Department of Biology Course Outline

SC/BIOL 3250 4.00 Experimental design for environmental and evolutionary biology

Fall 2020

Course Description

This course examines advanced concepts associated with the design and implementation of experiments in environmental and evolutionary biology. Both basic and applied designs are described and major contemporary developments summarized.

Prerequisites (strictly enforced)

SC/BIOL 2060 3.00 or an equivalent statistics course.

Course Instructor(s) and Contact Information

Dr. Christopher J. Lortie
218A Lumbers
Telephone: 416-736-2100 ext. 20588
e-mail: lortie@yorku.ca
Office hours: Please email to set up an appointment.

Schedule

LECTURES
Date and Time: WEDNESDAY: 6:00PM
Location: REMOTE
Course Session: FALL 2020 - Start date: September 9, 2020.
Course ID: S44K02 or S44K03

LABS
Date and Time: WEDNESDAY & THURSDAY: 2:30PM
Location: REMOTE

Evaluation

Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.

LECTURE COMPONENTS

Test	30%
Grant proposal	20%

LAB COMPONENTS

Dataset with meta-data for pilot experiment	5%
Dataset with meta-data for field experiment	5%
Field lab report	30%
Data-design lab report	10%

All work must be submitted to turnitin.com as PDF.
Class ID: **25429289**
Key: **experiment**

Important Dates

September 30th, 2020. Data and meta-data for pilot experiment.
October 21st, 2020. Data and meta-data for field experiment.
October 28th, 2020. Test. Final submission online by midnight.
November 11th, 2020. Lab report due by midnight.
November 25th, 2020. Grant proposal.
December 2nd, 2020. Lab report.

Drop Deadline: Nov. 6, 2020 (last day to drop without course on transcript)
Course Withdrawal: Nov. 7 to Dec. 8, 2020 (course still appears on transcript with 'W")

Resources

Textbook: 'Experimental design for the life sciences', fourth edition, by Ruxton & Colegrave, Oxford University Press. ISBN 978-0-19-87135-5

Links to peer-reviewed publications provided in class and labs to supplement textbook.

Lab manual provided online as PDF download from figshare.com

Learning Outcomes

Upon successful completion of this course, students should be able to:
(1) Understand the core concepts of experimental design for any natural science experiment.
(2) Understand key terminology, semantics, and experimental design philosophies.
(3) Critically assess experiments.
(4) Provide visual heuristics and workflows for experiments.
(5) Be able to design & execute an effective experiment.
(6) Be able to clearly write a well-structured manuscript suitable for publication in a journal.
(7) Be able to write a competitive grant proposal appropriate for a Master's application.

Course Content

Experiments are a powerful tool to understand, manage, and explore the world around us. This course will provide you with the terminology and concepts you need to be competitive and effective in research and employment. The lectures include exploration of the key terminology and ideas you need to process experiments. You will also practice design experiments.

Lectures
Read. Think. Create.

The first 6 weeks, we read a book together. This component of the lectures provides you with the critical elements, ideas, tools, and terminology you need to design better experiments. The extent that you develop your knowledge and design skills are evaluated using a test, provided in advance, that you complete on your own time.

The next 6 weeks, you design an experiment for graduate-level research and prepare an NSERC grant proposal (very short, see guidelines). The primary purpose of this component of the lectures is to provide you with the opportunity to generate a novel, useful research proposal on a **topic of your choice**. Key readings and discussion are provided to support your development and exploration of a topic.

Labs
Learn by doing.

There are two components to the labs. The first component is a field experiment. You are provided with three options. Try each briefly, then decide on the one that you want to pursue in depth and write up.

The second component of the labs focuses on reuse of data already collected. This is increasing common practice in the sciences, and it is an opportunity to apply design thinking to data and write a short research note. These relatively recent 'note' formats are succinct papers in most peer-reviewed science journals now used to report on a single finding and advance theory without a protracted introduction, methods, or discussion.

For both lab reports, we will look to the journal FACETS. It is Canada's first and only multidisciplinary open access science journal.

Experiential Education and E-Learning

Students will have the opportunity to explore figshare.com and other data repositories. GitHub will also be introduced as a collaborative open science project management tool for experiments. Speakerdeck and posted videos will be used.

Other Information

EXPECTATIONS
All information provided and discussed is testable.
Open and reproducible science is promoted in this course. However, effective scientific writing is also a critical professional skill we will develop. Consequently, students are provided time and opportunity to discuss all topics and research, but all final writing for exercises and tests should be done independently. All written content submitted will be evaluated using a comprehensive plagiarism checking tool, and students must thus ensure writing is done independently.

Course Policies

Alternative dates for assignments/evaluations are not available in this course. If documentation is provided for valid absences on test dates, accommodation will be granted in mutual discussion with the professors. To promote fairness and student responsibility, all exercises are due on the dates specified herein. A 10% penalty will be applied for the first day the exercise is late and 5% every day thereafter.

Students who anticipate being unable to submit the exercises on the due date are encouraged to submit early.

Grades on exercises and exams are not negotiable. Every reasonable action is made to ensure advance reminders are provided and instruction. Thus, the course director should only be contacted if there is calculation or clerical error present.

The Document Submission System must be used to submit all documentation associated with absences.
https://science.apps01.yorku.ca/machform/view.php?id=84113

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/

Important A note from the Faculty of Science Committee on Examinations and Academic Standards: Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting.

Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

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 - https://www.glendon.yorku.ca/counselling/
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 and submit an Examination Accommodation Form at least 3 weeks before the exam period begins. The form can be obtained from Student Client Services, Student Services Centre or online at http://www.registrar.yorku.ca/pdf/exam_accommodation.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