

BIEB 150 Evolution

Summer Session 2, 2011 M-TH 12:30-1:50, Center Hall 105

Professor: Christopher Wills, 3802 AP&M, 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: Freeman and Herron, Evolutionary Analysis, 4th 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. You must sign up for one of the sections:

Discussion	A01	Tu	09:00a - 10:50a	CENTR	207
Discussion	A02	Th	09:00a - 10:50a	CENTR	207
Discussion	A03	Tu	3:00p - 4:50p	CENTR	218
Discussion	A04	Th	3:00p - 4:50p	CENTR	218
Discussion	A05	M	3:00p - 4:50p	CENTR	220

The course will cover the field of evolutionary biology at a high level, and will enable you to understand 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 assigned 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 information from lectures and readings 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 on Sept. 2 (place to be announced) there will be one midterm, in class on Aug. 16. The midterm will count 40% of your grade, and the final exam 60%. 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 1 Darwinian and neo-Darwinian evolution.

Chapter 3

Aug. 2 An introduction to phylogenetic trees

Chapter 4

Aug. 3 The origins of genetic variation. Types of mutation.

Chapter 5

Aug. 4 The Hardy-Weinberg Law and its exceptions

Chapter 6

Aug. 8 Selection, random drift and gene flow

Chapter 7

Aug. 9. Mechanisms leading to gene substitution and polymorphism

Chapter 7

Aug. 10 Linkage, genetic recombination and the evolution of sex

Chapter 8

Aug 11 Discussion of Paper 1

Aug. 15 Adaptation

Chapter 10

Aug 16 MIDTERM

Aug 17 Sexual selection and kin selection

Chapters 11, 12

Aug 18 Discussion of Paper 2

Aug 22 Game theory, behavior, and life history evolution

Chapter 13

Aug 23	Speciation	Chapter 16
Aug 24	The basics of molecular evolution and the evolution of genomes	Chapter 15
Aug 25	Discussion of Paper 3	
Aug 29	The fossil record and major evolutionary advances	Chapters 17, 18
Aug 30	Evolution and development	Chapter 19
Aug. 31	Human evolution	Chapter 20
Sept.1	Discussion of Paper 4	
Sept. 2	FINAL EXAM 11:30 to 2:30	