

Evolution

Biol 319

Fall 2009

Professor: Dr. Tod Reeder, LS 264, 594-7826, treeder@sunstroke.sdsu.edu

Lectures: 9-9:50 am MWF (LS 248)

Office Hours: 10-11am, Mondays & Wednesdays; other times by appointment

Purpose of the course: This course is intended for students not concentrating in the sciences and will provide an introduction to the concepts and processes of biological evolution. We will consider: (1) the scientific method; (2) the history of evolutionary thought; (3) the evidence for evolution; (4) phylogenetic trees; (5) evolutionary themes such as natural selection, chance, and cooperation; (6) an overview of the evolution of viruses, cells, and multi-celled organisms; (7) human origins and evolution, and (8) the consequences of an evolutionary world view for understanding disease and aspects of human culture.

Furloughs: The devastating California state budget cuts prohibit faculty and staff at SDSU from working nine days per semester during the 2009/10 academic year. This has resulted in the scheduling of three furlough days for Bio 319 this semester (see class schedule). While efforts will be made to keep the content of this course consistent with past semesters, no formal lectures or office hours will be held on furlough days. To minimize or avoid faculty and staff furloughs in future academic years, you may want to contact your State legislators so that they better understand how cutting the state budget for higher education affects your education and your future.

Text: *An Introduction to Biological Evolution* (2nd Ed.), 2007, Kenneth V. Kardong. Additional papers and background materials will be periodically posted on Blackboard™ (<https://blackboard.sdsu.edu/>).

Grading Policy: Grades will be determined based upon the total points earned on the course examinations, quizzes, and out-of-class assignments. There is no provision for doing extra or outside work to improve your grade. In all, there will be four lecture exams (100 points each), four in-class quizzes (10 points each), four Blackboard “i-quizzes” (10 points each), and two out-of-class assignments (25 points each). Total possible points for class is 530 points.

General/approximate grade cut-offs: **A - A-** = 100-90.0%; **B+ - B-** = 89.9-80.0%; **C+ - C-** = 79.9-70.0%, **D+ - D-** = 69.9-60.0%; **F** < 60.0% (these cut-offs are not written in stone!)

Bring your own scantrons: **Form No. 815-E (in-class quizzes) & Form No. 882-E (lecture exams)**

If you have to miss a **lecture exam** for a justified reason, you are required to make arrangements with me **before** the scheduled exam.

Quizzes: A total of four in-class quizzes (10 points each) will be given in class. These quizzes will be given at the beginning of lecture (so be on time!) and will generally be unannounced. If you miss an in-class quiz, you will receive a zero for that quiz. A total of four i-quizzes (10 points each) will be posted on Blackboard at various times throughout the semester. For a given posted i-quiz, students can take the i-quiz up to two times, with the last attempt recorded at the end of the i-quiz period. Each i-quiz will be posted for ~24 hours (email notification will be sent out when i-quiz is posted). If you do not attempt to take a given i-quiz during the posted period, you will receive a zero for that i-quiz. All quizzes consist of multiple choice and true-false questions. These will provide good examples of the types of questions that will be asked on the lecture exams.

Out-of-class assignments: These two assignments (25 points each) will be given twice during the semester and will be due two weeks after they are assigned. Assignments must be turned in to me (hard copy or emailed [preferred]) by 5 pm on the due date (see schedule below). The assignments will be composed of essay questions covering recent and/or upcoming material. Sometimes questions may cover topics not specifically covered in class. The assignment of these essay questions is designed to make you think more critically about the course material.

Lecture exams: There will be four lecture exams (100 points each). The exams will consist of ~35 multiple choice/true-false questions and ~4-6 short answer/essay questions. The exams are not comprehensive (i.e., each exam will cover material since the previous exam).

Date	Topics	Read
31 Aug	Course introduction, goals and expectations; What is evolution?	Suppl. Reading #1 (pp. 1-9)
2 Sept	Scientific inquiry and the scientific method	SR #1 (pp. 10-12) & SR #2
4 Sept	What is Life?	
7 Sept	No Class – Labor Day	
9 Sept	History of evolutionary thought	Chapter 1; SR #3
11 Sept	Charles Darwin & “ <i>The Origin of Species</i> ”	
14 Sept	Fossil record	Chapter 2
16 Sept	Evidence of evolution - Past and present	Chapter 6; SR #1 (pp. 17-35)
18 Sept	No class (furlough day): Evidence for evolution - Past and present (continued)	
21 Sept	DNA structure and function - The Code of Life	Chapter 4 (pp. 69-71)
23 Sept	Principles of inheritance	Chapters 3
25 Sept	Population genetics and creation of genetic variation; brief review for exam	Chapters 3 (pp 53-55), 8

		(pp. 147-151)
28 Sept	Exam 1	
30 Sept	Phylogenies - Their inference and importance; Out-of-class Assignment 1	Appendix 2
2 Oct	Evolution and Selection	Chapter 7 (pp. 123-128)
5 Oct	Natural selection: Introduction	Chapter 7 (pp. 128-132); SR #4
7 Oct	No class (furlough day): Natural selection (continued)	
9 Oct	Natural selection (continued)	
12 Oct	Types of natural selection	Chapter 7 (pp. 132-140)
14 Oct	Other evolutionary processes; Out-of-class Assignment 1 due	
16 Oct	Other evolutionary processes (continued)	
19 Oct	Speciation: Formation of new species	Chapter 9
21 Oct	Speciation (continued); review for exam	
23 Oct	Exam 2	
26 Oct	Extinctions	Chapter 13
28 Oct	Emergence of organic life	SR #5
30 Oct	Diversity of Life: "Viruses" and bacteria	SR #6; Chapter 5 (pp. 77-79)
2 Nov	Diversity of Life: Origin of eukaryotes and "protist" diversity	Chapter 5 (79-80)
4 Nov	Diversity of Life: Plants	Chapter 5 (pp. 80-85)
6 Nov	Diversity of Life: Fungi	Chapter 5 (pp. 85)
9 Nov	Diversity of Life: Animals	(Chapter 5 (pp. 86-95)
11 Nov	No class – Veterans Day	
13 Nov	Diversity of Life: Animals (continued); review for exam	
16 Nov	Exam 3	
18 Nov	Co-evolution	Chapter 10
20 Nov	Evolution of life histories; Out-of-class Assignment 2	Chapter 11
23 Nov	Life in groups	Chapter 12
25 Nov	No class (furlough day): TBA	
27 Nov	No class – Thanksgiving Break	
30 Nov	Human evolution: Primates and early hominoid evolution	Chapter 14
2 Dec	Human evolution: Origin of <i>Homo</i> and modern humans	Chapter 15
4 Dec	Human evolution: Recent discoveries and controversies; Out-of-	

class Assignment 2 due		
7 Dec	Evolution and human culture - religion	SR #7 & 1 (pp. 13-15)
9 Dec	Creationism, intelligent design & evolution in the courts	Chapter 17; SR #1 (pp. 37-45)
11 Dec	Perspectives and wrap-up; review for exam	
16 Dec	Final Exam (=Exam 4); 8-10 AM in LS 248	

Supplemental reading: (additional readings will be posted as the semester progresses)

- 1) The National Academy of Sciences. 2008. Science, Evolution and Creationism.
- 2) Futuyma, D. J. 1995. Scientific Knowledge. Pp. 161-174 in Science on Trial. Sinauer Associates, Inc., Sunderland.
- 3) Darwin, C. 1874. Recapitulation and conclusions. Chapter 15 in The Descent. of Man (6th ed.) <http://www.literature.org/authors/darwin-charles/the-origin-of-species-6th-edition/chapter-15.html>
- 4) Mitton, J. 2001. Adaptation and natural selection: overview. Entry in online Encyclopedia of Life.
- 5) Brack, F. 2001. Origin of Life. Entry in online Encyclopedia of Life.
- 6) Minor, P. D. 2001. Viruses. Entry in online Encyclopedia of Life.
- 7) Gould, S. J. 1997. Nonoverlapping Magisteria. Natural History magazine.