

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

BIOL 121 – Genetics, Evolution and Ecology

General Course Syllabus (as of July 2019)

About the Course:

Course Description: Biology is the study of life. The course will build understanding of fundamental concepts within three major theme of Genetics, Ecology and Evolution. Topics include principles of storage and transmission of genetic variation, origin and evolution of species and their ecological interactions. Throughout the course, students will also practice thinking like biologists and viewing the world through a scientific lens.

Biology 121 serves roughly 2000 UBC students per year, is required for Life Sciences majors or honours (e.g., Biology, Microbiology and Immunology), is a prerequisite for many BIOL and MICB courses, and is a prerequisite for admission to or is part of a program in other faculties e.g., medicine, dentistry, forestry, etc. Credit will be granted for only one of BIOL 121 or BIOL 344.

Course Format: Lecture.

Credits: 3

Prerequisites: One of BIOL 11, BIOL 12, BIOL 111.

Course Learning Objectives:

The course goals are to use the three main disciplines of Genetics, Evolution and Ecology for students to:

- Achieve an understanding of the core concepts in biology that are required for upper-level courses.
- Acquire lasting knowledge and appreciation for living organisms and their connections to the world.
- Connect concepts from various sub-disciplines of biology.
- Appreciate how biologists, as scientists, understand the world.
- Apply knowledge to new situations and integrate concepts from multiple sub-disciplines to solve problems or make predictions about biological systems.

Topic-specific course goals are for students to be able to:

- Describe, diagram, and make predictions about cellular mechanisms and their effect on DNA at multiple scales. (Genetics)
- Analyze different kinds of genetic data and explain how they are the result of cellular mechanisms. (Genetics)
- Apply knowledge of the main mechanisms of evolution (mutation, drift, selection, gene flow) to explain change in lineages over time. (Evolution)
- Analyze and interpret how organisms and taxa are related and describe the morphological and molecular evidence supporting evolution. (Evolution)

- Evaluate and make predictions about the abundance and distribution of populations and communities over different time scales. (Ecology)
- Explain the roles and interactions among individual, population, communities and abiotic factors in building and changing an ecosystem. (Ecology)

More detailed learning objectives will be provided in class.

Textbooks and Additional Resources:

TEXTBOOK (REQUIRED): Freeman, Harrington and Sharp (2018-2019) Biological Science—Custom Edition for UBC.

- Copies of the text are available from the UBC Bookstore or for short-term loan from the Biology Office.
- The 2015-2016 UBC Custom Edition or 2nd & 3rd Canadian Editions are also acceptable, but finding the correct pages is up to the student.
- Do not use: Biological Science, US Editions. This textbook has very different content

CANVAS COURSE WEBSITE (REQUIRED): Canvas will be used for announcements, posting lecture slides after class, pre-reading quizzes, exam preparation, registering clickers, checking grades and more. Access the site from canvas.ubc.ca. Students are responsible for checking this site frequently.

IClickER (REQUIRED): iClickers are used to engage students in thinking, peer discussion, and providing feedback, and as a way to gauge who attends class (participation).

PIAZZA (OPTIONAL): Piazza is a discussion forum where students can ask questions related to Biology 121 that can be seen and answered by their peers as well as the teaching team.

MASTERING BIOLOGY (OPTIONAL): students may visit [masteringbiology.com](https://www.masteringbiology.com) to use their online resources (videos, diagrams, practice problems, etc.). There are no grades associated with completing problems on Mastering Biology, as they are simply provided as an additional resource for study. Typically, the questions on Mastering Biology are low level (recall/basic comprehension), good for basic review. The in-class questions, practice questions, and homework questions are higher level (apply, analyze) — similar to what students will get on an exam.

BIOLOGY LEARNING CENTRE (RESOURCE): The Learning Centre has tables and white boards that students can use for studying alone or with a group. This is also where the BIOL 121 TAs and peer tutors will be holding their office hours; a schedule of these office hours will be posted on Canvas.

Evaluation:

Note: the grades breakdown may vary by year, term, or section.

Assessment	Weight
Pre-Reading Quizzes	4-5%
In-Class participation (iClicker questions & Group work)	5%
Assignments (Weekly homework & Community Based Education trip (CBEL))	5-6%
Midterm 1	15%
Midterm 2	20%
Final Exam	50%
Total	100%
Bonus Engagement in Learning (Diagnostic quiz & feedback surveys)	Up to 2%

Important: In order to pass the course, students must achieve a minimum of 50% based on the individual portion of the exams (midterms and final) alone.

DETAILS ON ASSIGNMENTS:

PRE-READING QUIZZES: Each week, students will have a pre-class reading assignment and quiz. These reading quizzes let students check their understanding of the background material (and let instructors know how well students understand the week's topics). Class time will focus on applying concepts to higher-level problems. For Pre-reading quizzes, iClicker questions, and group assignments, the instructor may drop the lowest score(s) of the semester. Details will be provided at the start of each term.

CLASS PARTICIPATION: CLICKERS: There will be clicker questions during most classes. Clicker questions are for participation and not graded for correctness. If some aspect of the classroom (e.g., WiFi not working, iClicker system not responding) prevents students from participating in clicker questions, they should let the instructors know right away.

CLASS PARTICIPATION: GROUP WORK: There will be in-class activities in most classes. There will be group activities to encourage students to take an active part in their own learning, and to overcome the challenges of learning in a large class. It is recommended to work in the same group all semester. Occasionally, these activities will be handed-in and graded for participation, sometimes correctness. Of the 8-12 group assignments, up to three will be graded for marks. There will be no make-up for missed in-class activities.

ASSIGNMENTS: WEEKLY HOMEWORK: Most weeks students will be assigned an

end-of-week homework assignment. Most homework is graded as participation; one random homework will be graded for correctness. Late homework will not be accepted.

CBEL ASSIGNMENT: Students may attend a Community-Based Educational Learning field trip and complete an individual written assignment and reflection afterwards.

MIDTERMS AND FINAL EXAMS: Midterms and final exams will be open-ended, short-answer or problem-based and include higher cognitive-level questions (apply, analyze, evaluate, justify). There are no make-up midterms. If students have a valid reason to miss an exam, they must contact the instructor immediately.

BONUS ENGAGEMENT IN LEARNING: Students can receive up to 2% bonus marks for participating, and answering honestly and thoughtfully, the diagnostic quizzes and in-class feedback surveys.

Schedule of Topics:

Below is a sample schedule from 2018W2 (subject to change):

Unit 1: GENETICS

Week	Topics	Relevant Textbook Chapters
1	Course Intro Genes and Chromosomes	Course syllabus Ch 11.1 What Is a Chromosome?
2	Genes and Chromosomes continued The Cell Cycle, Mitosis and Meiosis	Ch 11 The Cell Cycle (including Mitosis) Ch 12 Meiosis
3	Meiosis continued Inheritance of traits	Ch 13 Mendel and the Gene
4	Inheritance of traits continued Pedigree Analysis	Ch 13.6 Applying Mendel's Rules to Humans
5	Catch-up / Genetics Review Midterm 1 (50 minutes, in class)	

Unit 2: EVOLUTION

6	Evolution Introduction Population Genetics	Ch 15 How Genes Work Ch 25 Evolutionary Processes
7	Evolutionary Mechanisms (mutation, genetic drift, gene flow, natural selection) Natural Selection	Ch 24 Evolution by Natural Selection
8	Evolutionary Trees Species and Speciation	Ch 27.1 Phylogenetic Trees Ch 26 Speciation
9	Catch-up / Evolution Review Midterm 2 (50 minutes, in class)	Ch 27 pgs 531-532

Unit 3: ECOLOGY

Week	Topics	Relevant Textbook Chapters
10	Ecology Introduction Population Ecology	Ch 50 Introduction to Ecology Ch 52 Population Ecology
11	Population Ecology continued Community Ecology	Ch 53 Community Ecology
12	Community Ecology continued Ecosystem Ecology, Biomes	Ch 54 Ecosystems
13	The Great Bear Rainforest Case Study Ecology and Course Review	To Be Determined
	Final Exam: Exam date set by the registrar. Do not book travel during the term end exam period, including Saturdays.	

Course Policies:

In Biology 121, students are expected to abide by the rules, regulations and policies described in the Academic Calendar. Plagiarism or any form of cheating is not tolerated in this course. Please see UBC's rules regarding Academic Honesty and Standards.

It is expected that students attend and actively participate in class, promptly communicate any questions, issues or concerns to the instructor, are punctual (i.e. be ready to start class right on time, respect deadlines, etc.) and interact with other in a respectful manner. At the start of the course, instructors will outline expectations regarding students' and teaching team's responsibilities as students are expected to be proactive, independent and responsible for their own learning.

Only students registered in Biology 121 have legal access to the course material. Students should refrain from distributing course material on other websites to other groups in any way.

In order to protect the privacy of students, students should not make video recordings of class lectures. Audio recordings may be permissible, but students are asked not to record the group activities if a group member objects. Slides and material shown in the lecture will be made available on Canvas as soon as possible after the lecture.

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](#).