

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

BIOL 230 – Fundamentals of Ecology

General Course Syllabus (as of September 2019)

About the Course:

Course Description: A course on the dynamics of plant and animal populations, structure of ecological communities and functioning of ecosystems. Interpretation of research results and application to environmental issues. Labs meet once a month. Please consult the [Faculty of Science Credit Exclusion Lists](#).

Course Format: Lecture and Laboratory

Credits: 3

Pre-requisites: One of BIOL 121 or SCIE 001

Course Learning Objectives:

By the end of this course, students should be able to address the following four focal questions:

- What determines the number of species in a community?
- Why don't populations expand infinitely?
- Why are there so many more plants than animals? *or* Why is the world is green (and blue)?
- Are humans reducing the ecosystem services on which we depend?

Textbooks and Additional Resources:

Textbook (required): Cain, M.L., S.D. Hacker, W.D. Bowman. 2017. Ecology. 4th Edition Sinauer. Students can make do with the 3rd and 2nd Ed. – the pre-reading quizzes will have page numbers for both editions.

iClicker (required): in-class participation measured by the iClicker system will count for marks during the term.

Evaluation:

Two midterm exams (50 min, closed book) will be held in lecture.

Field Labs: There will be three field-lab cycles in the term. All supporting materials for Labs are provided in Canvas, including a [General Lab Manual](#) with policies and instructions. For each lab, there is a simple pre-lab quiz to complete in advance of each lab, to ensure students have read and understood the instructions. Two of the three labs

also have a training session the week before fieldwork, to teach students how to identify species.

Unit review tests: Four Canvas-based tests are due near the end of each Unit. The questions in these tests are based on previous midterms and exams, so should give students a good idea of what to expect on midterms and exams.

Excel exercise: A short online activity to teach the Excel operations needed for the labs.

Pre-reading quizzes: Weekly Canvas-based quizzes based on the assigned reading for the upcoming lecture. It's very much in the students' own interest to be alert for the key dates and times.

The final examination will be cumulative, 150 minutes in duration and closed book.

Marks Breakdown:

Assessment	Weight
Midterm 1	10%
Midterm 2	20%
Field Labs	18%
Unit review tests	4%
Excel exercise	1%
iClicker participation	2%
Pre-reading quizzes	5%
Final exam	40%

Schedule of Topics:

Lecture:

Topic	# Lectures
Introduction to the course and to ecology Overview of course including field labs; Introduction to the 4 focal questions of the Biol 230 curriculum; the importance of preparation/participation during class; the history of the study of ecology, and its goals; what ecologists do, including data-gathering methodologies.	1 lecture
Why don't populations expand infinitely? Exponential & logistic growth; discrete & continuous growth; birth & death rates; limitation/density-independence & regulation/density-dependence.	4-5 lectures

<p>Inverse density-dependence & the extinction vortex; competition & carrying capacity (K).</p> <p>How competition controls growth within and between species (evidence, models); interactions between disturbances and competition.</p> <p>How consumers/predators control growth; life-history constraints for different taxa/habitats</p>	
<p>What determines the number of species in a community?</p> <p>Species distributions in space and time; describing diversity; dispersal & vicariance.</p> <p>Roles of area and productivity; colonization filters; equilibrium/nonequilibrium systems.</p> <p>The role of competition; niche theory; intermediate disturbance and coexistence.</p> <p>Keystone species, dominants, and ecosystem engineers; direct and indirect interactions.</p>	<p>4-5 lectures</p>
<p>Why are there so many more plants than animals? Or Why is the world green (and blue)?</p> <p>Autotrophy & heterotrophy; biomass and production across trophic levels of both terrestrial and aquatic food webs</p> <p>“Green World” hypothesis and theory debates arising from it; predator-control of herbivore impact on plants.</p> <p>Limits on herbivory due to digestion & nutrient content</p> <p>Modes of plant defence; co-evolution of herbivores and plants</p> <p>Aquatic/terrestrial contrasts in the production and consumption of biomass.</p>	<p>4-5 lectures</p>
<p>Are humans reducing the ecosystem services on which we depend?</p> <p>Defining ecosystem services and functions; assessing the evidence for a contemporary mass extinction event (biodiversity loss)</p> <p>Extinction risk & life history traits</p> <p>Types of anthropogenic threats to biodiversity (habitat change, climate change, invasive species, overharvesting, pollution)</p> <p>Evidence for the relationship between biodiversity and ecosystem services</p> <p>Mechanisms explaining the relationship between biodiversity and ecosystem services</p> <p>Global nutrient cycles (N and C) and how humans are modifying them; eutrophication (N pollution); climate change effects on species</p> <p>Conservation biology</p>	<p>5-6 lectures</p>

Labs:

Lab	Topic
1	Epiphyte on trees
2	Isopod abundance
3	Forest diversities

Course Policies:

- There are no “makeup” midterms but, with a valid excuse (as defined in the [UBC Academic Concession policy](#)) for absence, the other midterm + final exam mark will both be scaled to cover the missed midterm. Students authorized to write midterms and exams through Access and Diversity are asked to contact Instructors as soon as possible.
- Students are asked not to schedule any travel or other commitments until after the completion of the exam period. University policies on permissible reasons for missed or deferred exams, and exam hardship, are summarized [here](#).
- Remarking of midterms/exams: Students are advised that only entire exams or midterms are remarked, not an individual answer, and therefore their final mark could go either up or down. Requests for remarking must be submitted within two weeks of each midterm and two months of the final exam. Only exams written in ink can be remarked.

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](#).