

Biology 408, Spring 2008
Principles of Evolution

Dr. Kristina A. Schierenbeck
 Holt 114, Off. hrs. MWF 9:00-11:00
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Class Web Page: see WebVista, Biology 408

Required Text: Freeman, Scott and Jon C. Herron. 2007. *Evolutionary Analysis*. (4th Edition). Prentice Hall, New Jersey. Occasionally assigned journal articles also will be required reading.

Grading:	Midterm #1	100
	Midterm #2	100
	Midterm #3	100
	Final Exam	150
	Term Paper	100
	Problem Sets	75
	Total	625

The course total of 625 points will be broken down as follows: 90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D, 59% and below=F.

Exams: The exams will be in essay format and will include definition, short and long essays. The exams will include material from both the lectures and reading, although they will emphasize lecture material. The exam answers should be written in a clear, concise manner and cover material at the level addressed in lecture.

Term Paper: Please read these directions carefully. You will be required to complete a **TEN** page (double-spaced, 12 pt. type, 1 inch margins, typewritten, including references) literature review on a topic of your choice (related to evolution, of course). The topic must be selected and turned into me by 28 March. Five points will be taken off your final grade if the topic is not turned in by this date. Each paper must include at least **EIGHT** references. At least five references must be from the primary literature in scientific journals. All literature must be cited within the text [for example (Smith 1979)]. **Format the literature cited section as found in the journal, *Evolution*** as follows:

Journal article:

Storm, E. C. 1974. Omnology at the crossroads. *J. Omnol.* 22:1-44.

Book:

Calm, I. M. 1974. *Omnology has passed its peak.* Univ. of Chicago Press, Chicago.

Article in a book:

Storm, E. C. 1974. Whither goest omnology? Pp. 33-44 in I. M. Calm, ed. *The future of omnology.* Univ. of Chicago Press, Chicago.

The first complete draft of the term paper will be due 23 April and reduced 5 points for every day late. I will correct the draft and return it to you by 2 May. The final draft (with corrected first draft) will be due at the final. Absolutely, positively no papers will be accepted after the final.

Date	Lecture Topic	Reading
January 28	Introduction	Suggested background reading: Chapters 1, 2, & 3
30	History and the rise of evolutionary biology	Chapter 3 http://www.nceas.ucsb.edu/~alroy/lefa/lophodon.html http://www.ucmp.berkeley.edu/history/evotmline.html
February 1	The new synthesis	Web pages above
4	The molecular basis of evolution (basic genetics review)	Chapter 5
6	Natural Selection: Basic Theory	Chapters 3, 4, & 5
8	Natural Selection: Basic Theory	Chapters 3, 4, & 5
11	Natural Selection: Selection, Mutation	Chapter 5 & 6
13	Natural Selection: Mutation	Chapter 5
15	Natural Selection: Migration, Drift, Mating	Chapters 7
18	Natural Selection: Drift, Mating	Chapters 7
20	Exam Review - Problem Set #1 Due	
22	Midterm #1	
25	Evol. at multiple loci: Linkage and Sex	Chapter 8

	27	Evol. at multiple loci: Linkage and Sex	Chapter 8
	29	Evol. at multiple loci: Quantitative Genetics	Chapter 9
March	3	Adaptation and Constraint	Chapter 10
	5	Evolution of sex	Chapter 11
	7	Evolution of sex	Chapter 11
	10	Kin and Group Selection	Chapter 12
	12	Kin and Group Selection	Chapter 12
	14	Aging and Life History	Chapter 13
	17-21	SPRING BREAK	
	24	Aging and Life History	Chapter 13
	26	Evolution and human health	Chapter 14
	28	Exam Review	
	31	Cesar Chavez Day - No Class	
April	2	Midterm #2 - Paper topic due	Chapter 15
	4	Phylogenies and Speciation	Chapters 15, 16
	7	Speciation	Chapter 16
	9	Development and Evolution	Chapter 19
	11	Development and Evolution	Chapter 19
	14	Origins of Life/Precambrian	Chapter 17
	16	Origins of Life/Precambrian	Chapter 17
		http://www.ucmp.berkeley.edu/help/timeform.html	
	18	The fossil record/Extinction	Chapter 18
	21	The fossil record/Extinction	Chapter 18
	23	The fossil record/Extinction- Paper draft due	Chapter 18
	25	The fossil record/Extinction	Chapter 18
	28	Exam Review – Problem Set #2 due	
	30	Midterm #3	
May	2	Primate Evolution	Chapter 20
	5	Primate Evolution	Chapter 20
	7	Primate Evolution	Chapter 20
	9	Cultural/Social "evolution"	Assigned
	12	Cultural/Social "evolution"	Assigned
	14	Exam Review	
	16	Exam Review - Problem Set #3 due	
	19	Comprehensive final exam, Monday, 12-2 pm Final version of paper due	

Learning Goals. By the end of the semester of Biology 408 and in combination with the prerequisites for this course, each student should have solid understanding of the following:

- An understanding of the false dichotomy between evolution and creationism
- A brief history of the development of evolutionary thought
- The major tenets of Darwinian principles
- The relevance of the “new synthesis” to modern evolutionary thought.
- Understanding the importance and function of DNA, RNA, replication, mutation, amino acids, proteins to evolution
- An in-depth understanding of the mechanisms that drive evolution
- The nature of quantitative traits, quantitative genetic experimentation, multiple gene interactions and selection
- The molecular basis of adaptation
- The process of speciation; geography, hybridization, polyploidy
- The Tree of Life: its historical origin and major units
- Phylogenetic principles that underlie tree building
- The importance of form and function to adaptation
- Differences between macro- and micro-scale evolutionary changes and the genetic mechanisms that underlie them.
- The many aspects of sexual selection - driving forces, sexual dimorphism, competition, female choice.
- Kin selection, its impact on social behavior, and the evolution of altruism
- The evolution of aging and other life history characteristics
- Pathogen evolution, human behavior and disease, the evolution of virulence
- The Geological Time Scale
- The basics of fossil formation and dating
- The interaction between culture and biological evolution.

