Biology 3334 and BioEng 5737: Mammalian Physiology
Spring 2017, T, Th 11:00-12:20 PM
164 Beury

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What is Physiology? Physiology is a study of how organisms solve life challenges. A partial list of major physiological challenges include insights about how animals retain salts in very precise concentrations such that small variations can invoke medical emergencies. How do organisms deal with changes in temperature? How does metabolism vary with seasons and circadian clocks? How does the nervous system respond to the external environment and equally intriguing how do the internal rhythms of the nervous encode information that is critical to life?

We will begin with a review of biology to relate other disciplines from evolution to molecular biology because these disciplines will contribute to our understanding of physiology. Since this course is likely your introduction to physiology, you should formulate more questions than we answer (more about the questions later). Physiology is a quantitative science build on basic ideas and relationships in physics and chemistry. I hope you will share the excitement of being part of this this journey to appreciate animal diversity as you explore physiology.

Textbook: Animal Physiology by Hill, Wyse and Anderson 4th edition. ISBN: **978-1-60535-471-2** for bound and looseleaf is **978-1-60535-594-8**

http://www.sinauer.com/animal-physiology-842.html

The course was named Mammalian Physiology years ago and so the name is a legacy or hold over from the past and mostly because medical school required applicants to have taken mammalian physiology before matriculating. The text book uses a broader approach to help you understand "how" organisms deal with their environment. The labs have been redesigned to allow you to perform most of the measurements on yourself along with your lab mates. More about that in the lab syllabus. My point is that the labs will, with one exception, have yourselves as the experimental animals.

Syllabus: The syllabus is a working plan. These are major topics we will cover but the material in each section is likely to change as we decide how best to focus on the issues selected. I will solicit your input throughout the course in order to fine-tune the class presentations and discussions to an appropriate level. Feel free to email me about any curricular issues or suggestions.

The schedule below lists possible articles but these are subject to change. They will give you a sense of the class focus but the exact material is like to change.

Date	Week	Topic:	Chapter	Lab
1/17/17	1	Introduction to animal physiology: A sandpiper story	1	No lab: Assignment 1 due in lab Week 2
1/19/17		Molecules to cells review: An enzyme story of LDH	2	
1/24/17	2	Overview of genomics and epigenetics and their potential roles in physiology	3 & 4 selected topics	1. Intro to physiological measurements and bone
1/26/17		Physiological instructions: genome and proteome and exercising one leg	3	
1/31/17	3	Water and solutes: Why are [K^+] the most conserved in all cells?	5	2. Blood lab
2/2/17		Transport and water movement: Aquaporins and osmosis		
2/7/17	4	Osmosis, Part 2	5	3. Earthworm axon AP and Biopac
2/9/17		Neurons, Part 1 Nernst equation	12	
2/14/17	5	Neurons, Part 2 GHK equation		4.Earthworm, Part 2
2/16/17		Exam 1		
2/21/17	6	Introduction to Synaptic physiology	12	
2/23/17		Synaptic physiology, Part 2	13	5.Earthworm, Part 2
2/28/17	7	Sensory physiology: Mechanotransduction, sound and taste	14	6. Sensory physiology
3/2/17		Sensory physiology: Olfaction, brief overview of vision and vestibular		
3/11-3/19/17		Spring break		
3/7/17	8	Nervous system organization, Part 2	15	Muscle physiology I
3/9/17		Biological clocks		
3/14/17	9	Introduction to Muscle physiology	19	Muscle physiology 2
3/16/17		Exam 2		
3/21/17	10	Cellular respiration	22	
3/23/17		External respiration	23	
3/28/17		Circulation	25	
3/30/17		Circulation, Part 2		
		To be updated through April		
4-12-17		Exam 3		

5/4/17 **Final exam 10:30-12:30**

Conceptual understanding and review: While the organization and content of the course is the responsibility of the instructors (course and lab), the responsibility for learning belongs to you. In view of the size of the class, small group discussions will be limited and so, I suspect, will questions during class. Although I debated using Turning point, I have decided to use a different approach requiring students to submit written questions during the semester.

Each student will submit questions for each of 5 classes (your choice of days and topics). At the beginning of class, you will place on the front desk as you enter a question about the previous lecture material or the current lecture. You will type the questions with the class date, your name,Chapter number and your lab section. I will use the questions in class to help me evaluate class understanding as we progress through the semester. The questions will be graded by the team (lab instructors and course instructor) and points will be awarded toward the assignment grade. Details and discussion of the questions will be discussed in your first lab meeting.

Laboratory: The laboratory exercises are under development at this time as we are in the process of getting new equipment for the labs. Some topics and chapters in the book we will not discuss in class but we will investigate them in the lab. Two examples are excretion (urine output) and sensory physiology. The lab syllabus and each lab protocol will be posted on BB as well as criteria for the lab summaries.

Grading: More details about the lecture questions and homework assignments during the initial lab. I anticipate at least 3 homework assignments consisting of problems. Physiology is a quantitative science and it is essential that you are comfortable working through the fundamental equations that govern the behavior or various systems. The homework will provide you with experience doing problems before the exams. More details about this in the first class.

Midterm exams:	30%
Lab,	25%
In-class and assignments:	15%
Final exam	30%

Graduate student requirements: Engineering students may not have had Introductory biology and certainly are not expected to have a biology background as comprehensive as the biology majors. Therefore I will provide you with review articles related to several topics essential for understanding physiology most likely including evolution, details of protein structure and function and an introduction to genes. The papers will be assigned and we will schedule a journal club discussion to help you understand the relevant background related to these important topics. Attendance at the journal club will be mandatory and will be factored into your final grade as a discussion component.

There are NO MAKEUP EXAMS In the case of illness, sports competitions or other excused absences, you will be excused **IF** you inform me in advance. You must have a note from your physician, a coach or whoever is appropriate for explaining a legitimate absence. If you are not excused, you will receive a zero for the midterm.

Honesty and Civility: You must abide by Temple's Code of Conduct (see http://www.temple.edu/assistance/udc/coc.htm) , which prohibits:
1. Academic dishonesty and impropriety, including plagiarism and academic cheating. We will discuss collaboration on assignments in terms of what is acceptable and what is not.
2. Interfering or attempting to interfere with or disrupting the conduct of classes or any other normal or regular activities of the University.

3. Avoid all appearance of cheating. We have a "zero tolerance" policy. The Temple Honor code, which you will sign before you take all of the exams in the course, provides disciplinary action for cheating which may include expulsion from the University.

The penalty for academic dishonesty can vary from receiving a reprimand and a failing grade for a particular assignment, to a failing grade in the course, to suspension or expulsion from the university. The penalty varies with the nature of the offense, the individual instructor, the department, and the school or college. Please refer to the following university policy:
http://www.temple.edu/bulletin/Responsibilities_rights/responsibilities/responsibilities.shtm

Disabilities: Any student who needs accommodation because of a disability should contact me privately to discuss the specific situation as soon as possible. The Office of Disability Resources and Services (215-204-1280) in Ritter Annex 100 can coordinate reasonable accommodations for students with documented disabilities. Students who are eligible for extra time on exams need to talk with us well in advance of the exam to make arrangements for extended time.

Freedom to teach and freedom to learn are inseparable facets of academic freedom. The University has a policy on Student and Faculty and Academic Rights and Responsibilities (Policy #03.70.02) which can be accessed through the following link: http://policies. temple. edu/getdoc.asp ?policy _no=03. 70. 02