BIOL 4446: ANIMAL PHYSIOLOGY
Fall 2015

Faculty: Dr. David W. Garton
313 Cherry Emerson (Biology) Building
tel: 404-385-1039 email: david.garton@biology.gatech.edu

Description: An introduction to the fundamentals of animal physiology, including basic principles of homeostasis at cellular, tissue and organismal levels. This course includes a survey of basic comparative physiological mechanisms, but focus is primarily on normal functions of vertebrate/mammalian organ systems.

Textbook: Randall, David, Warren Burggren and Kathleen French. *Eckart Animal Physiology: Mechanisms and Adaptations*. 5th Edition, W.H. Freeman.

Lectures: Attending lecture is **expected**. The lectures and readings are complementary and some material not in the text will be presented only in lecture (and *vice versa*). Lecture exams will be based on topics and material presented in class and in the assigned readings. As a courtesy to your fellow students, **please turn your cell phones, PDAs and laptops off while in lecture.**

Readings: Please complete each reading assignment as specified in the syllabus before coming to class.

Grading:

In-class exams:	40% (4 @ 10% each)
Final exam (comprehensive):	30%
Class assignments:	30% (3 @ 10% each)

There will be four 'midterm exams' during the semester, each worth 10% of your final grade. Format will include multiple choice, short answer and problem sets, and these exams are designed to help you prepare for the comprehensive final exam worth 30% (***wow***) of your final grade. The other 30% of your final grade will be 'outside class assignments,' which will be on varied topics and involve preparing a short, written report based on current literature, accompanied by a single powerpoint slide summarizing your review. Exceptional ppt slides will be selected for in-class presentation (earning bonus points!). The topics and presentation dates are listed in the syllabus (below). Each assignment is due via electronic submission to your T-Square "Drop Box" **one week** in advance of the "special topic" class. As a reminder, these are individual assignments and you are bound by Georgia Tech's Honor Code not to collaborate nor plagiarize. **Violation of the Honor Code can result in enforced withdrawal from the course with a failing grade.**

Absences: Students are expected to attend class. Missed exams or other assignments can be completed at a later date ('make-up') only with an excused absence. Excused absences include medical emergencies (with a signed note from the attending physician or health care provider), family emergencies requiring your presence, or an institute sanctioned event (e.g. athlete participating in a competition). **Make-up of missed exams or assignments will not be permitted for non-excused absences, and a grade of 0 (zero) will be entered for the missed exam or assignment.**

Date	*Topics*	*Chapters*
17 Aug	Introduction to Animal Physiology Central Themes & Concepts; Homeostasis	1
19 Aug	Review of Membranes, Osmosis & Ion Transport (Chapter 3 is assigned for review, you are responsible for the material in this chapter, too!)	4 (3)
21 Aug	Ion transport	4
24 Aug	Excitable Membranes: Nernst & Goldman Equations	5
26 Aug	Voltage-gated channels and the properties of action potentials	5
28Aug	Membrane, action and generator potentials	5
31 Aug	AP conduction within and between neurons	
2 Sep	Neurotransmitters: Production & Recycling	6
4 Sep	Intro to sensory systems: transduction	6
7 Sep	**Labor Day, No classes**	-
11 Sep	Sensory systems **Research Paper 1 Due (Topic: Neurotransmitters & Behavior)**	7
13 Sep	Special Topic In Class Presentations I	7
14 Sep	**Midterm Exam 1**	1,3,4,5,6
16 Sep	Sensory systems	7
18 Sep	Sensory systems	7
21 Sep	Sensory systems	7
23 Sep	Overview of the nervous system	8
25 Sept	Nervous system	8
28 Sept	Integration of command & control: neuroendocrine pathways	9
30 Sept	Neuroendocrine pathways **Research Paper 2 Due (Topic: Unusual Sensory Receptors)**	9
2 Oct	Special Topic In Class Presentations II	
5 Oct	**Midterm Exam 2**	7,8,9
7 Oct	Intro to Muscle: Structure & Function	10
9 Oct	Muscle Fine Anatomy	10
12 Oct	**Fall Break, No classes**	
14 Oct	Physiology of Muscle Contraction	10

16 Oct	Integration of Motor Units	10
19 Oct	Adjusting to the Environment: Ionic & Osmoregulation	14
21 Oct	Mammalian Kidney Function	14
23 Oct	Mammalian Kidney Function	14
26 Oct	Non-Mammalian Kidney Function: Weird Ways to Pee	14
28 Oct	Overview of circulatory systems	12
30 Oct	**Midterm Exam 3**	10,14
2 Nov	Circulation: Physiology of the Heart	12
4 Nov	Circulation: Physiology of the Heart	12
6 Nov	Circulation: Distribution Dynamics **Research Paper 3 Due (Topic: Unique Adaptations in Circulatory Systems)**	12
9 Nov	Circulation: Exchanges in Capillary Networks	12
11 Nov	Gas Exchange: Environmental Challenges & Solutions **Research Paper 3 Due (Topic: Unique Adaptations in Circulatory Systems)**	13
13 Nov	Special Topic In Class Presentations III	
16 Nov	Physiology of gases in blood	13
18 Nov	Physiology of gases in blood	13
20 Nov	Energy: Acquisition and Fate	
23 Nov	**Midterm Exam 4**	12,13
25 Nov	**Class Break: No classes**	15
27 Nov	**Thanksgiving Holiday, No classes**	15
30 Nov	Energy: Responding to Environmental Changes	17
2 Dec	Energy: Responding to Environmental Changes	17
4 Dec	Course review session, final exam format	

COMPREHENSIVE FINAL EXAM
Friday, Dec 11, 11:30 am-2:20 pm