

## **COURSE SYLLABUS**

Evolutionary Ecology meets MWF, 10:00-10:50 in Wilson 128. Please read this syllabus carefully and guard it for future reference--it contains information that is important to your academic health.

### **GOALS AND PHILOSOPHY**

This is an upper level course in evolutionary thinking and the process of studying evolution. The course title was chosen to reflect the diverse and idiosyncratic set of evolutionary topics that will be covered, set mostly within an ecological context. My goals in this course are:

- to introduce you to several specialized topics in evolutionary biology
- to encourage critical thinking through readings, discussion, and writing
- to develop widely-useful professional skills, including:
  - asking thoughtful questions in response to readings, in the role of a critical scientist
  - writing short critical reviews of research articles, in the role of a journal reviewer
  - giving a short oral presentation and answering questions from an audience, in the role of a conference speaker
  - writing a short research proposal about an area of scientific interest, in the role of principal investigator (PI)
  - evaluating proposals written by other PIs and taking part in a mock review panel, in the role of a scientific peer

My philosophy of teaching is to encourage you to think critically, to take intellectual risks, to make your best effort, and to engage you in the process of the profession about which you are learning. I understand that people come in with different backgrounds and experiences. I hope you will all interact, cooperate, and learn from one another. This class is not graded on a set curve--with initiative and effort, everyone can (theoretically) do well.

### **CONTACT INFORMATION**

**You must provide me with a current e-mail address** for an account that you check daily. I will use e-mail to announce reading assignments, to receive and send out discussion questions, and to give other general information. I can be contacted as follows:

- e-mail: podolsky@unc.edu
- phone: 962-9247
- office hours: M,W 11-12 or by appointment, inner office of G-40 Wilson Hall

### **WEBSITE**

The course web site will have copies of the syllabus and other handouts, as well as access to course readings. The web site address is <http://www.bio.unc.edu/courses/2001spring/biol156-001/>, and can be found starting from the biology department homepage.

### **READINGS**

There is no textbook for the course. All readings will be from the primary literature and from popular sources (papers and review articles). Readings will be announced by e-mail and made

available the week before they are to be discussed. Copies of the readings will be found on electronic reserve. Check the course website for instructions of how to obtain reserve readings.

### OUR FICTITIOUS JOURNAL AND GRANTING AGENCY

Much of the life of a biologist revolves around journals, granting agencies, and a process known as "peer review." In this class you will play the roles of various people connected to these organizations: article reviewer, journal editor, proposal writer, proposal reviewer, grant panel member. I will occupy the more privileged posts of Editor-in-Chief of our journal ("The Evolutionary Ecologist") and Panel Head for our granting agency (NSF, the "Natural Sciences Foundation").

### HOW TO SUCCEED IN THIS COURSE

Attend lectures and discussions consistently. Class time will be used largely to talk about the process of doing evolutionary science. The final exam will be based on lecture and discussion information.

Take effective notes. Learning is helped by the act of writing notes, especially in your own words. Come prepared to lectures and discussions. Do the assigned readings as suggested before lectures, and prepare material for the questions I send out each week before coming to Friday's discussion.

Read carefully. The articles I assign may be challenging. I don't expect you to understand everything immediately, but I do expect you to work hard to understand. For readings, take notes on the main arguments, the kinds of data that were collected, the conclusions that were drawn, and whether they were justified. If you do so, asking good discussion questions should be straightforward. Make sure you understand figures and tables.

Keep up with the assignments. The total amount of reading and writing in this course is not excessive, but it is steady. Short, regular assignments are the most effective way to learn.

Honor the honor code. My starting assumption is that we're all responsible adults, but...in my short time at UNC I've already spotted plagiarism and watched a student convicted by the student honor court. So, please submit work that is only your own.

Ask questions! Make sure material is clear in your mind. Come to office hours, ask for clarifications in lecture, and talk with other students to find out what you do and do not understand. A general and important rule for lectures and especially discussions: there are no stupid questions or comments! You will learn more by participating and verbalizing your understanding of the material.

### LECTURE SCHEDULE (topics subject to change)

<u>MODULE</u>	<u>day/date</u>	<u>class activity</u>	<u>assignments</u>
<b>INTRODUCTION AND PHILOSOPHICAL REVIEW</b>			
week 1	W Jan 10	Intro to the course	
	F Jan 12	Classic studies: Bumpus and Grant	
week 2	M Jan 15	***No class: Martin Luther King day***	
	W Jan 17	Selection, performance, adaptation, fitness, trade-offs	
	F Jan 19	<b>Discussion of articles</b>	

**EVOLUTIONARY ECOLOGY OF SEX**

week 3	M	Jan 22	Evolution of sexual reproduction	<b>article reviews</b>
	W	Jan 24	Red queens and tangled banks	
	F	Jan 26	<b>Discussion of articles</b>	
week 4	M	Jan 29	Evolution of the sexes	<b>article reviews</b>
	W	Jan 31	Evolution of breeding systems	
	F	Feb 2	<b>Discussion of articles</b>	

**LIFE-HISTORY EVOLUTION**

week 5	M	Feb 5	Selection on offspring number/size	<b>article reviews</b>
	W	Feb 7	Reproductive schedules, senescence	
	F	Feb 9	<b>Discussion of articles</b>	

**EVOLUTIONARY PHYSIOLOGY**

week 6	M	Feb 12	Studies with natural populations	<b>article reviews</b>
	W	Feb 14	Selection in the laboratory	
	F	Feb 16	<b>Discussion of articles</b>	
week 7	M	Feb 19	<b>Presentations</b>	} <b>oral presentations</b>
	W	Feb 21	<b>Presentations</b>	
	F	Feb 23	<b>Presentations</b>	

**EVOL PHYS (cont.)**

week 8	M	Feb 26	Biochemical adaptation	<b>article reviews</b>
	W	Feb 28	Evolution of stress responses	
	F	Mar 2	<b>Discussion of articles</b>	

**EVOLUTIONARY MORPHOLOGY**

week 9	M	Mar 5	Physical processes and competition	<b>article reviews</b>
	W	Mar 7	Plant-animal interactions	
	F	Mar 9	<b>Discussion of articles</b>	

week 10	M	Mar 12	***No class: spring recess***
	W	Mar 14	"
	F	Mar 16	"

**EVOL MORPH (cont.)**

week 11	M	Mar 19	Evolution of plasticity	<b>article reviews</b>
	W	Mar 21	Paleoecology	
	F	Mar 23	<b>Discussion of articles</b>	

**COEVOLUTION**

week 12	M	Mar 26	Evolution of mutualisms	<b>article reviews</b>
	W	Mar 28	Patterns of cospeciation	
	F	Mar 30	<b>Discussion of articles</b>	

**ORIGINS OF LIFE AND EARLY DIVERSIFICATION**

week 13	M	Apr 2	Cambrian explosion and mass extinctions	<b>grant proposal</b>
	W	Apr 4	"Biggest scale" trends in evolution	
	F	Apr 6	<b>Discussion of articles</b>	
week 14	M	Apr 9	Steps in the origin of life	<b>grant proposal</b>
	W	Apr 11	Where did life begin?	
	F	Apr 13	***No class: Good Friday***	

## HUMAN EVOLUTIONARY ECOLOGY

week 15	M	Apr 16	Evolution of human traits
	W	Apr 18	Ecology of human societies
	F	Apr 20	<b>Discussion of articles</b>

## CONSERVATION AND POSSIBLE EVOLUTIONARY FUTURES

week 16	M	<b>Apr 23</b>	Evolution and conservation	<b>proposal reviews</b>
	W	Apr 25	Predictions of an evolutionary future?	
	F	Apr 27	<b>Discussion of articles</b>	

## GRANT PROPOSAL REVIEW

week 17	M	Apr 30	<b>Mock review panel convenes</b>
	W	May 2	<b>Panel makes funding decisions</b>

## OVERVIEW OF YOUR RESPONSIBILITIES (see descriptions below)

<u>Assignment</u>	<u>How much</u>	<u>How often</u>	<u>Grade</u>
Discussion participation	readings and prepared notes	most weeks	<b>12%</b>
Submitted DQs	2 questions/comments	each week of discussion*	<b>16%</b>
Article reviews	3 pages max, 1.5sp**	2 reviews for the semester	<b>15%</b>
Editorial decision	2-3 sentence decision	1 for the semester	<b>2%</b>
Oral presentation	4-6 min including questions	1 for semester	<b>8%</b>
Research proposal	5 page max, 1.5sp**	1 for semester	<b>17%</b>
Proposal reviews	1-2 page each, 1.5sp**	2 reviews	<b>10%</b>
Final lecture exam	based on lectures	once!	<b>18%</b>

\* DQs are not required on weeks when you submit an article review

\*\* 1.5sp=one-and-a-half spaced

## HOW AND WHEN TO SUBMIT ASSIGNMENTS

<u>Assignment</u>	<u>How to submit to me (email subject line)*</u>	<u>Absolute deadline</u>
Article reviews	attached or in body of e-mail (“review, week #”)	Thurs by 10am
(Review revision**)	hard copy, with original attached	≤ 1 week after return
Editorial decision	in body of e-mail (“editorial, week #”)	Mon by 10am
Discussion questions	in body of e-mail (“DQs, week #”)	Wed by 10am
Oral presentation	present in class	week of Feb 19-23
Research proposal	3 hard copies, in class	Mon, Apr 9 <sup>th</sup>
Proposal reviews	3 hard copies of each, in class, with proposals	Mon, Apr 23 <sup>rd</sup>
Final exam	in class	Mon, May 7 <sup>th</sup> , 8 am

\*Send email submissions to <podolsky@unc.edu>. **Make sure to use the subject line as shown in parentheses!**

\*\*Optional! You may turn in a substantially revised article review for re-grade within one week of its return to you.

## DESCRIPTION OF YOUR RESPONSIBILITIES

### Readings

You are responsible for doing the assigned readings each week. You should complete the reading preferably by Monday's lecture, absolutely by Wednesday's lecture (since you will be responsible by then for submitting either discussion questions or a short critical review (see "DQs" and "reviews" below)). Discussions each Friday (see next section) will be based on the readings, and you will need to prepare for discussions in advance.

### DQs

For each week (when you do not write a review), you will submit two discussion questions (DQs) in response to assigned readings for the week. The ideal format for a DQ is similar to the kind of question one might pose after hearing a seminar: give enough introductory information to put the question in context, and then end with a thoughtful question that was provoked by but goes beyond the material. These questions/comments can therefore be as short as a few sentences, but the more background you give the easier it may be for me to understand what motivates your question. If you take notes and jot down questions while reading, you should have plenty of material from which to choose your most insightful comments. Your questions will aid in the Friday discussion--I will collect and summarize the best questions and send them back to you by e-mail for preparation, on the Thursday before discussion. I expect you to print out a copy, jot down notes that you will use in discussion, and bring these notes to class. The discussion time is limited, so preparation is essential.

### Discussions

Most Fridays will be devoted to an open discussion of the readings and related material. I expect you to come prepared for discussions by (a) having carefully read the material and (b) preparing ideas in advance in response to final set of DQs (see below) that I will send by e-mail each Thursday before discussion. You should print out the final DQs and bring your annotated copy to class.

### Reviews

Over the course of the semester you will write **two** short (2-3 page) critical reviews of one of the assigned journal articles. You will be assigned randomly to the week and paper that you review. I will provide guidelines for writing a good review, and possibly an example. Your general goals are (1) to identify the major arguments posed by the author, (2) to evaluate how well the data presented support the author's conclusions, and (3) to provide feedback to the editor (see "editorial decisions" below) and to the author about positive and negative points of the article.

**Note: within one week of receiving comments from me, you may resubmit a revised version for a regrade. This resubmission is entirely optional.**

### Editorial decision

Once during the semester you will act as subject editor for the journal by making an editorial decision based on the submitted reviews from the past week. Be prepared to announce your decision at the start of class the following week. You should also submit a 2-3 sentence decision to me by email, indicating your reasons for the decision.

### Short oral presentation

You will give a short oral presentation on a topic in evolution or evolutionary ecology. The length of the presentation will depend on the number of people in the class--probably 4-6 min. The topic must come from your reading or viewing of a popular (not technical) source (for example, New York Times, Time, Vogue, GQ, People, web news service, television program). Your goals are:

- to teach other course members about a topic recently of interest in the popular press;
- to evaluate the agenda of the source and how the news item was reported. Some relevant questions in your evaluation are: What is the intention of the writer? In what ways is the writing sensationalized? Is there an implicit political orientation? Is the topic meant to be intriguing like science fiction, or does it carry a serious message or warning? Is the information reported accurately and fairly? Why was this topic chosen, given the current cultural/political/economic context of American society?

For this evaluation you will need to do enough additional reading to convince yourself (and other members of the class) of how fairly and accurately the news was reported. **Note: there is no written component to this assignment.**

Here are some recent controversial topics in the popular press relating to evolution:

*conflicts between evolution and creationism*

*the evolution of menstruation and morning sickness*

*the politics and economics of textbook language about evolution*

*mechanisms and conditions for the origins of life*

*extra-terrestrial theories about origins of life on earth and other planets*

*species preservation and conservation*

*the evolution of sexual orientation in humans*

*the evolution of infectious disease*

*the evolution of drug resistance*

*human origins*

*the origins of flight*

*evolutionary relationships between birds and dinosaurs*

*future human evolution in the computer age*

*animal intelligence*

*historic changes in earth's climate*

*the evolution of organism complexity*

*life on other planets*

*failures in disease and pest control*

*natural and computer viruses*

*evolutionary ecology of the use of spices for preserving food*

*evolutionary principles in the evolution of lifespan*

*evolutionary theories of homicide*

*past and present applications of eugenics*

*limits to human evolution*

*genetic engineering in disease and agriculture*

### Research proposal

You will write a short research proposal on any topic of interest in evolutionary ecology. I will provide extra guidelines before you start writing. This exercise is a major component of the course, and provides the basis for subsequent reviews and the grant review panel. I strongly suggest you get started early in figuring out a research topic, and coming to talk with me about ideas. A topic and preliminary outline will be due later in the semester.

### Proposal reviews and mock grant review panel

We will use anonymous versions of the grants submitted by class members to convene a mock (but authentic!) grant review panel. This will involve each member of the class writing reviews for two grant proposals. The reviewers will provide short (1-2 page) commentaries to a spokesperson, who will make a case to the audience about whether or not the grant should be funded. This will give you a feeling for how intense but sometimes how arbitrary the whole review process can seem.

### Final exam

There will be a final exam covering material from lectures and discussions. This will be in the form of short answers and short essays. I will provide study guides for each set of lectures, and you should use the DQs I send out as a guide to discussion material.