BIEB 150 Evolution
Summer Session 2, 2018 M-TH 11:00-12:20, Center Hall 222

Professor: Christopher Wills, 3238 Bonner Hall, cwills@ucsd.edu

Professor's office hours: 1:00-2:00 M-W. If you cannot come to my office hours, I will be glad to arrange appointments by email.

Text: Zimmer and Emlen, Evolution: Making Sense of Life, Roberts & Co., 2nd edition. The text is not required, but you will find it well-written and helpful.

Sections: There will be 2 IA-led sections per week. Sections will consist of reviews of the course material and workshops conducted by the IA that will deal with especially challenging concepts. 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. Make sure you are signed up for one of the sections:

DIscussion	A01	MW	1:00-1:50p	Centr	217A
Sara Sandoval, sssandov@ucsd.edu					
Discussion	A02	Tu-Th	4:00-4:50p	Center	217A
Sara Sandoval, sssandov@ucsd.edu					

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. At the present time there is more active research about all aspects of evolution than has ever been seen before, thanks to advances in molecular biology, paleontology, behavior, and many other fields. We will explore many of these exciting new advances, which are taking place almost daily.

I encourage you to participate during class, to ask questions and to answer questions that I will pose. If you are puzzled, or if you have something to contribute, speak up!

We will begin with a thorough examination of the process of evolution and how it takes place. We will use a mathematical approach to investigate the rules that govern gene pools, and the factors that change allele frequencies in populations. Calculus will not be required, however. To follow these discussions you must already 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.

Sets of questions, drawn from the lecture notes and the text, will be posted on the course web site periodically. The questions will not be graded, but you should answer them and then discuss any questions with which you have difficulty with your IA during the discussion sections or during the IA'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 (starting with week 2), the Thursday 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 to the discussion 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 for your participation, remember that some of this material may easily find its way onto the exams…

In addition to the final exam at 11:30-2:30 on Friday Sept. 7 in a room 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 many questions that test your understanding of the material rather than 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 ("TritonEd") site after the lectures. Enrollees in the class should have immediate access to the site — CHECK! Important additional information about the course will also be posted on the site, so you should visit it regularly.

There will be IA-led review sessions before the midterm and the final. An IA-led discussion forum will also be available on the TritonEd site. Please avail yourself of the discussion, but check to make sure that your question has not already been answered. In-depth discussions of the material in the course, and of recent advances in evolutionary biology, are encouraged.

Outline of lectures:	Text readings:
Aug 6 Darwinian and neo-Darwinian evolution.	Chapter 2
Aug. 7 An introduction to phylogenetic trees	Chapter 4
Aug. 8 The origins of genetic variation. Types of mutation.	Chapter 5

Aug. 9 The Hardy-Weinberg Law and its exceptions Chapter 6

Aug.13 Selection, random drift and gene flow Chapter 6, Chapter 8

Aug. 14 Mechanisms leading to gene substitution and polymorphism Chapter 6.6

Aug. 15 Linkage, genetic recombination and the evolution of sex Chapter 11

Aug 16 Discussion of Paper 1

Aug. 20 Adaptation Chapter 10

Aug 21 MIDTERM, in lecture room (additional room will be needed, details TBA)

Aug 22 Sexual selection and kin selection Chapter 11.2-11.6

Aug 23 Discussion of Paper 2

Aug 27 Game theory, behavior, and life history evolution Chapter 16

Aug 28 Speciation Chapter 13

Aug 29 The basics of molecular evolution and the evolution of genomes. The fossil record.
Chapter 9, 3,14

Aug 30 Discussion of Paper 3

Sept. 3 HOLIDAY

Sept 4 Evolution and development, major evolutionary advances Chapter 10

Sept 5 Human evolution Chapter 17

Sept 6 Discussion of Paper 4

Sept 7 FINAL EXAM 11:30 to 2:30 TBA