EVOLUTIONARY ECOLOGY
ECOL 4500 / 6500
Lecture: TR 12:30-1:45pm
Discussion: W 11:15am-12:05pm
Ecology Rm. 117 (Seminar Room)

Instructor:
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Ecology Rm. 121
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Office hours:
T Th 1:45-3:00pm
Ecology Rm. 121 (right outside of the Seminar Room)

Objectives:
This class will explore the fundamental concepts and analytical techniques used in evolutionary ecology. It is intended not to be an introduction to behavior ecology, as some evolutionary ecology courses are, but a thorough exploration of general themes that cover all organisms. Oriented for the ecology major, this course will provide students with content designed to show how evolutionary concepts may be applied to ecological questions. Theory and applications will be covered, including examples in conservation, phylogenetics, and community ecology.

Course Requirements:
It is assumed that students taking this course understand the basics of evolution and population ecology. Coursework equivalent to GENE 3000 and/or ECOL 3500 should provide this background. Students without this coursework may still be accepted into the class at the instructor's discretion on a case-by-case basis, and some readings are on the ELC website to help students strengthen this background. **Attendance is absolutely essential to succeeding in this course.** The fact that we do not use a standard textbook for this course underscores the importance of attendance.

Course Grading:
Final grade will be calculated as a weighted average of the following:

Weekly assignments	10%	Final paper	25%
Midterm	20%	Participation	10%
Final exam	20%	Discussion	15%

Grade bands

A	at or above 93.4%	C+	77.7 – 79.9%
A-	90 - 93.3%	C	73.4 – 77.6%
B+	87.7 - 89.9%	C-	70 – 73.3%
B	83.4 – 87.6%	D	60 – 69.9%
B-	80 – 83.3%	F	less than 60%

Lecture Structure:
Each class meeting is 1hr15min long. To create the most conducive learning experience, class will typically include a roughly 50-60min long lecture followed by a 15-25min group-based exercise.

In addition to the lecture, we have a 50min discussion section each week. This discussion will generally be focused on the weekly readings, but will also include discussion of the assignments in the course. Students are expected to lead and participate in discussions, with the exact number of discussions led by each student determined by the number of students enrolled in each class.

Course Readings:
There is no particularly good textbook that can be used for this course, and so I have developed a schedule of course readings that incorporates many sources and is subject to change. Students will be expected to read and understand all of these readings.

Assignments:
This course includes weekly assignments. Each assignment is a review of an assigned paper for that week, and should be 1-2 paragraphs long. The paper must be an experimental or theoretical paper, NOT A REVIEW OR SYNTHESIS PAPER. In each summary, please: 1) identify the research question, 2) explain the methods, 3) relate the main results, 4) list the key inferences, 5) identify what is important about the paper, and 6) identify what could have been done better. The write-up for each assignment should be in Microsoft Word or Adobe PDF format (NO OTHER FORMATS WILL BE TAKEN!!!!!). All assignments should be submitted electronically on ELC. Students will also be required to write two class papers, and to present their final paper to the class. These papers differ for students enrolling in the two different sections of the course:

-Undergraduates taking the course for 4500 credit:
The term paper will be a synthetic review on a topic in evolutionary ecology, in which the student not only summarizes the literature on the subject but also advocates a position for further research based on an assessment of current gaps and problems in the science. An example is a demonstration of a model, such as how modern variants of evolutionary games may be used to understand the evolution of parasitism or disease. The format should include an Introduction and a Conclusion section, in addition to material that would flesh out the paper between these sections. This should be double-spaced, in a 10-12 point font, and 12-15 pages long (points will be deducted for papers that are either too short or too long), with a minimum of 15 citations from the primary literature. The citations and literature cited section should be in the format of either *Nature* or *Ecology*.

-*Graduate students taking the course for 6500 credit:*

The term paper should be a *scientific paper* on a topic in evolutionary ecology, involving either an analysis of the student's own data or a re-analysis of data obtained from the literature. This paper should be written in standard scientific style (Intro, Methods, Results, Discussion), and should be double-spaced, in a 10-12 point font, and 15-20 pages long (points will be deducted for papers that are either too short or too long),. A minimum of 20 citations from the primary literature should be included. The citations and literature cited section should be in the format of either *Nature* or *Ecology*.

Optional: Students may choose to a *research proposal* for extra credit. Students in the 4500 section should present an interesting problem in evolutionary ecology and proposes a study in order to deal with that problem. This paper should be written in scientific format (i.e., Intro, Methods, Discussion, Literature Cited), and should be 6-8 double-spaced pages written in a 10-12 point font. Graduate students may do this but as a *small grant proposal* written in the style of a NSF DDIG, though it should be double-spaced, 8-10 pages long, and written in a 10-12 point font (please see the NSF website for details about the NSF DIGG format). The focus should be a small project covering a topic in evolutionary ecology. The total extra credit to be earned is up to 7% onto the final class grade, depending on the quality of the paper.

Late Policy: Assignments must be received via ELC by Professor Shefferson by 5pm on the day that the assignment is due. Late assignments are strongly discouraged in this course, and will be penalized. Students will lose 10% of the maximum possible for each day that an assignment is late. Final papers WILL NOT BE ACCEPTED LATE, resulting in a 0% to anyone not handing them in on time.

Official University Policy:

The course syllabus is a general plan for the course; deviations announced to the class by the instructor may be necessary. All academic work must meet the standards contained in *A Culture of Honesty*. Students are responsible for informing themselves about those standards before performing any academic work.

Semester lecture and discussion schedule (please note that readings are posted on the ELC website):

Class	Date	Topic	Assignments due
1	10 Jan	Introduction to Evolutionary Ecology	
D1	11 Jan	4500: Roach 1993, Reznick et al 2004, Read Lynch Thomas 2009 6500: Vaupel et al 2004	
2	12 Jan	Life histories: Aging (Classic theory)	
3	17 Jan	Life histories: Aging (Contemporary theory)	
D2	18 Jan	4500: Spitze 1991, Reznick Nunney Tessier 2000, Roach Ridley Dudycha 2009 6500: Milot et al 2011	Summary D2
4	19 Jan	Life histories: Trade-offs	
5	24 Jan	Life histories: Variable environments	
D3	25 Jan	4500: Philippi Seger 1989, Roff Bradford 2000, Velando Drummond Torres 2006 6500: Koons Metcalf Tuljapurkar 2008	Summary D3
6	26 Jan	Life histories: Predictable environments	
7	31 Jan	Life histories: Phenotypic plasticity	
D4	1 Feb	4500: Nussey Wilson Brommer 2007, Wilbur Collins 1973, Shefferson Roach 2010 6500: Beaumonte-Barrientos et al 2010	Summary D4
8	2 Feb	Life histories: Reproductive schedules	
9	7 Feb	Life histories: Demography and population dynamics	
D5	8 Feb	4500: Metcalf Pavard 2007, Kokko Lopez-Sepulcre 2007, Coulson et al 2011 6500: Doebeli Dieckmann 2003	Summary D5
10	9 Feb	Life histories: Adaptive dynamics	
11	14 Feb	Life histories: Eco-evolutionary dynamics	
D6	15 Feb	4500: Schoener 2011, Yoshida et al 2003, Shefferson Roach 2012 6500: Ellner Geber Hairston 2011	Summary D6
12	16 Feb	Macroevolution: Phylogenetics I (Dr. Patrick Stephens)	
13	21 Feb	Macroevolution: Phylogenetics II (Dr. Patrick Stephens)	
D7	22 Feb	Review for midterm	
14	23 Feb	Macroevolution: Life histories	
15	28 Feb	Midterm	
D8	29 Feb	4500: Gittleman 2001, Losos 1992, Huang et al 2012 6500: Freckleton 2009	Summary D8
16	1 Mar	Biotic interactions: Intro and Game theory	
17	6 Mar	Biotic interactions: Game theory	
D9	7 Mar	4500: Hansen 1986, Stuart-Fox 2006, Burnham 2007 6500: McNamara et al 2009	Summary D9
18	8 Mar	Biotic interactions: Cooperation & cheating	
19	20 Mar	Biotic interactions: Economic models (Dr. Charles Cowden)	Final paper topic
D10	21 Mar	4500: Bronstein 2001, Simms et al 2006, Stanton	Summary D10

		Palmer 2011 6500: Doebeli Knowlton 1998	
20	22 Mar	Biotic interactions: Evolutionary ecology in disease (Dr. Daniel Streiker)	
21	27 Mar	Biotic interactions: Altruism & spite	Opt. research proposal
D11	28 Mar	4500: Gardner West 2009, TBA 6500: Boyd Gintis Bowles Richerson 2003	Summary D11
22	29 Mar	Biotic interactions: Specialization	
23	3 Apr	Biotic interactions: Evolution of broad interactions	
D12	4 Apr	4500: Shefferson et al 2007, Poore Hill Sotka 2008, Gomez Verdu Perfeccti 2010 6500: Weiblen et al 2006	Summary D12
24	5 Apr	Biotic interactions: Geographic mosaics	
25	10 Apr	Biotic interactions: Community evolution	
D13	11 Apr	Biotic interactions: Community evolution II	
26	12 Apr	Guest lecture: Orchid mycorrhiza and population genetics (Tyler Kartzinel, UGA, Odum School)	
27	17 Apr	Speciation	
D14	18 Apr	4500: Thompson 2009, Emerson Gillespie 2008, Urban et al 2008 6500: TBA	Summary D13
28	19 Apr	Guest lecture: Sexual selection (Dr. Vanessa Ezenwa)	
29	24 Apr	Biotic interactions: Eco-evolutionary community & ecosystem dynamics	
D15	25 Apr	Review session	
30	26 Apr	Evolutionary ecology of disease (Dr. Andrew Park)	Final paper due
Final	3 May	Final exam, 12-3pm, Ecology 117	