Physiological Ecology, Fall 2025

BIOL 4030-001 (Lecture)

BIOL 4030-301 (Lab)

INSTRUCTOR: Ed Mager, PhD; Tel: 940-369-8392; E-mail: Edward.Mager@unt.edu

LECTURE HOURS AND LOCATION: MWF 9:00 AM to 9:50 AM; WH 213

LAB HOURS AND LOCATION: Fridays 11:00 AM to 1:50 PM; ENV 358

STUDENT HOURS AND LOCATION: Monday 10 AM to 11 AM or by appointment; ENV 310L or via Zoom

TEACHING ASSISTANT (TA): McKenzie Metzner; E-mail: please email through Canvas email feature only

TA STUDENT HOURS AND LOCATION: Wednesday 8 AM to 11 AM; ENV 279 or via Zoom

COURSE OBJECTIVES: Animals live within a diverse array of habitats, each characterized by its own physical, chemical and biological constraints varying in intensity, duration and periodicity. In this course, you will learn various ways in which animals have evolved to meet these challenges and thrive in the context of their natural environments (biotic and abiotic). Specifically, a survey of the physiological, behavioral and biochemical adaptations of animals to environmental factors, including temperature, oxygen, water, salinity, pH and toxic chemicals will be explored. By the end of this course, you should be able to:

- Demonstrate an understanding of the roles of size and scale in animal responses to the environment.
- Explain the significance of metabolism and aerobic scope for influencing animal physiology and ecology.
- Apply knowledge of physiology to analyze how animals are likely to respond to future environmental changes, such as those associated with global climate change.
- Propose solutions to environmental change based on applications of physiology at the ecological scale.
- Consider the societal responsibility in the use and regulation of anthropogenic chemical stressors.

WEBSITE: https://unt.instructure.com/login/ldap (Canvas) is the official web portal to this course. Please check this website regularly as it will contain updates to the syllabus, lecture slides, course announcements and potentially other files (e.g., supplementary videos). It is recommended that you go to the website before each lecture to access the PowerPoint files to use as note taking aids. Students are responsible for checking for announcements. It is highly recommended that you select notifications as 'on' in your Canvas settings.

RECOMMENDED TEXTS:

- Environmental Physiology of Animals, 2nd Edition (2005), Pat Willmer, Graham Stone and Ian Johnston. Blackwell Publishing.
- Animal Physiology: An Environmental Perspective (2020), Patrick Butler, J. Anne Brown, D. George Stephenson and John Speakman. Oxford University Press.
- Principles of Thermal Ecology, 1st Edition (2017), Andrew Clarke. Oxford University Press.
- Scaling: Why is Animal Size So Important?, 1st Edition (1984), Knut Schmidt-Nielsen. Cambridge University Press.
- Biochemical Adaptation, 1st Edition (2002), Peter Hochachka and George Somero. Oxford University Press.

- Physiological Diversity and Its Ecological Implications, 1st Edition (1999), John Spicer and Kevin Gaston. Blackwell Publishing.
- Animal Physiology, 5th Edition (1997), Knut Schmidt-Nielsen. Cambridge University Press.

GRADING: There will be three non-comprehensive exams during the semester (each worth 100 points). No exam grades will be dropped from the calculation of the final grade. All students will also be expected to give a presentation toward the end of the semester as described below. Final course grades will be assigned according to the point break down listed below:

	Points	% of Total
Exam 1	100	20
Exam 2	100	20
Exam 3	100	20
Presentation	75	15
Lab Reports	125	25
Totals	***500***	***100***

Letter Grade	Point Range
A	450 to 500
B	400 to 449
C	350 to 399
D	300 to 349
F	299 and below

PRESENTATIONS: Each PowerPoint presentation should be 20 minutes in length and will be followed by a question-and-answer session open to everyone. Topics for the presentation must first be pre-approved by the instructor. Depending on the number of students enrolled, students will likely have to present as groups of two or more.

Grading for Presentations: Grading of presentations will be determined using a standard rubric that will be provided to all students ahead of time. A grace period of +/- 2 minutes will be allowed for the presentation length without penalty (i.e., 18-22 minutes). Timing will be strictly enforced: 3 points will be deducted from the presentation grade (out of 75) for every 1-minute period entered under or over this time frame. For example, if a presentation only lasts 16.5 minutes (1.5 minutes under), 6 points will be deducted. Presentations will be graded as a group and each person within the group will be assigned the same points (out of 75).

Attendance for Presentations: To encourage continued attendance for the student presentations, attendance will be taken each day of the presentations. A 2-point penalty will be incurred for each day a student is absent or late to class (>2 minutes late) whereas a 1-point bonus will be awarded for each day that a student is present (not including their day of presentation).

LAB REPORTS: There will be 10 lab reports due in total, each worth 12.5 points (total 125 points). Reports must be submitted in the form of an abstract and any associated figures/tables (these will be specifically requested if required). Unless instructed otherwise, reports must be submitted via Canvas to the TA no later than the following Friday at 11 AM. Reports turned in late will receive deductions of 2.5 points for every 24 h period that the report is late. Although students may work in groups during the actual lab, the lab reports must be written and submitted individually by each student. The format of the abstract should strictly adhere to the following:

- Introductory statement(s) that highlights the impetus/reason for the experiment.
- Clearly stated purpose of the experiments.
- Very brief description/overview of the *relevant* methods.
- A clear description of all the results. This section should describe any key results, including the actual relevant data, and any trends in the data, even if separate figures/tables are required. This is generally the largest section of an abstract as it allows readers to assess your data for themselves.
- A short concluding statement or two. In best practice this will address the purpose that was outlined earlier in the abstract.
- Be concise! The abstract should not be more than 250 words, so it is often difficult to address all the points outlined. Nonetheless, that is the challenge. *It will be beneficial to read some peer-reviewed abstracts before attempting your own. Be cognizant of the structure.*

MAKE-UP EXAMS: Exams may only be missed under extenuating circumstances or university sanctioned events and must be accompanied by evidence of those circumstances. In these cases, student options for accounting for the missed exam are at the professor's discretion. If a make-up exam is an option, it must be arranged as soon as possible after the missed exam. Incompletes will only be assigned under extenuating circumstances when a student has a C average or above on the exams taken to date.

CHEATING AND PLAGARISM POLICY: All exams are to be taken independently. No student will be admitted twenty minutes after the start of an exam and no student may leave during the first thirty minutes of the exam. All notes and books should be stowed away during exams. In addition, all computers, phones, and other electronics must be turned off and stowed during the exam. Cheating in any form will not be tolerated. Cheating includes, but is not limited to, copying from another's exam, talking to others during the exam, using notes on the exam, or using a phone during the exam. Students caught cheating will receive a zero for that grade opportunity and a note will be placed in their permanent file. If caught cheating twice they will be permanently removed from the course. Plagiarism will also not be tolerated and will result in a zero grade and a note will be placed in the student's permanent file. *Note that the use of artificial intelligence (AI) is not permitted for any writing assignments. Use of AI in this regard will be considered academic misconduct and will be reported to the Academic Integrity Officer.* Please also review UNT's Policy 06.003 regarding student academic integrity at: https://policy.unt.edu/policy/06-003.

ATTENDANCE: It is difficult to obtain all the information presented in lectures unless you get it "firsthand." Lectures may deviate from the textbook and from material made available on Canvas as seen fit by your instructor. I cannot stress enough the importance of attending class, paying attention, and taking notes. Students are expected to attend class meetings regularly and to abide by the attendance policy established for the course. It is important that you communicate with the professor and the TA (if missing a lab) prior to being absent, so you, the professor, and the TA can discuss and mitigate the impact of the absence on your attainment of course learning goals.

Lab Attendance: any student that misses a lab, or is late by more than 10 minutes, will receive a zero for their lab report for that day.

TECHNICAL ASSISTANCE: A Student Help Desk is available that you can contact for help with Canvas or other technology issues.
UIT Help Desk: UIT Student Help Desk site (http://www.unt.edu/helpdesk/index.htm)

Email: helpdesk@unt.edu
Phone: 940-565-2324
In Person: Sage Hall, Room 130; Walk-In Availability: 8am-9pm
Telephone Availability:

- Sunday: noon-midnight
- Monday-Thursday: 8am-midnight
- Friday: 8am-8pm
- Saturday: 9am-5pm

Laptop Checkout: 8am-7pm
For additional support, visit Canvas Technical Help (https://community.canvaslms.com/docs/DOC-10554-4212710328)

ETIQUETTE: We need to work together to ensure a high-quality teaching and learning environment. Disruptive and inconsiderate activities negatively affect the entire class and include talking, coming in late, leaving class for non-essential reasons, using cell phones, and general inattentive behavior. Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply to all instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. Visit UNT's Code of Student Conduct (https://deanofstudents.unt.edu/conduct) to learn more.

OFFICE HOURS: Please contact me if you have any difficulties or need further explanation of the material. Feel free to drop by during office hours (see top of document) or contact me to schedule a time to meet in person or over Zoom. **Please take advantage of my office hours - I am here to help you learn!**

ADA POLICY: UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website (https://disability.unt.edu/).

EMERGENCY NOTIFICATION & PROCEDURES: UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.

Lecture and Lab Schedule

Note: *Schedule subject to change without prior notice; Chapters listed are for Willmer et al. Additional recommended readings will be provided on Canvas weekly.*

Week	Lecture	Day	Lecture Topic	Chapter(s)	Lab #	Lab
1	1	Aug. 18	Introduction	1		
	2	Aug. 20	General Responses to Environmental Change	1		
	3	Aug. 22	Metabolism	6		No lab
2	4	Aug. 25	Metabolism	6		
	5	Aug. 27	Metabolism	6		
	6	Aug. 29	Size & Scale	3		Introduction
3		Sep. 1	Labor Day (no class)			
	7	Sep. 3	Size & Scale	3		
	8	Sep. 5	Temperature	8	1	Scaling of MR
4	9	Sep. 8	Temperature	8		
	10	Sep. 10	Temperature	8		
		Sep. 12	TBD/Review		2	Temp Effects on MR & Ventilation
5		Sep. 15	Exam 1			
	11	Sep. 17	Temperature	8		
	12	Sep. 19	Temperature	8	3	Thermal Tolerance
6	13	Sep. 22	Temperature	8		
	14	Sep. 24	Temperature	8		
	15	Sep. 26	Temperature	8	4	Epigenetics of Thermal Tolerance
7	16	Sep. 29	Aquatic Respiration	7		
	17	Oct. 1	Aquatic Respiration	7		
	18	Oct. 3	Aquatic Respiration	7	5	O2/CO2 Effects on Ventilation
8	19	Oct. 6	Anoxia	7		
		Oct. 8	TBD/Review			

		Oct. 10	Exam 2		6	Temp Effects on Behavior
9	20	Oct. 13	Aquatic Water & Osmotic Balance	11, 12, 13		
	21	Oct. 15	Aquatic Water & Osmotic Balance	11, 12, 13		
	22	Oct. 17	Aquatic Water & Osmotic Balance	11, 12, 13	7	Osmoconform vs. Osmoreg
10	23	Oct. 20	Aquatic Acid-Base Balance	11, 12, 13		
	24	Oct. 22	Aquatic Nitrogenous Waste Excretion	11, 12, 13		
	25	Oct. 24	Aquatic Locomotion	11, 12, 13	8	pH and Ammonia Toxicity
11	26	Oct. 27	Aquatic Locomotion	11, 12, 13		
	27	Oct. 29	Reproduction and Development	11, 12, 13		
	28	Oct. 31	Reproduction and Development/ Anthropogenic Stressors	11, 12, 13	9	Daphnid Predator Cue
12	29	Nov. 3	Anthropogenic Stressors	11, 12, 13		
		Nov. 5	Presentation & Library Tips/Review			
		Nov. 7	Exam 3		10	Toxicity Bioassay
13		Nov. 10	Student Presentations	Provided by students		
		Nov. 12	Student Presentations	Provided by students		
		Nov. 14	Student Presentations	Provided by students		No lab
14		Nov. 17	Student Presentations	Provided by students		
		Nov. 19	Student Presentations	Provided by students		
		Nov. 21	Student Presentations	Provided by students		No lab
15		Nov. 24	Thanksgiving Break (no class)			
		Nov. 26	Thanksgiving Break (no class)			
		Dec. 28	Thanksgiving Break (no class)			No lab
16		Dec. 1	Student Presentations	Provided by students		

		Dec. 3	Student Presentations	Provided by students		
		Dec. 5	Reading Day (no class)			No lab
17			No Final Exam			

PLEASE NOTE: NOVEMBER 7 IS THE LAST DAY TO WITHDRAW FROM THE COURSE WITH A GRADE OF W.