EVOLUTION GENE 3000

First Summer Session 2012. Lectures M – F 10:30am – 12:45pm

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COURSE OVERVIEW. This course is an introduction to biological evolution, including the history of the field, mechanisms of evolution, and the historical record of evolution on earth. The prerequisite is an understanding of basic genetic concepts. You should be familiar with the fundamentals of Mendelian and molecular genetics (e.g., gene inheritance, DNA coding for amino acids in proteins, etc). It may be worth reviewing this material by reading the appropriate parts of your favorite introductory biology text.

PREREQUISITES. Introductory Biology with a grade of C or better.

READINGS. The recommended text for the course is the fourth edition of *Evolutionary Analysis* (2004) by S. Freeman & J.C. Herron (available at the bookstore). It is strongly recommended that you read a textbook concurrent with the topics discussed in lecture, because the reading will clarify topics discussed in lecture. In addition to your textbook, the third edition of *Evolution* (2004) by Mark Ridley, and second edition of *Evolution* (2009) by Douglas Futuyma are both very good. Articles are assigned for some of the discussion sections (see schedule). These articles will be available on the Learning Commons site.

EXAMS. The exams are given during lecture time on Monday June 18, Monday June 25, Monday July 2, and Friday July 6. The exams are non-cumulative and cover only the material in the lectures indicated on the schedule. Makeup exams will only be given in the case of a medical or extreme personal emergency. It is the student's responsibility to provide relevant documentation. A review session will be scheduled before each exam.

DISCUSSION SECTIONS. Gene 3000 has ***required*** discussion sections on Mondays, Tuesdays and Wednesdays from 2:15 – 3:15pm to discuss readings from the literature. The sections meet seven times total. They are an essential part of the course, as it is the place where you are asked to think like a scientist, and you will have the opportunity to critically discuss ideas and the evidence supporting them. Each missed discussion will result in a 2 point deduction from your final average (out of 100 points). You will also be graded on participation in the discussion sections (see below). All the assigned readings should be read carefully ***before*** you attend discussion section. Come prepared to talk about the subject of the reading. It is not required that you fully understand the reading before each discussion, rather, we expect that, through your conversation with the other students in your section, you will develop a better understanding of the readings and of what it means to do science. If you find a reading particularly difficult, you should feel comfortable using the discussion section to ask questions for clarification. To help you formulate your thoughts on each paper, you are ***required to come up with two questions*** about the reading ***prior to each discussion*** and to bring the two questions to your discussion section on a sheet of paper with your name on it. The questions must be handed to the TA at the ***beginning*** of the discussion section. Discussion readings cover material not specifically discussed in lectures, and all discussion readings will be tested in the exams.

GRADING. The grade will be based on: (1) your performance on the 4 exams [22.5% each] and (2) your participation in the discussion sections [10%]. Don't forget that there are penalties for failing to attend discussion sections.

OFFICE HOURS Life Sciences C318 by appointment (Hall). Life Sciences C232by appointment (Hamlin).

COURSE WEBSITE. GENE 3000 uses the eLC Learning Commons Website (www.elc.uga.edu) to post lectures, discussion readings, exam keys, and other documents pertaining to the course. Lectures will be posted at least 12 hours before class.

CELL PHONES. Please turn OFF your cell phones during lecture, discussion and office hours.

TENTATIVE LECTURE SCHEDULE

Day	**Date**		**Lecture (tentative)**	**Textbook**
Fri	6/8	1	Introduction. Evolution: History and evidence	Chap. 2.
Mon	6/11	2	Variation: Phenotypes & genotypes	Chap. 5: 160-166. Chap. 6: 169-182. Chap. 7: 264-275.
Tues	6/12	3	Natural selection 1	Chap. 3. Chap. 6: 182-210.
Wed	6/13	4	Natural selection 2	Chap. 10.
Thurs	6/14	5	Natural selection 3	Chap. 6: 210-218. Chap. 7: 223-264.
Fri	6/15	6	Mutation, Genetic drift and migration	Chap. 11.
Mon	6/18	7	**Exam 1 (Lectures 1 – 5).** Sexual selection	
Tues	6/19	8	Sexual selection, Evolution of sex	Chap. 10: 392-395. Chap. 12. Chap 13.
Wed	6/20	9	Evolution of sex, Units of selection	Chap. 16.
Thurs	6/21	10	Units of selection. Life history evolution.	
Fri	6/22	11	Speciation	Chap. 4. Chap. 10: 376-380.
Mon	6/25	12	**Exam 2 (Lectures 6 – 10).**	
Tues	6/26	13	Phylogenetics and The Comparative Method	Chap. 4: 135. Chap 10: 391.
Wed	6/27	14	Coevolution	
Thurs	6/28	15	Molecular evolution 1	
Fri	6/29	16	Molecular evolution 2	Chap. 19.
Mon	7/2		**Exam 3 (Lectures 11 – 15).**	
Tues	7/3	17	Evolution & development	Chap. 17.
Wed	7/4	18	NO CLASS	
Thurs	7/5	19	History of life on earth	Chap. 18.
Fri	7/6		**Exam 4 (Lectures 16 – 19)**	

DISCUSSION SECTIONS SCHEDULE

Date	Meeting	Subject
6/11	1	Reading #1 (Mayr 2000)
6/12	2	Reading #2 (Cody & Overton 1996)
6/13		No meeting
6/18		No meeting (exam day)
6/19	3	Reading #3 (Rodríguez-Muñoz et al. 2010)
6/20	4	Reading #4 (Sherman 1977)
6/25		No meeting (exam day)
6/26	5	Reading #5 (Harvey & Purvis 1991)
6/27	6	Reading #6 (Begun & Aquadro 1992)
7/2		No meeting (exam day)
7/3		Reading #7 (Roux & Robinson-Rechavi 2008)
7/4	7	No meeting (July 4th)

Reading	Paper
#1	Mayr, E. 2000. Darwin's influence on modern thought. Scientific American 283: 78-83
#2	Cody, M.L. and J. McC. Overton. 1996. Short-term evolution of reduced dispersal in island populations. Ecology 84: 53-61.
#3	Rodríguez-Muñoz, R., A Bretman, J. Slate, C. A. Walling, and T. Tregenza. 2010. Natural and Sexual Selection in a Wild Insect Population. Science 328: 1269-1272.
#4	Sherman, P. W. 1977. Nepotism and the evolution of alarm calls. Science 197: 1246-1253.
#5	Harvey, P.H. and A. Purvis. 1991. Comparative methods for explaining adaptations. Nature 351: 619-624.
#6	Begun, D.J., and C. Aquadro. 1992. Levels of naturally occurring DNA polymorphism correlate with recombination rates in *D. melanogaster*. Nature 356: 519-520.
#7	Roux, J. and M. Robinson-Rechavi. 2008. Developmental constraints on vertebrate genome evolution: A genetic theory of morphological evolution. PLoS Genetics e1000311.