

University of Guelph
College of Biological Science
Integrative Biology
COURSE OUTLINE
BIOL*4110 - Ecological Methods
Fall 2014

Course description

This course will examine the theoretical and practical aspects of research methods in ecology. Emphasis will be placed on experimental design, sampling, population estimation, statistical inference, and characteristics of producers and consumers. Students will participate in research projects of their own design, and will gain experience in preparing research proposals, research papers and posters, and making oral presentations.

Prerequisite(s): BIOL*3010, (BIOL*3110 or BIOL*3120), (STAT*2040 or STAT*2230) - NO EXCEPTIONS.

This is a rigorous research-based course that requires considerable independent and group-based initiative; students lacking the pre-reqs would be at a considerable disadvantage and are therefore not permitted to take this course.

Teaching team

Andrew MacDougall SCIE 2459

Karl Cotttenie SCIE 2470

TAs: TBD

Course schedule

LEC Tues, Thur 01:00PM - 02:20PM SCIE, Room 2306

LAB Thur 02:30PM - 05:20PM SCIE, Room 2306

Learning goals and rationale

At the end of this course, the successful student will be able to work collaboratively and efficiently with peers and instructors to achieve the following:

1. to design a self-guided research question and project at the level necessary for a fourth-year research project within the constraints imposed by the course (one semester, available resources etc).
2. to apply the scientific method to current ecology problems and evaluate the evidence for an ecological mechanism that demonstrates the use of logic, an evaluation of the literature, incorporation of information on multiple perspectives, and statistical analyses of data.
3. to efficiently conduct an experimental design by actively employing empirical sampling techniques necessary to obtain unbiased and sufficient abiotic and biotic data.

4. to convincingly communicate this process as both a research article and an oral presentation to an audience with a general, ecological, background.

Course Resources

There are no required textbooks for this. Some textbooks that would be useful include:

- Karban, R. and M. Huntzinger. 2006. How to do ecology. Princeton University Press. 168 pp.
- Pechenik, J.A. 2010. A short guide to writing about biology. Pearson Education Inc. 288 pp.
- Ruxton, G.D. and Colegrave, N. 2003. Experimental design for the life sciences. Newmaster, S. 2010. Woodlot Biodiversity. University of Guelph.
- Krebs, C. Ecological Methodology, 2nd ed. Addison-Wesley Educational Publishers, Inc.

Course Content

There are no traditional lectures or labs for this course. Because it is a 1.0-credit course, students should expect to invest at least an additional 14h/wk. Class time will be devoted to discussions and exercises supporting inquiry-based learning. Specifically, groups of students will develop and carry out a semester-long ecological study involving collection and analysis of original data, and scientific report writing.

Methods of Assessment

Form of Assessment	Weight of Assessment	Due Date of Assessment	Learning Outcome Addressed
Written research proposal	20%	September 26	1, 2, 4
Field notebook/participation	20%	November 13	3
Written final research report	40%	November 27	2,4
Per student, one oral presentation of either proposal, research progress, meta-analysis, final research	20%	see dates below	4

Important Dates

First class	September 4
Research proposal seminar/defence	September 18
Research proposal due	September 26
Research progress seminar	October 16
40th class day	October 30
Meta-analysis seminar	November 6

Field notebooks due	November 13
Research seminar	November 20
Final research report due	November 27
Last class	November 27

Course and University Policies

Release and indemnification form

Students must understand the distribution of responsibilities when fieldwork is carried out. The University seeks to provide opportunities for an optimum training and educational experience, but it is the student's responsibility to effectively and safely exploit this opportunity. To this end, we (1) append to the course outline a list the kinds of field settings that might be encountered, and the attendant risks involved with these settings, as well as mandatory behaviours that will better ensure that field exercises are conducted safely; and (2) require students to fill out, sign and hand in at the first class, a Release and Indemnification Form (RIF), as a written agreement on your part to follow the behaviours and accept the responsibility for any deviations from them. Failure to hand in the RIF at the first class meeting will result in suspension of permission to conduct fieldwork until the form is handed in. The RIF will be available in class on the first day, and on Courselink thereafter.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing in person (NEVER EMAIL), with your name, id#, and e-mail contact, and be prepared to provide supporting documentation. See the undergraduate calendar for information on regulations and procedures for Academic Consideration:

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Centre for Students with Disabilities as soon as possible.

For more information, contact CSD at 519-824-4120 ext. 56208 or email csd@uoguelph.ca or see the website: <http://www.csd.uoguelph.ca/csd/>

Academic Misconduct

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisort.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

E-mail Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students. In addition, Courselink will be used to distribute information during this course, so all students are required to check the Courselink regularly.

Drop Date

The last date to drop one-semester courses, without academic penalty, is the 40th class day. To confirm the actual date please see the schedule of dates in the Undergraduate Calendar. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Copies of out-of-class assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Grading

Indicate all course policies regarding in-semester tests and assignment submissions, including time and place for submission of assignments and explicit penalties for late submissions.

Campus Resources

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>

If you are concerned about any aspect of your academic program:

- make an appointment with a program counsellor in your degree program.
<http://www.bsc.uoguelph.ca/index.shtml> or <https://www.uoguelph.ca/uaic/programcounsellors>

If you are struggling to succeed academically:

- There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance.
<https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention.
<https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.uoguelph.ca/~ksomers/>

If you have a documented disability or think you may have a disability:

- The Centre for Students with Disabilities (CSD) can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see: <https://www.uoguelph.ca/csd/>

SAFETY IN ECOLOGY FIELD COURSES AT THE UNIVERSITY OF GUELPH

Many of the courses at this University involve field work in natural or semi-natural settings. Students must understand the distribution of responsibilities when this work is carried out. The University seeks to provide opportunities for an optimum training and educational experience, but it is the student's responsibility to effectively and safely exploit this opportunity. To this end, here we list the kinds of field settings to be encountered, and the attendant risks involved with these settings. We also list a series of mandatory behaviours that will ensure that the field exercises are conducted safely. Lastly, we include a requirement to sign and return the last page to us, as a written agreement on your part to follow the mandatory behaviours and accept the responsibility for any deviations from them.

Location	Risks and measures to avoid them
Forest	-meeting cars while walking on road. Stay to side.
	-poison ivy. Learn what it looks like and avoid. If contact is made, wash skin and clothing as soon as possible.
	-bees. If you are stung, contact one of the course staff immediately. This is especially important if you have disturbed a colony! If you are allergic to bee stings, contact the staff at the beginning of the course.
	-tree branches, twigs, logs, dead snags. All of these can fall on you, cause you to trip and fall, or otherwise injure you. Do not pull on dead trees, or dead snags. Do not disturb coarse woody debris. Do not climb trees.
	-glass on ground or in soil can cut you badly. Do not dig through soil with your hands. If you get cut, contact the staff immediately and seek appropriate medical attention.
	-lightning. Do not conduct field work if there is lightning.
	-other people. Assaults have been reported in the Dairy Bush, Arboretum, and other University Properties. Always travel with another person. Never conduct field work alone.
	-animal bites. Do not encourage any vertebrate to approach you. This includes both wild and domestic animals.
	-sunstroke. Wear a hat and sunblock if long periods of time are to be spent in the open. Bring water to drink.

River	-any body of water can cause drowning. Always wear hip waders if so instructed. Never enter water alone. Respect powerful currents and slippery surfaces.
	-cold. Even in the absence of a drowning risk, falling into cold water in the fall or winter can result in hypothermia. Do not fall into cold water. Do not enter cold water alone. If you do get wet, exit the water immediately and seek assistance from the staff.
	-infections. The rivers of the Grand River watershed are not as clean as they used to be. Who knows what lurks in the water? Do not allow the water to get in your mouth. Do not allow open wounds to contact the water. Any illness associated with contact with the water should be reported to medical personnel.
	-slippery rocks. Avoid stepping on uneven rocks. Walk slowly and carefully. If you have a fall that causes an injury, let the staff know immediately.
Field	-farm equipment. Do not sample close to the ground in active or abandoned agricultural fields without making your presence known to people using farm machinery. Be alert to approaching machinery.
	- you may NOT enter any private land without permission from the landowner.