introduce and/or combine knowledge across biological disciplines through engagement with the primary literature. Cutting-edge research techniques will be explored and students will be exposed to current experimental design, methodology, and analytical approaches. This class will present the effects of the surrounding environment on physiology across biological levels in both invertebrate and vertebrate animals. Lecture material will review general topics such as molecular biology or population dynamics in the framework of environmental physiology so that students will be able to understand the influence of the environment on physiology across biological levels. Beyond lecture material students will use primary literature to design their own experiment to explore an aspect of environmental physiology presented in class. Students will present their proposals in both written and oral forms.

Topics: The focus of the class will be on the physiological responses to environmental conditions which can include (but are not limited to) environmental temperature changes, alterations in environmental oxygen, exposure to pollutants, and changes in environmental salinity. Effects on gene and protein expression, solute and water transport across epithelia, and biochemical pathways, whole animal physiology and population levels will be explored. Adaptation and evolution will be discussed.

Students will be required to participate in the discussion and critiquing. A midterm and a cumulative final will be written on lecture material. The format for both will be essay.

In addition to lecture hours, students will be given a group assignment to critically review scientific literature related to the class. This review will be presented to the class via presentation (~11 min; as a group). Following the assignment, the groups of students will have to prepare their own hypothesis related to course topics and design an experiment to test the hypothesis. They will have to predict their results and prepare a discussion pertaining to the theoretical results. This will be presented as a written paper in journal format (prepared individually) and research seminar (~45 min; as a group) to the class. Students are required to evaluate each other, and their own performance. A brochure and a newspaper article (prepared as individuals) will be due throughout the year on the group projects.

The course lecture topics this year are:

Integration in physiology
Evolution and Adaptation vs. Acclimation
The Environment – gas properties vs liquid properties
Ion and Water Regulation
Nitrogen Balance

Metabolism

Digestion

Respiration

And additional topic to be decided if time allows

This material is designed for use as part of (BIOL 4710) 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 and prosecution.

Experiential Education and E-Learning

Case study exploration and problem based learning will allow students to build their own experiment.

Other Information

Midterms and finals may occur online via eClass. Please see the following senate guideline for more information about what is required:

The instructor may use an online proctoring service to deliver the exam(s), which would be administered through the Learning Management System (e.g. Moodle, Canvas, etc.). Students are required to have access to minimum technology requirements to complete examinations. If an online proctoring service is used, students will need to become familiar with it at least five days before exam(s). For technology requirements, Frequently Asked Questions (FAQs) and details about the online proctoring service visit [<https://registrar.yorku.ca/proctortrack-faq>]. Technology requirements are described within. Students are required to share any IT accommodation needs with the instructor as soon as they are able

Further:

Several platforms will be used in this course (e.g., eClass, Canvas, Zoom, etc.) through which students will interact with the course materials, the course director / TA, as well as with one another. Please review the syllabus to determine how the class meets (in whole or in part), and how office hours and presentations will be conducted.

Students shall note the following:

- Zoom is hosted on servers in the U.S. This includes recordings done through Zoom.
- Students must authenticate using their PPY to enter Zoom sessions scheduled within eClass or using yorku.zoom.us.
- The system is configured in a way that all participants are automatically notified when a session is being recorded. In other words, a session cannot be recorded without you knowing about it.

Technology requirements and FAQs for eClass can be found here - <https://lthelp.yorku.ca/moodle>

Course Policies

What if I cannot attend the class that day?

The lectures are recorded and available through eClass. Participation in the classes is strongly encouraged to hone critical skills.

What if I hand in my assignment/paper 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?

For unplanned (emergency) circumstances please contact me as soon as possible after the midterm/exam, and no later than 3 days after. 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. 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.

The format of the deferred exam may be different from the final exam (i.e. an oral examination).

Midterms/Exams will not be returned. Dates and times for viewing will be announced through eClass. Regrading will not be limited to individual questions. Any regrading will be based on the entire assignment.

Academic dishonesty will not be tolerated in any form. Collaboration, using outside services, etc is a form of cheating and dishonesty and is strictly prohibited. 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 and in discussions with your peers on eClass. Failure to do so will result in a breach of academic integrity policies and will result in an immediate and non-negotiable referral to the Associate Dean of Student Affairs.

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/>

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 at least 3 weeks before the exam period begins, which can be obtained from Student Client Services, Student Services Centre or online at- <https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.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 - <https://www.yorku.ca/secretariat/policies/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>

More information can be found here (<https://www.yorku.ca/secretariat/policies/>) on University policies including but not limited to:

Academic Accommodation for Students with Disabilities

Class Cancellation Policy

Senate Policy on Religious Observance

Student Conduct and Responsibilities (Academic and non-Academic)

Important Dates can be found here (e.g. add/drop deadlines, sessional dates, religious dates): <https://registrar.yorku.ca/enrol/dates>