

Forest & Wildlife Ecology 401 Physiological Animal Ecology Fall 2015

Organization of Course

1. Instructor

Bill Karasov

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Office hours in A145 or nearby in A139: M 11; T 11; W 3:30; Th 3:30
(each period = 50 min)

2. Course Goals

This course is concerned with physiological function of wild vertebrates--primarily birds, mammals, reptiles, and amphibians. Physiological ecology focuses on interactions between animals and their environments, and relationships between animal physiology and the ecology and dynamics of populations of animals. We will discuss the physiology and energetics of major life processes such as respiration, growth, storage, and reproduction and the physiological features of animals that permit them to live in different environments. The course includes discussion of principles, methods of study, research results, and significance and relevance to wildlife ecology and management.

3. Course Structure - The course is organized to encourage thinking and learning from lectures, readings, discussion, analytical writing, and computations (periodic problem sets).

Lectures - Every Tuesday and Thursday morning a lecture is presented

Discussion Sections - On either Wednesday or Thursday afternoon you participate in a Discussion

section. Activities vary from week to week (see detailed schedule).

- (i) Some meetings are centered around problem sets. The problem sets are handed in for credit.
- (ii) Some meetings are discussions centered around readings or other material that complement the lectures. These materials will be placed on the course web page. To guide your preparation for the discussions, use the list of questions handed out for some discussions. You are responsible on examinations for material covered in these discussions
- (iii) Three meetings are midterm examinations

Reading assignments – Pages in the textbook *Animal Physiology*, 3rd edition (2012) by Hill, R.W., G.A. Wyse, and M. Anderson, Sinauer Associates, Inc., Sunderland, Massachusetts are assigned for many lectures. The course schedule has these reading assignments. A few other required readings are also assigned, from *Physiological Ecology: How Animals Process Energy, Nutrients, and Toxins* [2007] by Karasov, W.H. & Martinez del Rio, C., Princeton University Press. Check for copies of these books on Reserve at Steenbock Library.

Writing assignments - The first writing assignment is a review of a research proposal, due at Discussion section Sept. 30/Oct. 1. Undergraduates will work on this in a small group (3-4 students); graduate students will work alone. There is a separate handout explaining this assignment.

The second writing assignment will be a research proposal on a topic of your choice, due by Sun. Dec. 13. Undergraduates will work on this in a small group (3-4 students); graduate

students will alone. The proposal is an exercise in picking a problem and designing an attack on it. There are several steps leading up to your submission:

- (1) Your group will give a short oral presentation about your proposal in Discussion section Nov. 11/12. There is separate material handed out about this assignment, and your presentation is graded.
- (2) If your group turns in the written proposal early, by Sunday Nov. 22, it will be evaluated and returned to your group with a grade by Tuesday Dec. 1. If you choose, you can turn in a revision of the proposal that addresses the critique, and your grade may be improved.
- (3) The deadline for turning in revisions is Sunday Dec. 13.

Exams and Grading - There will be three midterm examinations, each worth 130 points, plus a cumulative final exam worth 170 points. Exams could include multiple-choice, true/false, shortanswer questions, calculations, and essay questions. (Previous examinations will be made available, so you can see what they are like). Bring to the exams your course notes, which you can use on most calculation problems, and a scientific calculator that can perform logarithmic and power transformations. Synthesis problems may be given to you to work on at home.

IF YOU REQUIRE SPECIAL ACCOMMODATIONS (E.G., WITH SPECIAL NEEDS, OR KNOWN SCHEDULING CONFLICTS) SPEAK WITH YOUR INSTRUCTOR(S) SOON AFTER THE COURSE BEGINS

Grades in the course will be calculated approximately as follows:		Based on performance of other classes in the past few years, an average score is 732 points. Approximate points necessary for each grade are:
Problem sets	140	For A, > 860 points
Proposal Review	20	For AB, >800 points
Group Proposal – oral presentation	40	For B, > 740 points
Group Proposal – written	200	For BC, > 680 points
Synthesis problem(s) (take-home)	40	For C, >570 points
Midterm exams (3 @ 130 each)		
+1 final exam @ 170	560	
Total	1000	

Note on academic honesty and misconduct:

- (1) During preparation of your problem sets and proposals you are free to discuss the material with other students. The problem sets you turn in on your own, and the proposal should be written by your group alone. You must properly cite sources and must not plagiarize. Consult this web site at The UW Writing Center for more information on citing sources and avoiding plagiarism:<http://writing.wisc.edu/Handbook/Documentation.html>
- (2) Work turned in for examinations, either in class or take-home, must be solely your own. You must not discuss this material with other students or examine the work of others

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Sequence of lectures, discussions, and examinations/may be modified

#	Date	Lectures Topic	Reading 3 rd edition	#	Date	Discussions Topic	Assign #	Reading
1	R.9/3	Aerobic metabolism	Ch 7	1	9/2&3	Allometry	1	<i>The Importance of Size</i>
2	T9/8	Aerobic/anaerobic metabolism	pp. 183-200 (Ch 8), pp. 536-539 (Ch 20)	2	9/9&10	Allometry/Activity	2	<i>Doubly labeled water method</i>
3	R.9-10	Anaerobic metabolism						
4	T9/15	Activity energetics	Ch 9	3	9/16&17	Oxygen delivery in divers	3	Ch 26 in text (diving)
5	R.9-17	Activity energetics						
6	T9-22	Oxygen delivery / Adjustment to altitude	Ch 22; pp. 583-590, 597-608 (Ch23); pp. 617-639 (Ch24); Box 8.3 (p. 204)	4	9/23&24	Heat Exchange & Heat Budgets	4	
7	R.9-24	Thermal physiology and climate change	Box 10.1 (pp. 228-229)					
8	T9-29	Poikilothermy	Ch 10	5	9/30 & 10-1	Primer on research	5	Proposal review due
9	R.10-1	Poikilotherms and adjustment to low temperature						
10	T10-6-	Homeothermy in mammals & birds	Ch 10	6	Thursday 10-8 (all students)	EXAM I		
11	R.10-8	Homeothermy and adjustment to high temperature	Ch 10					
12	T10-13	Homeothermy and adjustment to low temperature	Ch 11	7	10-14&15	Digestive Efficiency	6	
13	R.10-15	Chemical Ecology of Food	Ch 6					
14	T10-20	Digestion	Ch 6					

#	Date	Lectures	Reading	#	Date	Discussions	Assign	Reading
15	R10-22	Digestion	3 rd edition Ch 6	8	10-21&22	Topic Energy budgets including	7	
16	T10-27	Digestion	Ch 6					
17	R10-29	Post-absorptive nutrient processing	pp. 170-172, 180-181 (Ch 7); pp. 436-439 (Ch 16); pp. 782-785 (Ch 29)	9	10-22&29	Isotopic Ecology	8	
18	T11-3	Post-absorptive nutrient processing	<i>Postabsorptive processing of nutrients</i>					
19	R11-5	Post-absorptive toxin processing	<i>How animals deal with poisons and pollutants</i>	10	Thursday 11-5 (all students)	EXAM 2		
20	T11-10	Post-absorptive toxin processing/Water relations						
21	R11-12	Water relations	Ch 27, 28, 29, 30	11	11-11&12	STUDENT PRESENTATIONS	Handout #9	
22	T11-17	Water relations	pp. 737-751 (Ch 28); pp. 439-442 (Ch 16)					
23	R11-19	Regulation/Control Reproduction	pp. 462-466 (Ch 17) pp. 410-416 (Ch 15)	12	11-18&19	Water relations	Collect #9	
24	T11-24	Avian Reproduction						
	R11-26	THANKSGIVING	RECESS		11-25-26	RECESS		
25	T12-1	Finish Regulation/Control Reproduction; begin Mammalian Reproduction	pp. 468-481 (Ch 17)		12/2&3			
26	R12-3	Mammalian Reproduction		13		Reproductive energetics	10	
27	T12-8	Physiology of eggs						
28	R12-10	Growth		14	Thursday 12/1All students	EXAM 3		
	Sun 12-13					Research proposal is due		
29	T12-15	Growth	Last day of lecture Last day of classes					
	12/22	CUMULATIVE	FINAL EXAM		Dec. 22, 2015	2:45 – 4:45 pm		