



IBIO*6000 Special Topics in Ecology and Behaviour

Winter 2019

Section(s): C01

Department of Integrative Biology

Credit Weight: 0.50

Version 1.00 - January 08, 2019

1 Course Details

1.1 Calendar Description

This is a course in which several faculty lecture and/or lead discussion groups in tutorials about advances in their broad areas, or related areas, of ecology and behaviour. Topics may include animal communication, optimal foraging, life-history evolution, mating systems, population dynamics, niche theory and food-web dynamics, and will depend on who is co-ordinating the course for that particular offering. The course includes lectures and seminars in which the students actively participate.

1.2 Course Description

General course description

This is a modular course in which several faculty lecture and/or lead discussion groups in tutorials about advances in their broad areas, or related areas, of ecology and behaviour. Topics may include animal communication, optimal foraging, life-history evolution, mating systems, population dynamics, niche theory and food-web dynamics. The course includes lectures and seminars in which the students participate. Offered annually.

Course description specific to topic

The objective of this course is to provide students with a practical introduction to ecological data analysis using R. The course will be based on a series of teaching modules that will cover a variety of topics relevant to graduate statistics. Each module will begin with a brief synopsis or introductory lecture. Students will then be expected to independently work outside of class through a series of exercises that will allow them to learn relevant concepts through hands-on applications. The independent module exercises will finish with the completion of an assignment, which will include the analysis of a provided dataset as well as the student's own dataset. Students are, therefore, encouraged to enter the course with an analyzable dataset in hand, but if one is not available the instructor can provide a dataset to be analyzed during the course. The course will finish with a final project in which the students will have completed an entire analysis of their own data and written up their methods and results from this analysis.

This course will use R for all data analysis. An introduction to the use of R and R code for performing analyses will be provided. This course will, therefore, be a good opportunity for students to increase their familiarity with R. The goals of the course, however, are conceptual and will focus on statistical principles that are relevant to graduate students in Integrative Biology.

1.3 Timetable

The W19 offering of this course will be held on Thursdays 1-3pm in SSC 2315

Timetable is subject to change. Please see WebAdvisor for the latest information.

1.4 Final Exam

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

There is no final exam for this course in W19

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Andrew McAdam
Email:	amcadam@uoguelph.ca
Telephone:	+1-519-824-4120 x56826
Office:	SC1 2457
Office Hours:	TBD

3 Learning Resources

3.1 Required Resource(s)

Course Software (Software)

We will be using R (<https://www.r-project.org>) and RStudio (<https://www.rstudio.com>) in the course. These are freeware. Students will be required to download the most recent versions of these software packages at the start of the course.

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Reinforcement of basic principles of statistics
 2. Functional use of R and RStudio to perform statistical analyses.
 3. Familiarity with ethics of data analysis and presentation.
 4. Familiarity with contemporary approaches for analyzing real (i.e. messy) data.
 5. Practice effective communication of statistical results in text, tables and figures.
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5 Teaching and Learning Activities

5.1 Lecture

Topic(s): One two-hour meeting per week.

Topics:

1. Quantitative approaches
2. Power, replication, control and independence
3. Introduction to R
4. Presentation of data and results
5. Review of general linear models (regression, ANOVA)
 - a. Assumptions, diagnostics, interactions, SS types
 - b. Nonlinearities, collinearity, problems with ratio variables, ANCOVA
6. Maximum likelihood and model selection
 - a. Stepwise procedures, AIC
7. Non-normality, transformation and generalized linear models
8. Mixed-effects models

6 Assessments

6.1 Assessment Details

Assignments (60%)

There will be five assignments, only 4 of which will be graded. Each assignment will expect students to apply the principles discussed during class to a real situation. Students will be required to implement a technique discussed in class to a provided dataset and their own independent dataset using R. The results of this work will be written up as an assignment complete with annotated R code, text and perhaps tables or figures.

Learning outcomes: 1, 2, 3, 4, 5

Final Project (40%)

The final project for the course will involve each student completing a thorough analysis of some of their own data. The dataset and biological question to be addressed will be determined by each student individually. The project will describe statistical methodology used and provide results along with associated tables and figures. This project should be similar in scope to what might be included in a scientific paper on the topic. Each of the assignments in the course will help students progress toward completion of the final project.

Learning outcomes: 1, 2, 3, 4, 5

7 Department of Integrative Biology Statements

7.1 Academic Advisors

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

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

7.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: 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/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

7.3 Wellness

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/>

8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 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, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Dropping Courses

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

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

8.4 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.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website
<https://www.uoguelph.ca/sas>

8.6 Academic Integrity

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 encourages academic integrity. 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 advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

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

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>
