

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 HIV virus come from and what predictions can we make about the future of the AIDS epidemic? What are the mechanisms that 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 the first 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 learn to:

- Ask interesting questions about evolution;
- Design experiments and plan observations that would 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, Lecturer in Biology

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(206) 356-1336 - Business hours only please; this is my mobile

Office hours: Tuesday 10:30 – 11:30, or by appointment

Teaching Assistants

Frazer Meacham, Graduate Student in Biology

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Katrina van Raay, Graduate Student in Biology

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Office hours: Monday 3:00 - 4:00, or by appointment

Meeting times

Lectures: MW 1:30 - 2:20 Hitchcock 132

Sections: T various times in Chemistry Library (check UW Time Schedule)

Textbook

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

There are various options for getting the 5th edition. You can buy the hardcover from the UW Bookstore for \$142. If you buy directly from Pearson, you can get the book as unbound loose leaf binder pages for \$94. You can also subscribe to the electronic version (an exact replica of the print version that is accessible online) for \$57. Here's a link to Pearson's page:

<http://tinyurl.com/n36ur5q>

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 student 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 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 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 in class to receive credit.

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/846673>

Coursework and Grades

Grades for Biol 354 will be based on the following:

<u>Item</u>	<u>Fraction of final course grade</u>
Midterm	25%
Final	25%
Computer Labs, Lecture & Discussion Assignments	20%
Lab report and Independent research project	20%
Reading quizzes	5%
General participation	5%

Tentative Schedule

	Monday	Tuesday	Wednesday	Virtual Lab
Week 1: Sept 23 - 27	x	x	L01: Why study Evolution? <i>Evolutionary Analysis</i> , Ch 01	Evolutionary Evidence
Week 2: Sept 30 - Oct 4	L02: Evidence for Evolution <i>Evolutionary Analysis</i> Ch 02	D01: Reading primary literature	L03: Natural Selection <i>Evolutionary Analysis</i> Ch 03	Darwinian Snails
Week 3: Oct 7 - 11	L04: Estimating Trees 1 <i>Evolutionary Analysis</i> Ch 04	D02: The Great Clade Race	L05: Estimating Trees 2 <i>Evolutionary Analysis</i> Ch 04	Flowers and Trees
Week 4: Oct 14 - 18	L06: Variation <i>Evolutionary Analysis</i> Ch 05	D03: Jigsaw discussion	L07: Hardy-Weinberg <i>Evolutionary Analysis</i> Ch 06	Mendelian Pigs (w/ formal report)
Week 5: Oct 21 - 25	L08: Selection and Mutation <i>Evolutionary Analysis</i> Ch 06	D04: Spork & Beans	L09: Genetic Drift <i>Evolutionary Analysis</i> Ch 07	Genetic Drift & Bottlenecked Ferrets
Week 6: Oct 28 - Nov 1	L10: Linkage and Sex <i>Evolutionary Analysis</i> Ch 08	D05: Midterm review	Midterm	
Week 7: Nov 4 - 8	L11: Quantitative Genetics <i>Evolutionary Analysis</i> Ch 09	D06: Study Design	L12: Studying form & function <i>Evolutionary Analysis</i> Ch 10	Bugsville
Week 8: Nov 11 - 15	x (Veteran's Day)	D07: Jigsaw discussion	L13: Sexual selection <i>Evolutionary Analysis</i> Ch 11	How the Guppy Got Its Spots
Week 9: Nov 18 - 22	L14: Social Behavior <i>Evolutionary Analysis</i> Ch 12	D08: Common Goods tournament	L15: Human Health <i>Evolutionary Analysis</i> Ch 14	Finches & Evolution
Week 10: Nov 25 - 29	L16: Genome Evolution <i>Evolutionary Analysis</i> Ch 15	D09: Research proposal review	L17: Speciation <i>Evolutionary Analysis</i> Ch 16	
Week 11: Dec 2 - 6	L18: Fossil Record <i>Evolutionary Analysis</i> Ch18	D10: Final review	L19: Human Evolution <i>Evolutionary Analysis</i> Ch 20	Final Project Due
Finals: Dec 9 - 13	Final, 230-420 pm, HCK 132			