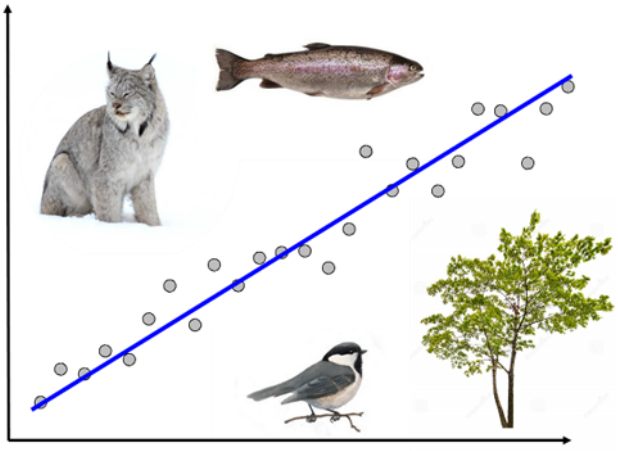
Introduction to Quantitative Ecology
NRC 290b - Fall 2018



Monday & Wednesday
11:15 - 12:30 (Sec 1)
13:00 - 14:15 (Sec 2)
Holdsworth 211
3 Credits

Instructor
Dr. Chris Sutherland
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Office Hours:
Tu AM (by appt)
Th AM (by appt)

Teaching Assistant
Donovan Drummey (Sec 1)
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Mo 10:00 - 11:00
We 10:00 - 11:00

Teaching Assistant
Joe Drake (Sec 2)
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Office Hours:
Mo 14:30 - 16:30

Course Overview:

Ecology, the study of the relationships between organisms and their environment, is a discipline concerned with quantifying relationships observe in nature. This introductory statistics course aims to provide students with a supportive, encouraging, and comfortable environment for developing an appreciation that ecology is a quantitative science while developing a sound knowledge of essential statistical concepts. My hope is to demystify statistics and help develop the basic level of quantitative understanding that all future ecologists and environmental scientists should possess.

Rather than focus on statistics in isolation, statistical analysis will be presented as one component of the scientific process - a very important component! Of course you will learn how to apply a range of common statistical tools to environmental data sets, but emphasis will be placed on understanding *why* different statistics are used to answer important ecological questions. This understanding will be achieved through two modes:

1. **In-class** learning using a combination of mini-lectures, group discussion sessions and group problem solving exercises, all aimed at reinforcing quantitative concepts
2. **Out-of-class** learning through assigned readings and individual assessments to prepare you for in-class sessions, and take home assignments that are also aimed at reinforcing quantitative concepts

Course Objectives:

The overall aim of this course is to develop the core quantitative skills required of a modern ecologist:

1. An appreciation of the scientific process
2. A proficiency in data manipulation and management
3. The ability to summarize and visualize data in a meaningful way
4. Choosing and using the appropriate statistical analysis when presented with an ecological question and data
5. Interpreting statistical results in the context of ecological questions
6. A working knowledge of the software `Excel` and `R`

Course structure

I have designed the course to follow a set structure throughout the semester so that deadlines and tasks remain consistent. I will make any deviations from this absoultely clear but will endeavour not to deviate from this. Hopefully the regularity and consistency of the submissions and requirements will help you organize your time and workload. Note that extensions will not be granted for any deadlines unless there is very good reason and that the request are made at least 48 hours in advance.

Before every class on Monday, you will be required to:

- complete the assigned readings
- complete an individual online exercise based on the assigned readings
  - individual exercises will be posted on `moodle`
  - **the deadline is 23:55 on the Sunday night before class on Monday**
  - individual exercises contribute to your final grade (see below)

Monday class sessions will be structured as follows:

- mini-lecture and/or discussions about concepts covered in assigned readings
- short group evaluation based on assigned readings (`i-clicker` or paper)
  - the group evaluation will be at the start of the class
  - the group evaluation will contribute to your final grade (see below)

Wednesday class sessions will be structured as follows:

- introduction of a problem
- group problem solving exercise
- ~5 exercises will include a take-home group assignment
  - **assignment deadline is 23:55 on the following Tuesday**
  - **peer evaluation deadline is 23:55 on the Wednesday**
  - late submissions of either will result in a max grade reduction of 50% per day
- take-home assignements contribute to your final grade (see below)

One `i-clicker` poll will be taken per class to take attendance, but also to keep track of how the class is being percieved (pace and content etc. . .).

Team generation will be done using the 'Team Maker' functionality in `CATME` at least three times throughout the semester. If you have enrolled on this course, you will be registeded on the course in `CATME` - you will recieve an email with instructions on how to answer the Team Maker and Peer Evaluation surveys.

Assessment & Grading

Your final grade will be made up of weighted contributions of each of the following:

1. Individual online assessments (`moodle`, 20%): Short weekly online assignments based on the assigned readings. The assignment must be completed on `moodle` by 23:55 the night before class on Monday.

2. In-class group evaluations (`i-clicker`, 20%): Short weekly in-class multiple choice or paper questions based on the assigned readings. Groups can openly discuss each question.

3. Group take-home problem solving assignments (a short report, 30%): Approximately five of the in-class problem solving exercises will include an additional related take-home assignemnt. Groups will write a short report summarizing tasks from take home (explicit instructions will be provided for each on assignemnt).

    - For each take-home assignemnt, you will provide an annonymous assessmement of the contributions made by members of your group. Peer evaluations will be conducted using the `CATME` peer evaluation instrument. Your group score will be weighted by your individual contribution score.

4. Final Project (a short report, 30%): At the end of the semester, in new groups, you will chose from a pool of ecological problems and use our newly aquired quantitative skills to answer a real life ecological problem. THe final project has two components (explicit instructions will be provided closer to the time): an *oral presentation* (15%), and a *written report* (15%). As with the group assignments, you will also provide a peer eveluation using the `CATME`.

Here is an example of how the peer evaluation weighting would work:

Group Grade	Peer evaluation grade	Your final Grade
100%	100%	100%
80%	50%	40%
50%	0%	0%

Grades will be regularly updated and displayed in the "Grades" section of `moodle`, but please allow for a 1-2 week lag for marking and grade processing. Grades will be calculated as pecentages and a final 'letter grade' will be awarded.

Responsibilities & Course Courtesies

Students are expected to attend all classes, to complete all assigned readings and team exercises, and take all scheduled online, in-class and peer evaluations. Students are also expected to participate and make meaningful contributions to all classroom discussions and exercises.

I will ensure that classes begin promptly and end on-time. I would ask that you please be punctual; late arrivals and early departures can be disrupting and impact the course schedule and as a consequence, your learning experience.

Using your phones and computers during class for any non-class related activities will not be tolerated.

Donovan, Joe and I will always be available during office hours and for a short time after class. Feel free to drop-in during those times or request a slot in advance. Office hours will be on a first-come-first-serve basis although if an appointment is made, you will be seen at that time.

Course Materials and Structure

The course will follow, by permission of the author, the structure of a single textbook:

> Gardener, M. (2017). Statistics for ecologists using R and Excel: Data collection, exploration, analysis and presentation (Second Edition). Pelagic Publishing.

Below is a tentative schedule including the topic, associated book chapters, and *an approximate* number of weeks to be spent on each topic. The schedule is purposefully approximate and gives enough flexibility to ensure topics are well understood before progressing.

Topic	Weeks	Reading
Why quantitative ecology	1	Giminez (2010); Barraquand (2013)
Doing science	1	Gardener Ch. 1
Data management	1	Gardener Ch. 2
Data exploration	4	Gardener Ch. 3, 4 & 6
Hypothesis testing	1	Gardener Ch. 5
Doing statistics	5	Gardener Ch. 7, 8, 9, 10, & 11
Reporting results	1	Gardener Ch. 12

Many of the problem solving exercises will be computer-based. If you have a laptop, you are welcome to use that in class, but there are classroom laptops that are available for use in any of the class sessions. Group evaluations and regular polls will be conducted using i-Clickers. You are required to bring your i-Clickers to **every class**.

Now for the assignemnt: Please complete the Team Maker survey so that we can create the teams for the first few week of the semester.

Policy Statements

1. Accomodations

The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), Learning Disabilities Support Services (LDSS), or Psychological Disabilities Services (PDS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first two weeks of the semester so that we may make appropriate arrangements (http://www.umass.edu/disability/).

2. Academic Honesty

Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst. Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. The procedures outlined below are intended to provide an efficient and orderly process by which action may be taken if it appears that academic dishonesty has occurred and by which students may appeal such actions. Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent. (http://www.umass.edu/dean_students/codeofconduct/acadhonesty/)