EVOLUTIONARY BIOLOGY
Spring 2017

EEB 2245/2245W (lecture portion)
Tu/Th 9:30–10:45 am
TLS 154

Instructors:

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Goal: The goal of this class is to teach the basic principles of evolutionary biology and the history of life on earth.

Grading:

EEB 2245: Each half of the course counts for 50% of your lecture grade. Your grade in the first half of the course will be based on your performance on two lecture exams (for a total of 200 points). Your grade in the second half of the course will be based on your performance on three lecture exams (180 points total) and weekly, short on-line quizzes (20 points) (for a total of 200 points). However, your grade for Exams1–4 will be dropped. **Please note: because you are allowed to drop one of these grades, *we will not give make-up exams***.

EEB 2245W: For W students your final grade in the lecture portion of the course will be calculated as above. This grade will constitute 75% of your final course grade. The W portion of the course, as determined by your "W" instructor, will constitute the remaining 25% of your final course grade. ***Please note that an F in either the W or lecture portion of the course will result in an F for the entire course.*** Dr. Paul Lewis (TLS 162; tel: 486–2069; paul.lewis@uconn.edu) is the coordinator of the W portion of the course. Refer to HuskyCT for further information on the W portion of the course. You will be assigned your W instructor at the mandatory library session you attend for the W portion of the course. You must sign up for a library session in HuskyCT by January 19th.

Text:

Futuyma, D. J. 2013. ***Evolution***. 3rd ed. Sinauer Associates, Inc. (ISBN 978-1-60535-115-5). Assigned readings are indicated below. Please read assigned chapters prior to coming to class.

Course website:

http://hydrodictyon.eeb.uconn.edu/eebedia/index.php/Evolutionary_Biology_Spring_2017

LECTURE SYLLABUS
FIRST HALF OF COURSE: EVOLUTIONARY PATTERNS (CAIRA)

	Date		Topic	Reading
1.	T	Jan 17	Introduction to the Geological Time Scale; the Fossil Record	Ch. 4 (pp. 77–81)
2.	Th	Jan 19	Life in the Precambrian; evolution of the Metazoa	Ch. 5 (pp. 103–110)
3.	T	Jan 24	Cambrian explosion & Life in the Paleozoic	Ch. 5 (pp. 111–119)
4.	Th	Jan 26	Life in the Mesozoic	Ch. 5 (pp. 119–125)
5.	T	Jan 31	Life in the Cenozoic	Ch. 5 (pp. 125–132)
6.	Th	Feb 2	Evolution of primates	Ch. 4 (pp. 90–95)
	T	Feb 7	**EXAM #1** (covers Lectures 1–6)	
7.	Th	Feb 9	Evolution of biodiversity & extinction	Ch. 7
8.	T	Feb 14	Characters, homology & homoplasy	Ch. 3 (pp. 51–63)
9.	Th	Feb 16	Systematics & reconstructing evolutionary history	Ch. 2
10.	T	Feb 21	Evolution and development	Ch. 3 (pp. 63–66) & Ch. 21
11.	Th	Feb 23	Biogeography & major patterns of distribution	Ch. 5 (pp. 129–132) & Ch. 6
12.	T	Feb 28	Continental drift & Historical Biogeography	Ch. 6
	Th	Mar 2	**EXAM #2** (covers Lectures 7–12)	

LECTURE SYLLABUS
SECOND HALF OF COURSE: EVOLUTIONARY PROCESSES (SIMON)

(See HuskyCT for weekly quizzes, periodic updates that track progress & introduce late breaking topics.)

	Date		Topic
13.	T	Mar 7	The uses of evolutionary biology. The evidence for evolution. The biblical literalists and the evolution debate; Refuting Creationist arguments www.law.umkc.edu/faculty/projects/ftrials/scopes/scopes.htm **Read:** Ch. 1 (pp. 1–3) and Ch. 23 (pp. 646–655)
14.	Th	Mar 9	Importance of variation. Sources of phenotypic variation. Variation due to the environment, phenotypic plasticity, common gardens. The Hardy-Weinberg equation: Why do we care? Is variability rare in natural populations? **Read:** Ch. 9 (to p. 235); Review Chapter 8 (basic genetics) on your own, especially pp. 208–209, mutation as a random process.
	T	**Mar 14**	**SPRING BREAK- no class**
	Th	**Mar 16**	**SPRING BREAK- no class**

15.	T	Mar 21	Epigenetic inheritance, variation in natural populations, Lewontin & Hubby, understanding deviations from HW ratios, effects of non-random mating, Inbreeding. Conservation biology and purging. **Read:** Ch. 9 remainder.
16.	Th	Mar 23	The Erosion of Genetic Variability by inbreeding. Genetic drift, consequences for conservation biology, Effective population size. Bottlenecks, founder events, gene flow models; gene flow studies. Geneflow x selection x drift. **Read:** Ch. 10.
17.	T	Mar 28	The interaction of ecology, climate, gene flow, bottlenecks. Northern purity/southern richness. Neutral theory. **Read:** Chs. 10 & 11
18.	Th	Mar 30	Introduction to selection, directional selection and the environment. Competitive character displacement, runaway sexual selection, the importance of heritability, multiple niche polymorphisms, the speed of directional selection, deleterious dominants. **Read:** Chs. 11 & 12
19.	T	Apr 4	Mutation and selection; fluctuating, frequency dependent, disruptive selection, Wright's shifting balance , balancing selection. Cystic fibrosis & typhoid fever, Levels of selection. Coevolution, the evolution of virulence. Interdemic selection, Group selection, Kin selection, Cooperation, Inclusive fitness. **Read:** Chs. 11& 12
	Th	Apr 6	**EXAM #3** (covers Lectures 13–19)
20.	T	Apr 11	Introduction to geographic variation. Character variation, parallel and perpendicular clines, geographic races of rat snakes and cicadas. Causes for clines. Human variation and the concept of Race. Ring species. Factors that inhibit gene flow- pre-mating isolation: Mating colors & dances, aggressive mimicry. Mating songs..**Read:** Chs. 9 (again), 17 & 18.
21.	Th	Apr 13	Post-mating and pre-zygotic: lock & key vs sexual selection and cryptic female choice, sperm-egg contact, natural selection at the molecular level. Post-mating and post-zygotic reproductive isolation, sterile hybrids. Post-mating and post-zygotic reproductive isolation (cont'd.), parasitic sterility, polyploids. **Read:** Ch.17
22.	T	Apr 18	Speciation: The origin of biodiversity. Species concepts: typological, biological, phylogenetic, cohesion. Practical considerations: large biodiversity studies versus detailed studies of specific genera. **Read** Chps. 17 & 18
23.	Th	Apr 20	Speciation Mechanisms: categories of speciation mechanisms. Butlin's 2008 Table of speciation events over time. Allopatric, peripheral isolates, founder event speciation, reproductive character displacement, reinforcement. Periodical cicada case study. Allochronic speciation, contact zones, reproductive character displacement. **Read** Chs. 17, 18 & 19 pp. 531–533.
24.	T	Apr 25	Speciation Mechanisms (cont.): Allochronic speciation, contact zones, reproductive character displacement (cont'd). Parapatric speciation, speciation with gene flow, North American chipmunk examples, sympatric speciation; host races. Translocations, polyploidy, polyphyletic species of *Hyla*.
25.	Th	Apr 27	Parallel speciation. Chromosomal speciation with hybridization; co-adapted allele complexes. Sunflowers. **Read:** Chs. 17, 18 & 19 pp. 531–533.

Final Exam week **EXAM #4** (covers Lectures 20–25) **& EXAM #5** (covers Lectures 13–25)

Registrar's office note: **Students are required to be available for final exams during the time stated in the Registrar's Office Schedule. If you have a conflict with this time you must visit the Office of Student Services and Advocacy to discuss the possibility of rescheduling your final exam. Please note that vacations, previously purchased tickets or reservations, graduations, social events, misreading the assessment schedule and over-sleeping are not viable excuses for missing a final assessment. If you think that your situation warrants permission to reschedule, please contact the Office of Student Services and Advocacy to meet with a staff member.**