

This syllabus is a general representation of the course as previously offered and is subject to change.

BIOL 404 – Ecological Methodology

General Course Syllabus (as of July 2019)

About the Course:

Course Description: Design, execution, and analysis of ecological surveys and experiments. Practical field methods for estimating population metrics and describing community structure. Computer techniques for the statistical analysis of ecological data.

Course Format: Lecture and Tutorial

Credits: 3

Prerequisites: BIOL 230 and one of BIOL 300, STAT 200.

Course Learning Objectives:

By the end of the course, students will be able to:

- Apply their ecological concepts in a real world environment.
- Gain employable skills for ecology such as:
 - Practical field methods: learn how to quantify populations, communities, and ecosystem processes.
 - Advanced statistics using R: how to manage and analyse complex datasets (i.e. data science).
 - Report writing.
- Design their own experiments with guidance from the instructor.
- Hone their scientific writing and thinking skills.
- Become more prepared to work in the environmental sector or pursue graduate studies.

Textbooks and Additional Resources:

Textbook (open access) is available from:

<http://www.zoology.ubc.ca/~krebs/books.html>

Software (open source download):

- [R](#)
- [R Studio](#)
- [GPower](#)

Mac users - please note that some R packages only run with the most recent versions of iOS, consider upgrading your iOS if you have a fairly old version. Further details on the links to download the software will be provided in the course.

Evaluation:

Assessment	Weight
Statistics assignments (7)	28%
Formal lab reports (3)	39%
Group research project, written independently	26%
Oral presentation	5%
Participation	2%

There are no exams in this course, but students will be assessed on weekly assignments and reports.

Participation includes: (1) uploading class data and group project data on time; (2) constructive, respectful participation and contribution to class discussions and activities and Piazza; (3) completion of writing scorecard prior to lecture on science writing. In the case of a substantial failure of (1) or (2), a mark of zero for participation will be given.

Late penalty: Lab reports and assignments: 5% off per day including weekends, unacceptable after 1 week.

Schedule of Topics

Week	Lecture	Lab
1	Introduction and experimental design exercise	No lab
2	Six rules for analysing data; Mark-recapture 1	R intro
3	Jolly Seber; Scientific writing and reporting	Mark-recapture I- bean counting in the wet lab
4	Statistical power and sample size; ANOVA 1: fixed and random effects, blocks	Quadrat lab - efficiency and power
5	ANOVA 2: nested versus crossed designs; Line transects, precision, accuracy and bias.	Quadrat lab part 2: analysing your data
6	Regression (part 1: multiple regression and stepwise regression); Independence, orthogonality and multiple tests	Line Transect lab- in Pacific Spirit Park
7	Replication and Pseudoreplication: Controls	Transect lab, part 2: data analysis
8	Regression (part 2: covariance and ANCOVA); Competition experiments	Group projects on species diversity. 1. Design project 2. Decide on pilot data

9	Diversity indices and randomization tests; Similarity, clustering and ordination	Group: collect pilot data
10	Conduct power analysis on pilot, alter expt design if needed	Group project data collection
11	New methods in ecology Careers in ecology	Group project data collection
12	In-class assignment: GLMs	R analysis of group project species x site matrices
13	Group project presentations	Group project presentations

University Policies:

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and so there are additional resources to access including those for survivors of sexual violence.

UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom.

UBC provides appropriate accommodation for students with disabilities and for religious, spiritual and cultural observances.

UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions.

Details of the policies and how to access support are available on [the UBC Senate website](#).