

Syllabus

The theory of evolution provides the conceptual foundation for all of modern biology. Biology 354 will explore patterns, processes, and consequences of evolutionary change in the context of modern research. We will emphasize problems of practical importance in biomedical science, agriculture, and conservation. Among the questions we will consider are these: Where did the Zika virus come from and how might it be controlled? Can tumor cells move from patient to patient? What mechanisms drive evolution, and what do they tell us about the persistence of genetic diseases and the challenges of saving endangered species? What are the genetic mechanisms that underlie adaptation and speciation? Where, when, and how did modern humans arise, and what does this tell us about relationships among contemporary ethnic groups?

Objectives

Biology 354 is designed to help students learn to think like evolutionary biologists. Our goal is to help you develop the knowledge and skills to:

- Ask interesting questions about evolution;
- Design experiments and plan observations to answer your questions;
- Analyze and interpret data in an evolutionary framework;
- Make inferences about evolutionary history and predictions about the future evolution of populations based on various kinds of data;
- Read and critically evaluate papers from the primary literature on evolution;
- Contribute to an informed conversation about evolution between specialists and the public.

Instructor

Dr. Jon C. Herron, Senior Lecturer in Biology, herronjc@uw.edu
Office hours: Th 2:30 - 3:30, HCK 216 B, or by appointment

Teaching Assistants

Hannah Jordt, Ph.D. Candidate in Biology, hljordt@uw.edu
Sections AB, AD, and AF.
Office hours: Tu 12:30 to 1:20, HCK 302, or by appointment

Dave Slager, Ph.D. Candidate in Biology, slager@uw.edu
Sections AA, AC, and AE
Office hours: Th 12:30 to 1:20, HCK 302, or by appointment

Meeting times

Lectures: Tu Th 1:30 - 2:20 HCK 132
Sections: W at various times and locations (check UW Time Schedule)

Students with disabilities

If you have a disability, please speak with the instructors about appropriate accommodations.

Textbook

Jon C. Herron and Scott Freeman. 2013. *Evolutionary Analysis*, 5th Ed. Pearson. You will want to use the 5th edition, not the 4th. The 5th edition is substantially different, with some chapters new from scratch and others heavily revised.

Copies are on reserve in Odegaard. Hardcover (used: \$129.20) and looseleaf (\$117.25) versions are available at the University Bookstore. If you buy directly from Pearson, you can subscribe to the electronic version (\$34.99; see <http://tinyurl.com/n36ur5q>). Rental copies can be found on Amazon.

Readings should be done before class. To provide incentive to keep up, graded online quizzes will be posted on the course website. In lecture, we will review fundamental concepts, analyze additional examples, and address questions.

Computer Labs

Most weeks a virtual laboratory exercise will be assigned as homework. These will let you explore evolutionary processes in depth, as well as design and conduct your own experiments on populations of simulated organisms.

Most of these virtual labs are part of a commercial package from SimBio.com. We will be accessing the labs through SimBio's SimUText application. To receive credit for the labs, all students are required to buy a SimUText subscription. Instructions for how to do so will be posted on the course web site.

At the end of each lab, be sure to complete the graded quiz.

Lecture and Discussion Assignments

Most lectures and discussions will include an in-class assignment. You must be present to receive credit. For lectures you will need a device that works with Poll Everywhere. For more info see the course website.

Practice Tests

Each week practice test questions will be posted online. To provide an incentive to keep up, you will receive credit for completing these questions before the deadline. After the deadline, answer keys will be posted.

Course Website

We will use the course website to make announcements, distribute resources, post assignments and answer keys, and more:

<https://canvas.uw.edu/courses/1115011>

Coursework and Grades

Grades for Biol 354 will be based on the following:
Midterm (25% of course grade) and Final (25%)
Lab report (5%) and Independent research project (15%)
Computer Labs (10%) and Discussion Assignments (10%)
Lecture questions (5%)
Reading quizzes (2.5%) and Practice tests (2.5%)

Tentative Schedule

	Tuesday	Wednesday	Thursday	Virtual Lab
Week 1: Sept 27 - 29		D01: Intro to Foundations in Evolution & Systematics	L01: Why study Evolution? <i>Evolutionary Analysis</i> , Ch 01	Evolutionary Evidence
Week 2: Oct 2 - 6	L02: Evidence for Evolution <i>Evolutionary Analysis</i> Ch 02	D02: Reading primary literature	L03: Natural Selection <i>Evolutionary Analysis</i> Ch 03	Darwinian Snails
Week 3: Oct 9 - 13	L04: Estimating Trees 1 <i>Evolutionary Analysis</i> Ch 04	D03: The Great Clade Race	L05: Estimating Trees 2 <i>Evolutionary Analysis</i> Ch 04	Flowers and Trees
Week 4: Oct 16 - 20	L06: Variation <i>Evolutionary Analysis</i> Ch 05	D04: Jigsaw discussion	L07: Hardy-Weinberg <i>Evolutionary Analysis</i> Ch 06	Mendelian Pigs
Week 5: Oct 23 - 27	L08: Selection and Mutation <i>Evolutionary Analysis</i> Ch 06	D05: PigCheck	L09: Migration & Genetic Drift <i>Evolutionary Analysis</i> Ch 07	Genetic Drift & Bottlenecked Ferret (w/ formal report)
Week 6: Oct 30 - Nov 3	L10: Drift & Selection <i>Evolutionary Analysis</i> Ch 07	D06: Midterm review	Midterm	Bugsville
Week 7: Nov 6 - 10	L11: Quantitative Genetics <i>Evolutionary Analysis</i> Ch 09	D07: Study design	L12: Studying form & function <i>Evolutionary Analysis</i> Ch 10	FrogPond
Week 8: Nov 13 - 17	L13: Sexual selection <i>Evolutionary Analysis</i> Ch 11	D08: Research proposal review	L14: Social Behavior <i>Evolutionary Analysis</i> Ch 12	Finches & Evolution
Week 9: Nov 20 - 24	L15: Aging and life history <i>Evolutionary Analysis</i> Ch 13	D09: Prisoner's Dilemma	No class: Thanksgiving	Work on final project
Week 10: Nov 27 - Dec 1	L16: Human Health <i>Evolutionary Analysis</i> Ch 14	D09: Jigsaw discussion	L17: Speciation <i>Evolutionary Analysis</i> Ch 16	Work on final project
Week 11: Dec 4 - 8	L18: The Fossil Record <i>Evolutionary Analysis</i> Ch18	D10: Final review	L19: Human Evolution <i>Evolutionary Analysis</i> Ch 20	Final Project Due: Dec 9, 5:00 pm
Finals: Dec 9 + 11 - 15				Final: Dec. 15, 2:30-4:20, HCK 132