

BIOL 3114/5114 Evolutionary Ecology

T, Th 12:30-1:50pm

Room 342 Bio-Life

3 credits

Dr. Rachel Spigler

Bio-Life Building, Room 443

(215) 204-8855

rachel.spigler@temple.edu

Office hours: Tuesdays 2:00-3:00pm and by appointment. Feel free to email me to find a time to discuss course-related matters.

Course synopsis

In this course we will explore the interface of ecology and evolution. The field of evolutionary ecology deals broadly with questions such as: What are the ecological causes of evolution? How do ecological interactions shape the evolution of traits and origination (or extinction) of species? How does evolutionary history shape species interactions and community structure? How might evolution influence community or ecosystem processes? The class will cover fundamental theories and approaches used to address questions in evolutionary ecology, including molecular tools, modeling, manipulative field studies, and laboratory- or field-based common garden studies.

Students must have completed BIOL 2227 (Principles of Ecology) (*Undergraduates only*).

Course goals

By the end of this course, all students will:

1. Know fundamental concepts and theories on core topics in evolutionary ecology
2. Be able to read and discuss current primary literature on topics in the field
3. Work collaboratively in groups to develop and to discuss scientific ideas
4. Interpret and evaluate data to make inferences and predictions about evolutionary change
5. Communicate their understanding of fundamental concepts in evolutionary ecology through discussion and oral presentations
6. Graduate students will also:
 - a. Learn to shape their ideas into formal proposals, learn the skills of grant writing, and develop independent thinking
 - b. Lead discussions on the current primary literature on topics in the field

Readings

Required readings for discussions will come from the primary literature. These should be read *before* the discussion class period. PDFs of the assigned readings will be made available on Blackboard (Go to links: Readings > Discussion Readings).

Recommended readings to supplement lecture come from the following books:

- Fox, CW, DA Roff, and DJ Fairbairn. 2001. *Evolutionary Ecology: Concepts and Case Studies*. Oxford University Press, New York.
- Mayhew, PJ. 2006. *Discovering Evolutionary Ecology*. Oxford University Press, Oxford.
- Additional readings from the primary literature that may be of interest will also be posted on Blackboard (Go to links: Readings > Supplemental Readings).

Blackboard

Students will need access to Blackboard through the TUportal. Log on to TU Portal using your Temple University user ID and password. Students enrolled in Biol 3114/5114 are automatically enrolled in the course web site. I will make every effort to post slides of lecture materials before class (Go to links: Lecture Slides). If you wish to print these out to take notes during class, you can access them on Blackboard. Students are responsible for checking Blackboard regularly for course announcements.

Assessments

“Journal club”: We will hold in-class discussions of papers from the primary literature on various topics throughout the semester. Papers will be assigned and posted in Blackboard.

To help you think critically about the paper and to prepare for and to foster discussion, students will hand in answers to the following questions after reading each assigned paper:

1. What was the goal of the paper and why is it important?
2. What are the main results/conclusions?
3. What struck you about this paper – what did you find particularly interesting or surprising?
4. What are two questions about the paper that you had that you would like to discuss in class?

Each of these “Journal club reaction papers” should be no more than 1 single-spaced, typed page.

Students must turn in their paper through Blackboard by the start of class (12:30 PM) on the day of the discussion. You must also BRING ONE COPY TO CLASS for personal use during the discussion (paper or electronic is OK).

Participation in the journal clubs will be reflected in your participation grade. Please see tips for reading articles and participating in discussions at the end of this document.

Exams: There will be three exams. Questions may be presented as multiple-choice, fill in the blank, short answer, or essay. Questions will be drawn from the lectures, required reading material, student presentations, and discussions.

“EE Conference” Presentation: Toward the end of the semester, each student will hone their scientific literacy and communication skills by delivering a short PowerPoint presentation describing a recent paper (2010+) to the class. The paper must be from the *primary literature*, but may be on any aspect of evolutionary ecology that interests you. Students must send a PDF of the article to me at least one week before the presentation.

Examples of journals where appropriate articles may occur are: *Evolutionary Ecology*, *Evolution*, *Ecology*, *Science*, *Nature*, *Journal of Evolutionary Biology*, *Evolutionary Ecology Research*. In addition to these suggestions, students should search databases such as *Web of Science*. If you are unsure whether a paper is appropriate, see me to discuss.

The talk will be in a format similar to that given at a national, professional scientific meeting. Namely, students should present: a brief introduction to the big picture/overarching topic in evolutionary ecology; specific hypothesis or questions addressed in the paper; methods used; main results; conclusions; your thoughts on the paper and topic. We will discuss additional details, including tips for giving an effective presentation, as the semester progresses.

Together, student presentations and discussions will give us a broad view of the exciting, current research in the field! Material from papers presented at the “EE Conference” may be on exams, and all students are expected to attend and to participate.

Attendance and participation: All students are expected to attend class and be active participants during in-class activities, Journal clubs, and the “EE Conference”; attendance is a prerequisite to participation. Tardiness and/or early departure without prior notification and permission will be reflected in participation grades.

Missed assignments, discussions, and exams: There will be no make-up opportunities for assignments or exams. Approved absences from journal clubs or EE Conference classes may be granted in advance for certain limited activities in exceptional circumstances. Students must contact me at least one week in advance of the anticipated absence to discuss options. If an emergency arises and you cannot attend an exam, you should contact me AS SOON AS POSSIBLE via email to alert me to the situation. DOCUMENTATION (legal or medical) OF THE EMERGENCY IS REQUIRED.

Graduate students will additionally be assessed on the following:

- 1) Graduate students will each be responsible for leading a Journal Club paper discussion. The leader should prepare a short introduction (approx. 10 minutes) to the discussion that summarizes and explains the main theories or hypotheses motivating the paper/topic. Leaders can either present a short power point presentation or use a less formal approach and provide students with a handout (up to 2 pages) to follow the introduction. The leader is not expected to (and should not) talk the entire time. Rather, it is the discussion leader’s responsibility to keep the conversation going and to encourage all students to participate. Leaders should have a list of open-ended discussion questions to intersperse throughout the discussion to keep the discussion going.
- 2) In lieu of the EE Conference presentation, graduate students will write a grant proposal on a topic of their choice in Evolutionary Ecology. Proposals should be in the format of a Sigma-Xi Grant-in-Aid application.

Grading (Percentages are <i>approximate</i>):	Undergraduate	Graduate
Exam 1	23%	20%
Exam 2	23%	20%
Exam 3	23%	20%
Journal club reaction papers	8%	5%
Journal club discussion lead	--	10%
"EE Conference" presentation	15%	--
Grant proposal	--	20%
Participation	8%	5%
Total	100%	100%

Note: Questions about grading will not be accepted *more than 1 week* after graded assignments/exams are made available to students.

Academic Dishonesty

You must abide by Temple's Code of Conduct (see <http://www.temple.edu/assistance/udc/coc.htm>), which prohibits:

1. Academic dishonesty and impropriety, including plagiarism and academic cheating.
2. Interfering or attempting to interfere with or disrupting the conduct of classes or any other normal or regular activities of the University.

Accommodations for students with disabilities

Any student who needs an accommodation based on the impact of a documented disability, including

special accommodations for access to technology resources and electronic instructional materials required for the course, should contact me privately to discuss the specific situation by the end of the second week of classes or as soon as practical. If you have not yet done so, contact Disability Resources and Services as soon as possible (<http://www.temple.edu/studentaffairs/disability/> 215-204-1280; 100 Ritter Annex) to learn more about available resources. We will work with DRS to coordinate reasonable accommodations.

Recording/cell phone use policy

The use of cell phones or other devices for taking photographs or making audio or video recordings during class is prohibited. Arrangements may be made through Disability Resources and Services in exceptional circumstances.

Student and Faculty Academic Rights and Responsibilities

Both students and faculty are entitled to certain rights that ensure academic freedom. The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02), which can be accessed through the following link: <http://policies.temple.edu/PDF/99.pdf>

Tips for reading scientific articles

Reading and comprehending scientific articles takes practice. To jump-start this practice, I strongly recommend you read about *how* to read a scientific article. Several general articles on this topic are posted in Blackboard.

When reading a scientific article, you should keep these questions in mind:

1. What are the specific goals of the study? Why is this important?
2. What approaches (methods) did the authors use to meet their goals? Are they appropriate?
3. What are the major results? (*Consider: Do I understand all figures and tables?*)
4. What are the main conclusions and implications?
5. What are the strengths of the study? Weaknesses?
6. What could the authors do next to build on their study?

Some tips for a good discussion

1. Listen carefully to others before speaking.
2. Challenge and refute ideas, not people.
3. Focus on the best ideas, not being the best.
4. Don't worry about your ideas being complete – your contribution is important and vital to the discussion, so speak whenever you wish (without interrupting!).
5. Ask questions! It is OK if you do not understand something – someone else in the group likely has the same question too!
6. Avoid disrupting the flow of thought by waiting until the present topic reaches its natural end before introducing new issues.
7. If you do wish to introduce a new topic—warn the group and let them know you're willing to wait until people are finished discussing the topic at hand.
8. Give encouragement and acknowledge other people's comments and opinions.

Class Schedule

Day	Date	Topic	Reading
TUES	8/25	Evolutionary Ecology - A Historical Perspective	Ch 1, 16 Mayhew
THURS	8/27	Phenotypic variation: causes, significance, evolvability	Ch 1, 2 Roff
TUES	9/1	Natural selection I	Ch 3, 4 Roff
THURS	9/3	Natural selection II	
TUES	9/8	Nonadaptive evolution and constraints	
THURS	9/10	Journal club	<i>Primary literature (TBD)</i>
TUES	9/15	Phenotypic Plasticity	Ch 5 Roff
THURS	9/17	Journal club	<i>Primary literature (TBD)</i>
TUES	9/22	Life History Evolution I	Ch 9, 10 Roff; Ch 4 Mayhew
THURS	9/24	EXAM #1	--
TUES	9/29	Life History Evolution II	Ch 9, 10 Roff; Ch 4 Mayhew
THURS	10/1	Sex allocation and sex ratio evolution	Ch 5 Mayhew
TUES	10/6	Journal club	
THURS	10/8	Mating systems	Ch 7, 15 Roff
TUES	10/13	Sexual selection	Ch 16 Roff
THURS	10/15	Journal club	<i>Primary literature (TBD)</i>
TUES	10/20	Niche Evolution	Ch 9 Mayhew, Ch 14, 20 Roff
THURS	10/22	Journal club	<i>Primary literature (TBD)</i>
TUES	10/27	EXAM #2	--
THURS	10/29	Ecological Speciation	Ch 12, 13 Mayhew
TUES	11/3	Mutualisms & Coevolution	Ch 10, 11 Mayhew
THURS	11/5	Journal club	<i>Primary literature (TBD)</i>
TUES	11/10	Community evolutionary ecology	Ch 14, 15 Mayhew
THURS	11/12	"EE Conference" presentations #1	--
TUES	11/17	"EE Conference" presentations #2	--
THURS	11/19	"EE Conference" presentations #3	--
TUES	11/24	NO CLASS - THANKSGIVING BREAK	--
THURS	11/26	NO CLASS - THANKSGIVING BREAK	--
TUES	12/1	Special topics in EE	
THURS	12/3	Journal club	<i>Primary literature (TBD)</i>
THURS	12/10	Exam #3 (Consult final exam schedule, location TBD)	--

Note: Changes to the schedule may occur. Reasonable notice will be given in class and on Blackboard under the "Announcements" section.