

Ecophysiology

University of Massachusetts Amherst, Dept of Environmental Conservation
Fall 2021 | NRC 597EP (3 Credits)

Instructor

Dr. Lisa Komoroske

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Office hours: MW 12:30pm-1:30pm and by appointment (*N.B. Office hours will be held according to University COVID policies; at the start of the semester this includes in person with proper masking, etc. but may change depending on evolving conditions. Alternatively, zoom appts are always an option-please reach out and we will set something up*).

Teaching Assistant:

Jamie Stoll

Office hours: By appointment

Email: jstoll@umass.edu

Course Information

Webpage: On Moodle

Time/place: MW 11:15am-12:30pm

Course Description: All organisms must cope with a variety of natural and anthropogenic challenges in order to survive, grow, and ultimately reproduce. Physical conditions and biotic interactions vary immensely across habitats, and organisms must possess the appropriate suite of physiological adaptations for success. Understanding the mechanisms and traits that permit organisms to cope with various conditions can provide great insights into eco-evolutionary processes, comparative physiology, and behavior. In NRC 597EP, we will study physiological systems and principles that are broadly used across taxa, as well as highlight some unique adaptations used by very specialized groups. Our focus will primarily be in animal systems, with some elements of others when possible (e.g., plants and bacteria). In each topical section, we will also discuss case studies that exemplify how ecophysiology is relevant in conservation contexts, and how it can be integrated into management effectively. Readings will include those drawn from textbooks, peer-reviewed scientific literature, and a variety of other topical materials.

Overall Learning Goals: *

- 1) Understand key principles, terminology and concepts in ecophysiology/environmental physiology
 - Via: readings, discussion, lectures and assignments
 - 2) Gain abilities to apply content knowledge in real-world contexts
 - Via: active participation in lectures and discussions of conservation physiology applications
 - 3) Improve skills in evaluating scientific literature, writing and peer-review process
 - Via: peer-reviewed literature readings and discussions, final paper development and feedback
 - 4) Gain exposure to and knowledge of current ecophysiology research at UMass and beyond
 - Via: peer-reviewed literature readings and discussions, active participation in guest lectures
- *Specific content and skill learning goals for each unit will be also introduced with each unit*

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 perspectives and learning approaches. 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.

Disability Statement: Your success in this class is important to me. 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 can be elected in SPIRE and/or in class 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 Materials:

- There is no required textbook. Readings will come from the primary literature, textbook sections, and other digital resources made available on Moodle.
- Some required readings will come from various textbooks (specific sections uploaded to moodle). However, since we don't have time to cover everything in this course, these textbooks are also recommended as supplemental readings for those interested in further learning on these topics and are available through the UMass/Five College library resources.
 1. Environmental Physiology of Animals, 2nd edition by Willmer, Stone & Johnston. Blackwell Publishing, 2005.
 2. Principles of Animal Physiology, 3rd edition by Moyes and Schulte. Benjamin Cummings, 2008. (1st and 2nd editions are also fine)
 3. Animal Physiology, 2nd edition by Hill, Wyse, and Anderson. Sinauer Publishers, 2008.

General Course Format:

Active Lectures & Discussions: Each week we will have active lectures on core topics (see schedule below), followed by either 1) peer-led scientific literature and conservation application discussions, 2) guest lectures by scientists at UMass who conduct research in the realm of the topic (generally on alternating weeks). Lectures will augment assigned readings to prepare students for the topic discussions and ongoing research on the final papers. Students will sign up to lead one paper discussion during the semester.

Readings: Each week's topic will have an associated assigned reading from the peer reviewed literature, selected text, and/or other resource. At the beginning of the semester we will spend time learning how to read and digest these different types of documents to ensure that all students have the tools for success, regardless of previous experience in other classes, internships, etc. Readings are due by Monday each week to assist with preparation for group discussions and activities during lectures.

Midterm Exam: We will have one exam midway through the semester to assess content and synthesis knowledge.

Final Research Paper: In lieu of a final exam, students will select a topic of their interest within ecophysiology and conservation and write a term paper. A more thorough description will be posted in Moodle and discussed in class.

Tentative Class Schedule: (Detailed schedule with assignment deadlines will be posted and updated on Moodle)
This schedule is subject to change based on weather and other external forces (i.e., guest expert schedules).

Corresponding readings and/or assignments for each week will be posted on Moodle.

<u>Week of</u>	<u>Week No.</u>	<u>Day</u>	<u>Date</u>	<u>Unit Topic</u>
Part I: Foundational Principles				
Aug 30th	1	W	Sept 1st	Introduction to Ecophysiology
Sept 6th	2	M	Sept 6th	<i>(University holiday-no class)</i>
		W	Sept 8th	Foundational Concepts
Part II: Central Issues in Ecological Physiology				
Sept 13th	3	M	Sept 13th	Temperature & Thermoregulation
		W	Sept 15th	
Sept 20th	4	M	Sept 20th	Respiration and Circulation
		W	Sept 22nd	
Sept 27th	5	M	Sept 27th	Reproduction
		W	Sept 29th	
Oct 4th	6	M	Oct 4th	Energy Metabolism
		W	Ocr 6th	
Oct 11th	7	M	Oct 11th	<i>(University holiday-no class)</i>
		W	Oct 13th	Midterm Exam
Oct 18th	8	M	Oct 18th	Ion & Water Balance
		W	Oct 20th	
Oct 25th	9	M	Oct 25th	Immune function & disease
		W	Ocr 27th	
Nov 1st	10	M	Nov 1st	Control & homeostasis: Nervous, sensory & endocrine systems
		W	Nov 3rd	
Part III: Special Ecophysiological Adaptations				
Nov 8th	11	M	Nov 8th	Extreme living: highlight reel!
		W	Nov 10th	
Nov 15th	12	M	Nov 15th	Navigation & Migration
		W	Nov 17th	
Nov 22nd	13	M	Nov 22nd	<i>(No in person class, peer reviews due)</i>
		W	Nov 24th	<i>(University holiday-no class)</i>
Nov 29th	14	M	Nov 29th	Locomotion, Adhesion, & Performance
		W	Dec 1st	
Dec 6th	15	M	Dec 6th	<i>Final Papers</i>
		W	Dec 8th	

Course Assessment: Grades will be based on individual and group work throughout the semester. Specifically, emphasis is based on augmenting individual learning with group discussions.

Assignments & Grading:

Mid-term exam:	25%
Leading discussion:	10%
Discussion participation:	10%
Paper scoping:	5%
Rough draft:	10%
Peer review:	10%
Final paper:	30%

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

Graded assignments will be described in more detail in class and through handouts posted on Moodle.

Course Policies

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

Synchronous/Asynchronous Learning: This is a synchronous course, as per UMass policies Fall 2021 for in-person instruction (as of the start of the semester, subject to change if university policies change due to evolving COVID conditions). Attendance will not be taken, however I strongly encourage students to attend the in person class period to actively engage in lectures, discussions and activities to promote reaching learning goals. If you have concerns about or encounter challenges with attending in-person classes please contact me as soon as possible so we can discuss possible alternate solutions.

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 getting to know 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' (or have prescheduled zoom appts). If you do send an email, please include "NRC597EP: XX" in the email subject line to ensure it does not slip by me (if you initiate through Moodle, it should do this automatically). I will do my best to respond to emails within 48 hours, but the sheer volume of email I receive can sometimes make it difficult to respond promptly. Please plan ahead and do not email questions the night before an assignment deadline, it is likely you will not get a response in time. I am always happy to answer questions but 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 with your classmates first.

Technology: We are fortunate to have many tools to facilitate our learning. Please use laptops respectfully for taking notes or viewing course content. Otherwise, please do not use laptops or cell phones in a distracting manner. Please be considerate of your colleagues! This will not only facilitate your learning, but also help cultivate a connection with your classmates by allowing you to be 'present' with one another and focus on the course content.