

Biology 421: Advanced Evolution

Spring 2020

Lectures: MWF 11:30-12:20, Eng/Phys 216

Instructors:

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Jim Bull jbull@uidaho.edu

Office hours: Will be announced by each instructor at the beginning of their block

Required textbook: None

Optional textbook: Futuyma & Kirkpatrick, Evolution 4th edition (Sinauer)

Final exam: Thursday, May 14, 10:15-12:15, Eng/Phys 216

Learning outcomes: Evolution is the central explanatory framework that unifies the science of biology. Students in this course should develop a broad understanding of:

- evolution as an ongoing, observable process in living systems
- the full range of mathematical and conceptual theory that describes this process
- evolution as a historical science explaining the origins and diversity of organisms
- the major discoveries, experiments, and insights that led to current understanding
- how evolutionary principles can be applied to illuminate all aspects of biology

Course resources: Readings include peer-reviewed scientific papers available as electronic files online (bblearn.uidaho.edu). Lectures will present additional information not found in these readings. Any powerpoint slides from lectures will be posted online following each lecture, but complete lecture notes will not be provided to you – it is your responsibility to attend lectures and take notes, or to make other arrangements to get the information. Questions and discussion are welcome and encouraged at any point during lecture periods. Please treat your fellow students with respect at all times.

Disability services: Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through the Center for Disability Access and Resources located in the Bruce M. Pitman Center, Suite 127 in order to notify your instructor as soon as possible regarding accommodation(s) needed for the course. 208-885-6307; cdar@uidaho.edu; www.uidaho.edu/current-students/cdar.

Academic honesty: Collaboration is encouraged on take-home assignments, but quizzes and exams will be closed-book and must be solely your own work. Per university policy, cheating or plagiarism will result in failure and dismissal from the course. This includes any discussion of contents of a quiz or exam with students who have not yet taken the quiz or exam.

Grading: Exams will cover the full 50-minute period. Each exam, including the final, will focus only on the material since the last exam. Practice problems will be made available

Final grades will be calculated solely from exams (4 exams, 25% of your grade from each).

Lecture schedule:

Date	Topic	Instructor
Wed Jan 15	Course intro	All
Fri Jan 17	<i>Natural selection</i>	Jones
Mon Jan 20	NO CLASS – MLK Day	
Wed Jan 22	<i>Migration and drift</i>	Jones
Fri Jan 24	<i>Genetic variation</i>	Jones
Mon Jan 27	<i>Complex traits</i>	Jones
Wed Jan 29	<i>Quantitative genetics</i>	Jones
Fri Jan 31	<i>Multivariate phenotypes</i>	Jones
Mon Feb 3	<i>Sexual selection</i>	Jones
Wed Feb 5	<i>Mating systems</i>	Jones
Fri Feb 7	<i>Mating preferences</i>	Jones
Mon Feb 10	Exam 1	Jones
Wed Feb 12	<i>Phylogeography</i>	Sullivan
Fri Feb 14	<i>Centrality of Phylogenies</i>	Sullivan
Mon Feb 17	No class – Presidents day	
Wed Feb 19	<i>Introduction to Trees</i>	Sullivan
Fri Feb 21	<i>Approaches to Phylogeny</i>	Sullivan
Mon Feb 24	<i>Statistical phylogenetics</i>	Sullivan
Wed Feb 26	<i>Species definitions</i>	Sullivan
Fri Feb 28	<i>Speciation and RI</i>	Sullivan
Mon Mar 2	<i>Speciation/Hybridization</i>	Sullivan
Wed Mar 4	<i>Species trees</i>	Sullivan
Fri Mar 6	Exam 2	Sullivan
Mon Mar 9	<i>The origins of biological diversity</i>	Harmon
Wed Mar 11	<i>Mass extinctions and their aftermath</i>	Harmon
Fri Mar 13	<i>Biodiversity and the tree of life</i>	Harmon

Date	Topic	Instructor
Mon Mar 16	No class – spring break	
Wed Mar 18	No class – spring break	
Fri Mar 20	No class – spring break	
Mon Mar 23	<i>Evolution of novelty</i>	Harmon
Wed Mar 25	<i>Evolutionary stasis and depauperons</i>	Harmon
Fri Mar 27	<i>Adaptive Radiation</i>	Harmon
Mon Mar 30	<i>Species selection</i>	Harmon
Wed Apr 1	<i>Species interactions and macroevolution</i>	Harmon
Fri Apr 3	<i>Evolution of humans</i>	Harmon
Mon Apr 6	<i>The deep future of the universe</i>	Harmon
Wed Apr 8	Exam 3	Harmon
Fri Apr 10	<i>Experimental evolution</i>	Bull
Mon Apr 13	<i>Directed evolution</i>	Bull
Wed Apr 15	<i>Gene drives</i>	Bull
Fri Apr 17	<i>Gene drives</i>	Bull
Mon Apr 20	<i>Microbial drug resistance</i>	Bull
Wed Apr 22	<i>Microbial drug resistance</i>	Bull
Fri Apr 24	TBD	Jones
Mon Apr 27	<i>The Fallacy of Intelligent Design</i>	Sullivan
Wed Apr 29	<i>Phylogenetics and HIV forensics</i>	Bull
Fri May 1	<i>Vaccine evolution and attenuation</i>	Bull
Mon May 4	<i>Weed & crop pest evolution</i>	Bull
Wed Mar 6	<i>Evolutionary medicine</i>	Bull
Fri May 8	<i>Evolutionary medicine</i>	Bull