



Evolutionary Biology

Bio 380

Instructor Info



Andrew Kern



Office Hrs: Mon 10:00-11:00,
Fri 4:00-5:00p



Zoom: link



<http://kernlab.org>



adkern@uoregon.edu

Course Info



Prereq: None



MWF



8-8:50AM



Zoom Meeting ID: 998 1117
0173

Discussion Info



Friday



4 sections available for signup



See Canvas for Zoom info

TA Info



LyAndra Lujan



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Paul Reed



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Overview

This course focuses on the processes that create and maintain genetic variation within and between populations of organisms, from man to the lowliest worms. These forces are inherently evolutionary, thus we will pay particular attention to the myriad ways in which evolution acts to shape genomes. Topics covered will include population genetics, evolution by natural selection, concepts of fitness and adaptation, the genetic bases of evolutionary change, quantitative genetics, genetic mapping, molecular evolution, and phylogenetics.

Material

Required Texts

Course Notes

I will provide detailed lecture notes as well as all of the slides I present during the term. The lecture notes will be the primary source of written material that I will test on while the text will augment and flesh out those subjects that I cover. These course notes come from two major sources during my own education. The first is David Rand's excellent Evolutionary Biology course at Brown University, where I first became enamored with the idea of becoming an evolutionary biologist. Some of the materials I will cover in this course come directly from David and to him I am indebted. The second major source of my notes is from my Ph.D. advisor John Gillespie's course in population genetics, which I took as a first year graduate student. John was a masterful teacher and it is ever my goal to convey a fraction of the clarity for mathematical population genetics that he did. Beyond the course notes, there will be half a dozen additional papers that we will read throughout the term. These additional readings can be found on the Sakai site and will both enhance your understanding of the material and be tested upon.

Recommended Text

Futuyma, D. J. 2005. *Evolution, 2nd Edition*. Sinauer Associates, Sunderland, Massachusetts

Note this version is out-of-date. This is a deliberate choice so that you can pick up copies from Amazon via loose leaf for around \$14.

Discussion Section Readings

Required journal articles and book chapters will be provided on Canvas.

Grading Scheme

55%	Exams
20%	Problem sets
15%	Canvas assignments
10%	Discussion participation

There will be no curve applied (e.g. everyone can possibly get an A)

Learning Objectives

- Become familiar with the forces that shape the evolutionary history of biological organisms
- Learn to appreciate the intricacies of genetic variation and the limits to which it underlies phenotypic variation
- Improve our quantitative reasoning (i.e. do some math!), using evolution as our platform.
- Learn to critically read primary literature in Evolutionary biology and discuss it with your peers.

FAQs

? Do we have to do math in this course?

! Yes, we to study evolution you need to do math. That said, if you passed Algebra II you have the chops it will take. Often the hardest part of the math we will do in this class is in understanding its connection to the biology

? Can I study evolution even if I don't believe in it?

! Absolutely. As you'll see there is little difference between studying say physics with the way we were treat evolutionary biology.

? Why so few exams?

! Exams are a tool of limited utility for pedagogy in my honest opinion. While that is so student assessment is important, so we have to do something!

? Do humans evolve?

! Indeed humans are a product of evolution, just as is every other biological entity. We will cover the evolutionary history of our own species in detail during this class.

Make-up Policy

Make-up exams or assignments will be allowed if needed. I can only believe that this term will provide a multitude of challenges on both the instructors' end and well as on your own. With patience and caring I am confident that we can have an excellent term.

General Guidelines for Remote Class Participation

Make-up exams or assignments will be allowed if needed. I can only believe that this term will provide a multitude of challenges on both the instructors' end and well as on your own. With patience and caring I am confident that we can have an excellent term.

Diversity and Inclusivity Statement

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, ability - and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming and inclusive environment for every other member of the class.

Accommodations for Students with Disabilities

I strongly encourage students with disabilities, including "invisible" disabilities like chronic diseases, learning disabilities, and psychiatric disabilities to discuss with me as soon as possible what appropriate accommodations might be helpful to them. You are also encouraged to contact the Accessible Education Center in 164 Oregon Hall at 541-346-1155 or uoac@uoregon.edu.

Academic Integrity

The University Student Conduct Code defines academic misconduct, which includes unauthorized help on assignments and examinations and the use of sources without acknowledgment. Academic misconduct is prohibited at UO. I will report misconduct to the Office of Student Conduct and Community Standards—consequences can include failure of this course. I will ask you to certify that your exams/papers are your own work. Exams are downloaded from Canvas and are take home. I have designed them with the expectation that you will have access to course materials and the Internet when you take them—and that's just fine. I will be looking to see evidence of critical thinking and your ability to put the concepts we're working on into action in response to the exam prompts.

Class Schedule

Introductory Material

Date	Topic	Futuyma Chp.	Discussion Reading	HW
30-Sept	Course details + Why Study-Evolution?		-	-
2-Oct	History of, and Evidence for,- Evolution		Organize	-
5-Oct	Basics of Genetic Variation	1 & 2	-	Canvas 1
7-Oct	Genotypic and Phenotypic Vari-8 ation		-	-

Microevolution

9-Oct	Intro to Population Genetics	9	Dawkins	-
12-Oct	Natural Selection: Adaptation	11	-	Canvas 2
14-Oct	Natural Selection: Population12 Genetics		-	-
16-Oct	Mutation and Migration	10	Gould and-Vrba, Gould and Lewon-tin	
19-Oct	Genetic Drift	10	-	Problem Set 1 due
21-Oct	Integration of EvolutionaryReview 9-11- Forces			-
23-Oct	Linkage and Recombination	8	Simulation lab	-
26-Oct	Exam 1 (Covers through Inte--gration)		-	-
28-Oct	Molecular Evolution	12	-	-
30-Oct	Phylogenetic Inference	2	Novembre et-al	
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2-Nov	Molecular Systematics	2	-	Problem Set 2 due
4-Nov	Mental Health Day	-	-	-is

Phenotypic Evolution

6-Nov	Quantitative Genetics: the classics	13	Dorus et al	-
9-Nov	Quantitative Genetics: mapping disease alleles	13	-	Canvas 3
11-Nov	Levels of selection	11	-	-
13-Nov	Evolution / Genetics of Behavior	14	Colosimo et al.	
16-Nov	Sexual Selection	14	-	Canvas 4
18-Nov	Species Concepts	14	-	-
20-Nov	Models of Speciation	15	Coyne and Orr	
23-Nov	Genetics of Speciation	15	-	Problem Set 3 due
Macroevolution				
25-Nov	Diversity and Evolution of life	5	-	-
27-Nov	Thanksgiving	-	-	-
30-Nov	Macroevolution	22	-	-
2-Dec	Human Evolutionary History	Green et al.	-	-
4-Dec	Exam 2	-	-	-