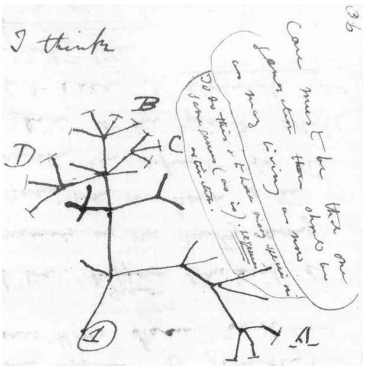
NRC 390E - Evolution & Conservation (3 credits)



Course Information

Webpage: On Moodle
Lecture MW 9:05am – 9:55pm
Lab Fri 9:00am-12:00pm
105 Holdsworth Hall

Instructor

Dr. Lisa Komoroske
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Holdsworth 127 (413) 545-2491
Office hours: M/W 10-11am & by appt.

Teaching Assistants

Jamie Stoll jstoll@umass.edu
Agriculture Engineering 109
Office hours: T 3:30-4:30pm & by appt.

Course Description: This course will provide the evolutionary basis for understanding biological problems in conservation. Evolutionary thinking adds an important dimension to conservation biology, and future conservation practitioners must be equipped with the ability to think about conservation from an evolutionary perspective. Major topics include: (1) a survey of evolutionary theory; (2) the application of evolutionary thinking to case studies and problems in conservation biology.

Course Learning Goals: Students will acquire a fundamental understanding of how evolution operates combined with the skills to apply this knowledge to address conservation problems in the real world. Additionally, students should walk away from this course with a better appreciation for the complexity of these issues, what we are still learning/remains unknown in this field, and the diversity of perspectives on the 'right' way to achieve effective conservation and management. Broadly, this course is focused on developing an 'evolutionary way of thinking' and building critical problem-solving skills, with relatively little emphasis on memorization of facts.

I realize that students taking this course will go on to many different careers that may be related to conservation and evolutionary biology, or not. Whether you go on to be an academic biologist, conservation practitioner, medical professional, or instagram fashion icon, it is my goal that you have the skills to think like an evolutionary biologist to evaluate science, policy and news in our society.

Communication: Email and Moodle will be used routinely for announcements, reminders, and resources. Please check these resources regularly.

Statement of Inclusion: Learning is strengthened with a diversity of human perspectives and learning styles. We will foster an inclusive learning environment where people of all ethnicities, sexual orientation, genders and gender identities, religions, socio-economic status, and disabilities are encouraged to share their perspectives. Any behavior that is disrespectful toward others or violates the inclusivity of this shared learning environment will not be tolerated.

Learning Objectives: After completion of this course, students should be able to:

- Understand the key mechanisms of evolution and how these are important to ecology, conservation biology, and our daily lives!
- Connect how humans influence evolutionary processes with resulting impacts on biodiversity and extinction rates
- Draw upon evolutionary theory to tackle conservation problems
- Apply critical thinking skills and have capacity to work in diverse teams to collaboratively problem-solve complex conservation challenges
- Discuss scientific literature, topical conservation management challenges, and how evolutionary theory is incorporated for sustainable solutions.

Course Materials:

- Textbook: *Evolution: Making Sense of Life* 3rd Edition by Zimmer and Emlen*
- SimBio labs (see Moodle for details)
- iClicker+ or iClicker 2 (optional-will discuss in class)
- Additional readings from other sources will be assigned throughout the semester and posted on Moodle

Course format: This course will be taught in a hybrid format of individual and group learning, consisting mainly of active lectures and laboratory exercises and discussions. The goal of this format is to provide each individual student with resources and accountability to achieve learning goals, while augmenting this with group learning and building skills in teamwork and applying course content to "real world" situations.

Tentative Class Schedule:
(Detailed schedule with corresponding assignment deadlines will be posted and updated on Moodle)

Week	Week Starting	Topic
1	21-Jan	Course Introduction & Conservation of Biodiversity
2	27-Jan	Unit 1: Biodiversity, Evolution & Extinction
3	3-Feb	Unit 2: Raw Material & Intro to Population Viability
4	10-Feb	Unit 3: Genetic Drift & Inbreeding
5	18-Feb	Unit 1-3 Recap and Exam
6	24-Feb	Unit 4: Selection
7	2-Mar	Unit 5: Genes & Heritability
8	9-Mar	Unit 6: Phenotypic plasticity & Epigenetics
		Spring Break
9	23-Mar	Unit 4-6 Recap and Exam
10	30-Mar	Unit 7: Natural Selection in the Wild & Adaptation
11	6-Apr	Evolution in the Anthropocene
12	13-Apr	Unit 9: Sexual Selection & Behavior
13	20-Apr	Unit 10: Evolutionary Ecology & Co-Evolution
14	27-Apr	Final Review and Group Presentations

* *This textbook provides a very good reference for the foundational concepts we will learn in this course and I recommend purchasing a copy to use throughout the course. However, I understand the cost of textbooks is a significant factor for students and I do not wish this to be a burden or barrier to success in the course. A copy of the textbook has been put on reserve at the library, and I also have one available in my office for on site lending. Students may also wish to share a textbook with a partner; I will strive to post assign readings and weekly homeworks well in advance to allow students using these alternate options to plan ahead.*

Disability Statement: UMass Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services or the Center for Counseling and Psychological Health, you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first two weeks of the semester so that we may make appropriate arrangements. For more information, consult the UMass Disability Services website.

Pronoun Policy: Everyone has the right to be addressed and referred to by the name and pronouns that correspond to their gender identity, including the use of gender-inclusive pronouns. Pronouns are not indicated on SPIRE class rosters, so students will be asked to indicate the pronouns they use for themselves. As a community, the class will respect and work together to learn and use each student's preferred name and pronoun.

Course Assessment: Your grade will be based on individual and group work throughout the semester. Specifically, emphasis is based on augmenting individual learning with group discussions and activities. Graded assignments will consist of:

1. Weekly Homework: Students will complete online homework assignments based on corresponding readings and previous lectures that will be submitted through Moodle. The goal of these assignments is to provide rapid feedback on understanding of course materials and to prepare you to apply the concepts to challenging 'real-world' problems in class and laboratory activities. Assignments will be graded out of 15 pts (1pt each question) and are due on Moodle each week by the beginning of lecture on Wednesday (9:05am).

Please note: Students are encouraged to use all course materials, discuss in groups and come to office hours to ask questions to complete the homework. **My goal is for students to have the tools to get 100% on every assignment.**

2. Weekly Short Quizzes: Students will complete in class short quizzes consisting of 5 questions that are drawn directly from the homework at the beginning of lecture on Wednesday. The purpose of these assignments is to reinforce individual understanding of key concepts and provide rapid feedback on understanding of course materials. These will be graded out of 10 points each (2pts each question). **Again, my goal is for every student get 100% on the quizzes if they have taken the time to prepare.**

N.B. Everyone has a bad day where they miss a class because a car breaks down, miss an alarm, or whatever. To alleviate this issue in an equitable way, quizzes cannot be made up, but the lowest quiz score will be automatically dropped at the end of the semester for everyone. However, if you are facing a serious crisis or health concern that causes you to miss multiple classes please come meet with me and/or seek Student Counseling Services, as appropriate.

3. Laboratory Activity Assignments: Students will work in pairs and small groups to complete laboratory activities designed to apply concepts introduced in readings and lectures. These will be turned in at the end of each laboratory period, and then reviewed (at the end of the period or beginning of following week lab, time permitting). The goal of these activities is for students to apply their knowledge to new scenarios, deepening understanding and revealing which concepts/topics needing further discussion and study. Assignments will be graded out of 20-30 pts each, conducted either within software or through accompanying worksheets as appropriate to the activity.

4. Laboratory Discussion Assignments: Students will work in pairs and small groups to first complete a set of structured questions based on reading a scientific paper, and then come together as a larger group to discuss the paper. The goal of these assignments is for students to learn how to read and analyze a scientific paper and to translate how concepts from the course are applied in real-world conservation research. Assignments will be out of 20-30 points based on written group answers (each group will write names of contributing group members at top of worksheet) and individual participation in discussions.

5. Cooperative Exams: Students will take two written exams individually in class to assess their knowledge of

content and applications from the previous units. They will then take the same exam in the lab period with the ability to discuss answers among their peers. The goal of this form of exam to provide opportunities for deepening learning through the peer-peer discussion and exchange of ideas, while also reinforcing teamwork skills. The individual portion counts for 70% and the cooperative portion counts for 30%. N.B. Individuals can only improve their scores by participating in the group portion, i.e., you will not be penalized for performing better on the individual portion than on the cooperative portion. As this format may be new to students, the exam format and grading breakdown will also be discussed in class to ensure that everyone understands how they are being assessed.

6. Final Group Project: Students will work in small groups to complete final projects (in lieu of a final exam). Your group will ask an applied conservation question that requires the use of evolutionary principles to answer. Details of this project will be provided in a separate handout (on Moodle) and will build on concepts, exercises and discussions used throughout the semester. The purpose of this assignment is for students to use the concepts and skills built throughout the semester to a real world conservation context. The project will be broken down into sub-assignments; feedback and grading will be based on the rubric (on Moodle). **Students MUST be present for the final presentation to receive credit.**

7. Evolution Current Event: Students will have the opportunity to give a short (~5 min) presentation on a new article, controversy or other current event relating to evolution. Details on the rubric, etc. will be explained in class and a sign-up sheet will be posted to spread out presentations over the course of the semester.

Final grade percentages will be converted to course letter grades as follows:
93.0-100%=A, 90.0-92.99%=A-, 87.0-89.99%=B+, 83.0-86.99%=B, 80.0-82.99%=B-, 77.0-79.99%=C+, 73.0-76.99%=C, 70.0-72.99=C-,67.0-69.99%=D+, 60.0-66.99%=D, 0-59.99%=F

Additional suggestions for student success in this course:

1. **Attend class!** This time by design involves activities and discussions that will deepen your comprehension by engaging with other students and reflecting on readings/lectures.
2. **Come to office hours!** We purposely set aside this time for the sole purpose of helping students to improve their understanding and performance in the course. We genuinely want to help! If you cannot make the designated time, please email me or the TA to make an appointment.
3. **Study actively,** not passively (in and out of class). Passive studying is reading over notes and the text. Active studying involves explaining concepts to other students or drawing graphs and diagrams to contextualize your learning.
4. **Engage with other students.** This can be through the Moodle forum and working with your groups in and out of class. Explaining concepts to others can useful in reinforcing your own understanding (see #2). In the event that you don't understand a concept, your classmates can help you.
5. **Focus on graphs**. Visualizations provide a wonderful summary of information and are critical for communicating science. Practice translating text into graphical form and vice versa. Use graphs and other visualizations to explain concepts in your groups-this will not only hone your abilities to effectively communicate, but also help you remember the key take home messages of each topic.

Course Policies

Academic Honesty: Students are expected to conduct your own work in an honest and ethical manner. Dishonest activity will not be tolerated (see the UMass Honesty Policy).

Email Inquiries: I strongly encourage students to take advantage of office hours for questions on material and activities. These hours are dedicated to helping you, and I look forward to meeting students personally. Attending office hours may also be more efficient than emailing me with questions. I *may* answer emails during office hours, but I will prioritize meeting with students who are attending the office hours in person. If you do send an email, please include "NRC390E: XX" in the email subject line to ensure it does not slip by me.

I will do my best to respond to emails within 48 hours, but the sheer volume of email I receive can make it difficult to respond promptly. Please plan ahead and do not email questions the night before an exam or assignment deadline, it is extremely likely you will not get a response in time. If you email me a question that is answered by the syllabus or information provided on Moodle I will likely direct you there, so please check those resources and your classmates first.

Absences & Makeups: Student performance is highly correlated with attendance and engagement in class, especially in courses with active and group learning environments. Attendance is also really important in order for us to have fun, dynamic group discussions and lab activities. **Thus, it is expected that students will attend all lectures and labs**. However, I believe that students are in charge of their own learning and do not explicitly take attendance. Please note that makeups will only be given for missed class work for excused absences, as per the UMass policy, and students must be present to receive credit for any group work turned in[1]. Additionally, some activities are not easily completed as makeups (e.g., discussions), so in the event of an excused absence I will assign an alternate assignment (e.g., write-up).

Deadlines: I commit to clear and early communication of deadlines to give students ample time to complete all graded work in this course. If something changes that affects the entire, or a large portion of the class I will adjust deadlines accordingly (e.g., snow days, activity that goes over time, etc.). **I sincerely want to every student to do well in this course!** In return, I expect students to work to meet these deadlines. In most cases, late assignments cannot be accepted due to their nature and to be equitable to other students in the course (e.g., homework assignments that are due prior to the in-class quiz). Occasional situations arise where late assignments are accepted with a penalty that will be communicated in class and via Moodle.

Cell Phone & Other 'Device' Use: Out of respect for your classmates, instructors and yourself, when you come to class **please be present**. There are a litany of studies demonstrating how 'multi-tasking' is detrimental to your ability to absorb material, critically think and solve problems-basically it erodes your capacity for learning and quality of your work.

We will use computers for activities, note-taking etc., but use should be limited to activities related to the class tasks at hand. Please refrain from using cell phones in class. If use is blatantly distracting and disruptive to the learning of others or the instructor, one warning will be given before grading penalties are assigned. *Seriously, we are all adults, and this creates a really uncomfortable situation for everyone involved. Please just be good citizens so we never even need to go here!* [1]

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[1] These policies are in place to facilitate supportive learning environment, while also providing an equal educational opportunity for all students. If you have a disability that will pose challenges to these policies, please meet with me and/or visit UMass Disability Services to make appropriate accommodations. Also, this policy is not including situations where a student needs to keep a phone on for urgent personal needs (e.g., parents that need to be accessible for calls from child caretakers); if this occurs and you need to take an urgent call, please just let me know and/or step outside the classroom.