Evolutionary Biology

Bio 380

Instructor Info —

Andrew Kern

Office Hrs: Mon 10:30-11:30; Fri 2:30-3:30pm

Mon: PAC301; Fri: Zoom Meeting ID: 922 6513 1796

http://kr-colab.github.io

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Course Info ——

Prereq: None

MWF

2-2:50PM

229 McKenzie Hall

Discussion Info —

Wednesdays

3 sections available for signup

44 Columbia Hall

TA Info ——

Jordan Rodriguez

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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. I'm currently in the process of turning these notes into a more convenient book format that is available here

Beyond the course notes, there will be half a dozen additional papers that we will cover in Discussion section. These additional readings can be found on the Canvas site.

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Note this version is out-of-date.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%	Take Home Exams (2)
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 take home 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! I prefer to make a harder exam that you have to actually think on rather than be forced to reguritate info back in a limited time.

? 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

If you are unable to turn in a Canvas assignment, a Problem Set, the class policy is that the lowest score will be dropped within each category. If you are absent for an exam, you will be given a make-up exam.

General Guidelines for Absences

While officially we are in-person this term I encourage you to stay at home if you feel at all sick or have been in contact with folks that may be sick. To ease this I'm going to include on Canvas course recordings of lectures from last term. Unfortunately, this year's classroom is not set up for recording.

Absences will be excused for illness, religious observance, or other compelling reasons. If you are absent, it is your responsibility to find out what you missed.

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, gender identities, religious affiliations, sexual orientations, and abilities. 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 uoaec@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
28-Sept	Course details + Why Study Evolution?	-	Organize	-
30-Sept	History of, and Evidence for, Evolution	1	-	-
3-Oct	Basics of Genetic Variation	8	-	Canvas 1
5-Oct	No Lecture	-	Dawkins	-
7-Oct	Genotypic and Phenotypic Variation	8	-	-

Microevolution

Date	Topic	Futuyma Chp.	Discussion Reading	HW
10-Oct	Intro to Population Genetics	9	-	Canvas 2
12-Oct	Natural Selection: Adaptation	11	Gould and Vrba, Gould and Lewontin	-
14-Oct	Natural Selection: Population Genetics	12	-	-
17-Oct	Mutation and Migration	10	-	Problem Set 1 due
19-Oct	Genetic Drift	10	Simulation lab	-
21-Oct	Integration of Evolutionary Forces	Review 9-12; 20	-	-
24-Oct	Linkage and Recombination	9	-	-
26-Oct	Molecular Evolution	20	-	-
28-Oct	Exam 1 (Covers through Mol Evol)	-	-	-

Phenotypic Evolution

Date	Topic	Futuyma Chp.	Discussion Reading	HW
31-Oct	Quantitative Genetics: the classics	13	-	-
2-Nov	Quantitative Genetics: mapping disease alleles	13	Novembre et al	Canvas 3
4-Nov	Levels of selection	11	-	-
7-Nov	Evolution / Genetics of Behavior	16	-	Problem Set 2 due
9-Nov	Sexual Selection	15	Dorus et al	-

Macroevolution

Date	Topic	Futuyma Chp.	Discussion Reading	HW
11-Nov	Systematics	2	-	-
14-Nov	Phylogenetic Inference	2	-	Canvas 4
16-Nov	Species Concepts	17	Colosimo et al.	-
18-Nov	Models of Speciation	17	-	-

Date	Topic	Chapter	Reading	Assignment
21-Nov	Genetics of Speciation	18	-	Problem Set 3 due
23-Nov	Human Evolution and Diversity	4	Coyne and Orr	-
25-Nov	Diversity and Evolution of life	5	-	-
28-Nov	Thanksgiving	-	-	-
30-Nov	Macroevolution	22	Green et al.	-
2-Dec	Exam 2	-	-	-