

IB 162 Ecological Genetics
University of California, Berkeley
Department of Integrative Biology
(4 units)

Course Description:

This course presents modern approaches to studying evolution in natural populations, which requires both ecology and genetics. We will study quantitative and molecular causes of inheritance of ecologically important traits and their evolution. We will use simple mathematical models to predict evolution in natural populations. This course will help you build a conceptual framework for understanding biology.

"Nothing in biology makes sense except in the light of evolution."
Theodosius Dobzhansky (1970) *Genetics of the Evolutionary Process*

Format:

There are lecture and discussion sessions. Lectures will focus primarily on broad concepts and ideas. Weekly discussion sections will help you master ideas and give you practice in reading and analyzing primary scientific literature.

Lectures: TBD

Discussions: TBD

Goals:

1. Students will understand how genes and environments interact to produce phenotypes, including biological fitness, and influence which alleles are passed on to the next generation.
2. Mathematical models make our assumptions explicit. We will develop and apply simple mathematical models for studying evolution in natural populations.
3. Students will improve their ability to ask questions and answer them using scientific methods.
4. Students will gain factual knowledge of terms and concepts used to study evolution in natural populations.

Instructors and their contact information.

TBD

Office hours are the best way to get help and feedback. If you have a complicated question, are struggling to understand something, or want to dive deeper, come to office hours of the professor or the GSI.

Grade Breakdown

| Activity (see below for details) | Points |
|---|--------|
| Discussion section quizzes (5 @ 2 pts. each) | 10 |
| Lecture section quizzes (5 @ 2 pts. each) | 10 |
| Practice paper review | 4 |
| Proposal question and annotated bibliography | 3 |
| Paper review (3 pts. for 1 st draft/peer review, 5 pts. for 2 nd draft) | 8 |
| Proposal peer review | 3 |
| Midterm (in lecture, close book, no calculators or phones) | 25 |
| Proposal (3 pts. for 1 st draft/peer review, 9 pts. for final draft) | 12 |
| Final Exam | 25 |
| Total | 100 |

Required materials

Prerequisite courses

Bio1A and Bio1B or a comparable college-level introductory biology course. You should know some basic genetics, including DNA, gamete production, genotype, and phenotype.

Required texts

Allendorf, F. W., G. Luikart, and S. N. Aitken. 2013. Conservation and the Genetics of Populations, 2nd edition. Wiley, Oxford, UK.

Conner, J. K. and D. L. Hartl. 2004. A Primer of Ecological Genetics. Sinauer, Sunderland, MA.

Additional readings assigned for particular lectures and discussion sections will be posted on [bcourses](#).

Expectations

Lecture attendance is recommended because quizzes and in-class activities will help you learn the material. You can miss one lecture quiz for “free.” Keep it for when you need it! If you don’t miss any lecture quizzes, you can drop your one lowest lecture quiz score.

Discussion attendance is required and will be monitored. You can miss one discussion quiz for “free.” Keep it for when you need it! If you don’t miss any discussion days, you can drop your one lowest discussion quiz score.

All students are expected to complete all assigned readings, questions, quizzes & problems; actively participate in lecture, discussions, and peer review exercises; take the in-class midterm exam, complete all writing assignments, and take the final exam.

Assignments are due *at the beginning of class* on the date indicated on the class schedule. Without a good medical (or other approved) excuse, late assignments will be docked 10% per day (after the start of class counts as one day late).

There will be no make-up quizzes or midterm. The midterm exam can be missed only with *prior* written approval of Professor Simms. There will be no opportunity to make up a missed midterm exam. If you miss the midterm *with prior approval*, at semester's end, your midterm grade will be calculated as the average of all your other grades – that is, it would neither help nor hurt your course grade. If you miss the midterm *without prior approval*, you will receive a zero on the midterm.

The scheduled final exam can be made up only with *prior* written approval of Professor Simms. **Check the final exam schedule *before* enrolling in this course. Conflict with scheduled exams in other courses is *not* considered a reasonable excuse to miss the scheduled final exam.** If you obtain permission to miss the scheduled final exam, you will be provided with a make-up final at another time. However, Professor Simms reserves the right to change the format of the make-up exam.

Academic integrity and inclusivity

All students must abide by the **UC Berkeley Code of Conduct** of academic integrity and inclusivity. It is posted on [bCourses](#). Please see me if you are unclear about the code. Please don't scam/hustle/cheat in class. I hope that you can find fascinating things in this class that awaken an intellectual passion. If not, stop making yourself miserable. Just drop the class and do something you find more fulfilling.

Campus resources

[Disabled Students' Program \(DSP\)](#) - 260 Cesar Chavez Student Center, 642-0518. The Disabled Students' Program serves students with disabilities of all kinds. Services are individually designed and based on the specific needs of each student as identified by DSP's Specialists.

We will be happy to accommodate you, but **please make your needs known to your professor or GSI as soon as possible.** We need sufficient time to reserve additional exam rooms and arrange proctoring.

Details

| | |
|--------------------------|---|
| Quizzes and problem sets | Many quantitative concepts are presented in this class. You will receive problem sets for practice and self-evaluation, followed by quizzes in lecture and/or discussion section. |
| Paper review | You will learn to review research papers from the primary literature. |
| Grant proposal | You will work in pairs as you learn to write a research grant proposal. |
| Midterm | 1½ hours, in class on TBD, covering material covered up through TBD |
| Final | 3-hour, comprehensive, but more emphasis on 2 nd part of semester Final exam Group TBD: |