

## Department of Biology Course Outline

### SC/BIOL 4710 3.00 Integrative Environmental Physiology Winter 2017

#### 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. Three lecture hours per week. 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: 431A Life Sciences Building  
[cbucking@yorku.ca](mailto:cbucking@yorku.ca)

#### Schedule

**Lectures:** Mondays, Wednesdays, Fridays at 12:30 – 1:30 pm. L S B 1 0 1 .

#### Evaluation

20% Midterm  
30% Final  
10% In Class Activities (clickers, peer evaluations, minute assignments)  
20% Presentations (8%, 12%)  
20% Written Paper

#### Important Dates

Presentation Dates will be announced in class and on Moodle.

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

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

Several helpful textbooks will be placed on reserve at the library to assist with additional material if needed. Helpful textbooks include: Environmental Physiology of Animals (Wilmer, Stone, Johnston), Environmental and Metabolic Animal Physiology (Prosser). Clickers are **mandatory**.

**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

- 1) Demonstrate an understanding of the influence of the surrounding environment on integrative physiology
- 2) Describe adaptation from gene to population levels
- 3) Demonstrate critical thinking and problem-solving skills
- 4) Demonstrate an understanding of experimental design, execution, and analysis
- 5) Demonstrate communication skills, both verbal and written
- 6) Demonstrate detailed knowledge of course topics
- 7) 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 both as a paper and a seminar.

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, and will be supplied with questions (clickers may be employed) to answer for a portion of their activities mark. A midterm and a cumulative final will be written on lecture material. 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 a brief (10 min) presentation.

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 and research seminar (20 min) to the class.

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.

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.

### Experiential Education and E-Learning

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

### Other Information

### Course Policies

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

- You must fill out an appropriate accommodation form according to the undergrad handbook/registrar's 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.

#### 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?

- First, you must fill out an appropriate accommodation form as outlined above and according to the undergrad handbook/registrar's 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.

Student's 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/>