

COMPARATIVE ANIMAL PHYSIOLOGY
Spring, 2008
BI 314

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Office hours: M – F, 8:30-10:30, and by appointment

Lecture (GMSL 103): Tuesday, Thursday @ 11:30am – 12:50pm

Laboratory (GMSL 103): Thursday @ 1:30 – 4:50pm

Textbook:

Hill, Wyse, & Anderson, *Animal Physiology*. Sinauer Associates, Sunderland, Massachusetts.

Please bring your copy of the textbook to lectures to follow along with figures I show in class.

One copy of this text is on reserve in the library. This is the first edition – there is also a second edition, but we'll use the first.

If you would like an alternative explanation of the material from that of your instructor and the course text, the following oldie-but-goodie is on reserve in the library:

Prosser, C.L. (1991) *Comparative animal physiology* (4th edition). New York: Wiley-Liss.

Volume 1. Environmental and metabolic animal physiology

Volume 2. Neural and integrative animal

Course Description and Objectives

This course explores how animals work. We will utilize your understanding of biology, chemistry, and physics as a springboard for discussing major topics in animal physiology at cell/molecular, tissue/organ, and whole animal levels of organization. Our discussions will address both invertebrates and vertebrates in a comparative context, focusing on how very different organisms accomplish similar tasks. The role of the environment in shaping physiological adaptations will provide a common theme throughout the course.

The course objectives are:

- to understand animal function from molecules to whole organisms in a comparative, ecological, and evolutionary context
- to develop skills in conducting physiological investigations in the laboratory
- to improve scientific writing skills through reading and synthesizing primary scientific literature, and writing laboratory summaries as both abbreviated reports and full scientific manuscripts

Course Organization

Expectations of me. My responsibility as an instructor is to prepare and deliver lectures and direct laboratory sessions that facilitate your learning the subject of comparative animal physiology. To further your learning, I am available to you during my office hours, after laboratory meetings, and by appointment to discuss course material and help clarify any physiology questions you may have. Please make time to see me if you have questions – I am here to help you learn, but it is your responsibility to seek my help when you need it.

Expectations of you.

Lecture: You are expected to attend all lecture sessions, having read the assigned reading prior to each period. Lectures are of primary importance for your success in the course and will cover material from the course textbook, as well as other sources, including other textbooks, the primary scientific literature, and my own experiences as a comparative physiologist. To get the most out of each lecture, you need to prepare by having reviewed your notes from the previous lecture and by having read the assigned material. As an extra incentive to attend class and keep up with your notes and the course reading, we will periodically have lecture quizzes to test your knowledge of lecture material.

Labs: Come to all laboratory sessions. Many laboratory exercises are multi-week experiments, so missing a lab will impact your ability to conduct further labs. Please schedule any travel plans around our class time. In general, you may not make up labs. Come see me as early as possible in the event you need to miss a lab for extreme circumstances.

Cell phones and music. Please turn off all cell phones and personal music players prior to lecture, lab, and exams; they should remain off for the class period (**both lecture and lab**).

All assignments are due on time. You will be provided with ample time to complete all assignments for this course. Late assignments will not be accepted.

Hurricane Evacuation Plans. If, for any reason, Eckerd College is evacuated, students who leave campus for stays of overnight or longer should bring their texts, notes and syllabus so that you are ready to continue your course work. If this occurs, check your Eckerd e-mail from your off-campus location and continue with the course work as delivered via the Online Course Materials website.

Special Accommodations. If you have a disability or believe that you qualify for accommodations under the Americans with Disabilities Act or other laws, please contact Disability Support Services at extension 8248 or via email at dss@eckerd.edu. All information will be kept confidential. Appropriate accommodations can only be arranged through that office, and may not be made retroactively.

Eckerd College Honor Code. Academic dishonesty, as defined by Eckerd College, will result in failure in the course. It is your responsibility to make sure that all of your work is entirely your own and that your actions cannot be misinterpreted or misunderstood. If you are struggling in the course or an emergency arises, please come see me so that we can discuss options.

The EC Honor Code will be upheld in this course. The honor code states, "On my honor, as an Eckerd College student, I pledge not to lie, cheat, or steal, nor to tolerate these behaviors in others." You will be expected to write "pledge" with your signature on every assignment.

Grading. Your grade will be determined based on 3 exams and various quizzes, assignments and lab reports. There is no extra credit beyond these assignments, so do well on them.

Each exam may consist of a mixture of multiple choice, true-false, matching, fill-in-the-blank, diagram, and short answer questions, as well as synthetic essay questions in which you will be expected to write deep, thoughtful, responses that show an understanding of the material and its broader context. The third exam will be cumulative, and must be taken during the specified time slot of finals week – no exceptions. Exams cannot be taken in advance or after exams have been administered. Make-up exams will only be allowed under extreme circumstances.

Exams (100 pt x3)	= 300 (46%)
Lecture quizzes	= 50 (8%)
Osmoregulation manuscript	= 80 (12%)
Blood respiratory pigment lab	= 40 (6%)
Dive reflex lab	= 20 (3%)
Metabolism lab	= 60 (9%)
Research project	= 100 (16%)
<i>TOTAL</i>	<i>= 650 points possible</i>

General Lab Information:

Please try not to schedule work or other activities directly after laboratory. Some laboratory experiments may require an additional *few* minutes to complete and you will be missing summaries and important data if you have to "run out of lab" before it is over.

Lab Notebook. I do not require you to turn in a formal laboratory notebook, but you should come to the first lab session with some type of bound notebook in which you will keep all your protocols, lab notes, data, and calculations for the semester. It is best to have separate notebooks for lab and lecture. Chances are your lab notebook will get wet and/or be in contact with chemicals and animals. Write in your notebook with something that will not run if it gets wet -- pencil or indelible ink. All data, standard curves, procedures and protocols that you write should be pasted into the notebook so that you have a record of each experiment. The notes in your notebook should contain enough detail that you could go back and repeat your experiments without errors the following weeks – and you may in fact do this during your research projects!

Lab Rules.

1. Read, sign, and return the Biology lab rules sheet during our first lab meeting.
2. Leave the lab exactly as you found it upon your arrival. Clean all glassware, chambers, or other materials you used during the lab and return them to their proper place. Report anything broken or missing.
3. It will be necessary to leave materials in the lab (e.g., samples in the freezer). Please make sure to label anything that you do not want thrown out, or otherwise disturbed, with your name and the date. Refrigerators, incubators, and lab surfaces will be purged regularly. Respect others by not disturbing anything that is properly labeled.
4. For safety reasons, you may not eat, drink, or smoke in the lab. You must wear shoes.
5. All hazardous waste must be disposed of properly: **sharps** must be disposed of in the sharps box, **needles and syringes** must be put in the needle disposal container, hazardous materials such as **chemicals and body fluids** must be placed in plastic bags and disposed of immediately. No chemicals or solutions should go down the drain. You must report **mercury spills** to me, receive instructions on how to clean them up completely, and store the waste in the fume hood in the lab. **If you have any questions about waste disposal, please ask.**
6. Reading materials in the lab stay in the lab at all times, except for photocopying. If you remove something for photocopying, you must sign it out first and bring it back immediately.
7. You are responsible for informing anyone you bring into the lab with you of lab rules.

Date	Lecture/Lab Topic	Readings/Assignments Due
Week 1		
T, Jan. 27	Homeostasis, Salt & Water Basics	Ch. 1, 2, 3
Th, Jan. 29	NO CLASS NO LAB – find osmoregulation literature on your species	
Week 2		
T, Feb. 3	Salt & water balance I	Ch. 25
Th, Feb. 5	Salt & water balance II Lab: <i>Osmoregulation – day 1</i>	Ch. 25, 26
Week 3		
T, Feb. 10	Salt & water balance III	Ch. 27; Quiz
Th, Feb. 12	Excretion I Lab: <i>Osmoregulation – day 2</i>	Ch. 27
Week 4		
T, Feb. 17	Excretion II	Ch. 27
Th, Feb. 19	EXAM I NO LAB – work on manuscripts	
Week 5		
T, Feb. 24	NO CLASS – work on manuscripts	
Th, Feb. 26	Gas exchange I Lab: <i>Blood Respiratory Pigments – day 1</i>	Ch. 20, 21 Osmo. manuscript due
Week 6		
T, Mar. 3	Gas exchange II	Ch. 21, 22
Th, Mar. 5	Gas exchange III Lab: <i>Blood Respiratory Pigments – day 2</i>	Ch. 22; Quiz
Week 7		
T, Mar. 10	Circulation I	Ch. 23
Th, Mar. 12	Circulation II Lab: <i>Dive reflex in comparative physiologists</i>	Ch. 23 BRP lab due

<u>Date</u>	<u>Lecture/Lab Topic</u>	<u>Readings/Assignments Due</u>
Week 8		
T, Mar. 17	NO CLASS – Spring Break	
Th, Mar. 19	NO CLASS – Spring Break NO LAB – Spring Break	
Week 9		
T, Mar. 24	Metabolism I	Ch. 4 Dive reflex lab due
Th, Mar. 26	Metabolism II Lab: <i>Metabolism – day 1</i>	Ch. 5, 6; Quiz
Week 10		
T, Mar. 31	Metabolism III	Ch. 7
Th, Apr. 2	EXAM II Lab: <i>Metabolism – day 2</i>	
Week 11		
T, Apr. 7	Thermal relations I	Ch. 8
Th, Apr. 9	Thermal relations II Lab: <i>Metabolism – day 3</i>	Ch. 8
Week 12		
T, Apr. 14	Neurons I	Ch. 10, 11; Quiz
Th, Apr. 16	Neurons II Lab: <i>Orientation</i>	Ch. 11, 12 Metabolism lab due
Week 13		
T, Apr. 21	Sensory systems I	Ch. 13 Research proposal due
Th, Apr. 23	Sensory systems II Lab: <i>Research Projects – day 1</i>	Ch. 13; Quiz
Week 14		
T, Apr. 28	Muscles I	Ch. 17
Th, Apr. 30	Muscles II Lab: <i>Research Projects – day 2</i>	Ch. 18

Date	Lecture/Lab Topic	Readings/Assignments Due
Week 15		
T, May 5	Muscles III	Ch. 18
Th, May 7	Review and Synthesis	Research project abstract due
	Lab: <i>Research Project Symposium</i>	
Finals Week		
M, May 11	FINAL EXAM (cumulative)	3 – 6 PM