

Course syllabus: BIOL 455 ZOOPHYSIOLOGY, Fall 2006

Instructor:

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Office hours:

Mon 12-1, Tues & Thurs 9-10
or just drop by

General Course Information:

Prerequisites: BIOL112, 220, CHEM 362, or permission
Credits: 5
Class meets: M, W, F 10:00-10:50, Science Rm 240
Lab: Wednesday, 1:00-4:50, Science Rm 228

Text and Reading Materials:

Required text:

- Hill, Wyse, and Anderson, 2004. Animal Physiology. Sinauer Associates, Inc. ISBN: 0-87893-315-8
- Laboratory activity handouts will be distributed in class.

Course objectives:

This course in Zoophysiology, or Animal Physiology, is an in-depth study of how animals function. Our approach will be to consider the physiological adaptations of animals in relation to the environments in which they live. This will include fascinating examples of species that live in extremely harsh environments. Although this is largely a course in vertebrate physiology, I will bring in interesting examples from the invertebrates, especially when they nicely illustrate an important concept.

I like to think that this is a course that integrates the seemingly disparate subjects you have studied already. You will apply your knowledge of physics, chemistry, and molecular biology to understand physiological responses of animals, and even begin to explore how these factors influence animal ecology. You will also have the opportunity to follow your interests and perform a physiological experiment of your own design.

General Course Topics

We will generally follow Wise *et al.* but with some additions and deletions

- Fundamentals of Physiology
- Food, Energy, and Temperature
- Integrating systems (especially the nervous system)
- Muscles and movement
- Oxygen, carbon dioxide, internal transport
- Water, salts, and excretion

Course Objectives/Outcomes:

1. Learn the major processes and concepts in physiology:
 - a. Apply physical and chemical concepts (e.g. osmosis, diffusion, gravity) to how living animals function.
 - b. Explain the concept of homeostasis and its maintenance by feedback control mechanisms.
 - c. Describe various physiological processes that control nerve function, movement, circulation, water balance, respiration, and thermoregulation.
 - d. Differentiate between the different time frames over which physiology changes in species and individuals.
 - e. Describe the physiological problems animals face, how those problems vary in relation to the animals' environments, and how animals solve their physiological problems.
2. Practice asking relevant scientific (physiological) questions
 - a. Develop hypotheses and predictions
 - b. Design experiments or observations to test these predictions
 - c. Analyze and interpret data to evaluate hypotheses
 - d. Present your findings in correct scientific format
3. Develop laboratory skills in physiology, including:
 - a. Monitoring and measuring physiological processes such as muscle contraction, nerve conduction, metabolism, and heart rate
 - b. Analyzing data and keeping detailed laboratory notes
 - c. Patience, attention to detail, working in an organized fashion, decision-making, critical thinking, cooperation

Course Structure:

1. Class periods: 3/week. Class time will include lectures, discussions, and other activities. Three exams (two midterms plus a final) will require primarily short answer, definitions/explanations, problem solving, and short essays.
2. Labs: 1/week. Lab notebook will contain all calculations, notes on procedures, and answers to questions. A research project will be completed for lab during the quarter (below).
4. Research Project: Groups of students design their own projects and gather data to test a physiological hypothesis. Each group will gather and analyze data together, then each person writes his/her own research paper (in the format of the research journal *Physiological and Biochemical Zoology*) to turn in at the end of the quarter.

Interaction and Assistance:

This course is demanding, but also very rewarding if you keep up with the work. I encourage you to learn from one another, as well as from me. Also, please feel free to stop by during office hours to talk about the course, especially if you are having difficulty. For specific questions or clarification of lecture or lab material, an easy way to reach me is by e-mail.

Special Assistance:

If you have any condition that requires special attention or facilities, please contact me. I will be happy to make arrangements.

Grading:

Class points:

<u>Activity/Assignment</u>	<u>Percent</u>
Exams:	
Midterm I	15
Midterm II	20
Final (Cumulative)	25
Lecture quizzes	<u>5</u>
Lecture subtotal:	65
Lab:	
Assignments	15
Research project	<u>20</u>
Lab subtotal:	35
Total	100

Letter grades will be assigned according to the percent grade calculated by the evaluation scheme above. The tentative conversion is:

A = $\geq 93\%$	B+ = 86-88%	C+ = 77-79%	D+ = 67-69%
A- = 89-92%	B = 83-85%	C = 74-76%	D = 60-66%
	B- = 80-82%	C- = 70-73%	F = $\leq 59\%$

I reserve the right to adjust this conversion scheme but will do so only if absolutely necessary.

Course Policies:

- Students are expected to attend, come prepared for, and participate fully in each lecture and lab. Your preparation for class may be assessed by occasional quizzes from assigned material.
- Late assignments will receive a substantial penalty, typically 10% off per day. Make-up exams will be allowed only if arranged **in advance**, in cases of illness or other emergency. I follow university procedures (see the University Catalog or the Student Judicial Code) to determine legitimacy of reasons for absence, etc.
- No incompletes will be given except in cases of emergency.
- Academic honesty: The only true learning comes from hard work and self-motivation. No form of academic dishonesty (e.g. cheating on exams, plagiarizing) will be tolerated. This includes copying text word-for-word when writing, **even** if the source is cited. **All of your written work must be in your own words.**