

BIEB 150 Evolution

Summer Session 2, 2012 M-TH 11:00-12:20, Center Hall 105

Professor: Christopher Wills, 5256 Muir Biology, cwills@ucsd.edu

Professor's office hours: 9:30 – 10:30 M-TH. If you cannot come to my office hours, I will be glad to arrange appointments by email.

Text: Mark Ridley, Evolution, 3rd edition.

Sections: There will be 5 TA-led sections per week. Sections will consist of reviews of the course material and discussions of the sets of homework questions that will be assigned each week. There will also be two short quizzes given in section, one in the second week and one after the midterm. The quizzes will count for ten percent of the grade. You must sign up for one of the sections:

Discussion	A01	M	3:00p - 4:50p	CENTR	201
Discussion	A02	Tu	09:00a - 10:50a	CENTR	201
Discussion	A03	Tu	3:00p - 4:50p	CENTR	201
Discussion	A04	Th	09:00a - 10:50a	CENTR	201
Discussion	A05	Th	3:00p - 4:50p	CENTR	201

The course will cover the field of evolutionary biology at a high level, and by the end of it you will feel comfortable reading and understanding papers from the current scientific literature. We will use a mathematical approach to investigate the rules that govern gene pools and the factors that change allele frequencies in populations. It is also expected that you will be familiar with basic principles of genetics, biochemistry and molecular biology at the level taught in lower division introductory biology classes such as the BILD 1-2-3 series.

A set of questions, mostly but not entirely drawn from the text, will be posted on the course web site once or twice a week. The questions will not be graded, but you should answer them and then discuss any questions with which you have difficulty with your TA during the discussion sections or during the TA's office hours. Keeping up with these questions is essential if you are to handle the breakneck pace of the course that results from the compressed summer session format!

At the end of each week (excluding week 1), the lecture will be devoted to a discussion of a paper from the current literature that I will post on the class web site the week before. Each of the four papers will deal with a current aspect of evolutionary research, and will introduce you to some of the techniques and scientific controversies in the field. I challenge you to come prepared to question the assumptions of the papers, and to suggest testable hypotheses that can be used to extend the work that is presented in each paper. As an encouragement to your

participation, remember that some of this material may easily find its way onto the exams...

In addition to the final exam at 11:30 on Saturday Sept. 8 (place to be announced) there will be one midterm, in class on Tuesday Aug. 21. The midterm will count 30% of your grade, and the final exam 60%, with the two quizzes in section counting for the remaining ten percent. Exam formats will be a mix of different types of questions, including questions that test your understanding of the material rather than simply rote memorization. The final exam will emphasize the second half of the course, but it will include some questions from the first half as well.

Lecture notes and many of the slides shown during lecture will be posted on the class WebCT ("Ted") site after the lectures. Enrollees in the class have immediate access to the site. If you are on the wait list (and I am confident that all the wait list people will be accommodated) you should petition for access to the site. Important additional information about the course will also be posted on the site, so you should visit it regularly.

Lecture outlines:

Text readings:

Aug 6 Darwinian and neo-Darwinian evolution.

Chapter 1

Aug. 7 An introduction to phylogenetic trees

Chapters 15, 16

Aug. 8 The origins of genetic variation. Types of mutation.

Chapter 2 pp. 27-40

Aug. 9 The Hardy-Weinberg Law and its exceptions

Chapter 5 pp. 95-103

Aug. 13 Selection, random drift and gene flow

Chapters 4, 6, 7

Aug. 14. Mechanisms leading to gene substitution and polymorphism
Chapter 5 pp. 103-end

Aug. 15 Linkage, genetic recombination and the evolution of sex
12

Chapters 8,
12

Aug 16 Discussion of Paper 1

Aug. 20 Adaptation

Chapter 10

Aug 21 MIDTERM

Aug 22 Sexual selection and kin selection	Chapter 12
Aug 23 Discussion of Paper 2	
Aug 27 Game theory, behavior, and life history evolution beyond lecture notes	No readings
Aug 28 Speciation	Chapters 13, 14
Aug 29 The basics of molecular evolution and the evolution of genomes	Chapter 7 pp. 179-193
Aug 30 Discussion of Paper 3	
Sept 3 The fossil record and major evolutionary advances	Chapter 18
Sept 4 Evolution and development	Chapter 20
Sept 5 Human evolution	Chapter 18 pp. 540-556
Sept.6 Discussion of Paper 4	
Sept. 8 FINAL EXAM 11:30 to 2:30	