Sensory and Motor Systems (BI463) – Winter 2021
Course instructor: Benjamin Zemel
Preferred email: zemel@pdx.edu
Office hours: Tues. and Thurs. 3:50pm - 5:00pm
Zoom Password: neuron
Zoom Link: https://pdx.zoom.us/j/83767285036
Meeting ID: 837 6728 5036

Textbook: Principles of Neural Science (supplemental).

Course topics:
There is a great deal of interest and focused research in understanding the properties of the nervous system when integrated and fully functional. There are a number of properties of the nervous system that inform its functional output. Different wiring schemes, neurotransmitters and the capacity for plasticity provide a number of complicating factors when trying to understand fundamental principles of neuronal physiology. There is however a plethora of new tools being developed to study and dissect neural circuits of all types. Both the sensing of cues in the environment as well as the behavioral responses to those cues are driven, in part, by the nervous system. In this course, we will try to understand how both simple and complex physiological systems can be understood at the systems level (circuits).

Topics covered
- Neuron structure and function
- Electrical properties of biological membranes
- Topics in sensory and motor physiology
- Topics in neurodegenerative disease

Expectations: This is a 400-level course and it is designed to challenge you to learn as much as possible. I strongly recommend staying on top of this material. There will be 2 quizzes, midterm and final exams, group presentations and an in-class assignment.

This class will benefit you the most if you are fully engaged with the material. I am happily available outside of class, either in office hours or individually by appointment. Attendance is crucial to do well in the class!!! Attending presentations from fellow students is MANDATORY. If you fail to attend these presentations it will affect your class participation grade.

You are encouraged to talk through the material conceptually with your peers, but the work you turn in must be your own (your own calculations, your own words, etc.).

Group Presentations:
I will break you up into groups and each group will submit a topic to present to the rest of the class. A number of class periods will have a portion dedicated to discussing contemporary topics in neurophysiology. These sessions make up a major portion of the course and are designed to educate you in different neural systems and research techniques. I will give you some topics that represent key areas of systems neuroscience. The material in these presentations expand upon specific topics that we cover in class. The presentation requires a significant amount time, reading, and preparation. You will additionally need to send me an outline of the presentation not later than 5 days before that class period. Instructions for preparing this presentation and grading criteria can be found on a separate document.

For those of you on a given week NOT presenting, keep in mind that this information will be used for questions of the final exam.

Exams:
There will be two exams in this course – one midterm (Lectures 1-8) and one final (Lectures 9-17 AND information from student presentations). I will have review sessions before exams. The exams emphasize material presented in class and covered on presentations (only for the final exam). The best way to prepare for my exams is to be present and engaged in each lecture, to go through lecture slides and your notes carefully and making sure you are clear on all material we discuss. The goal is for you to combine multiple concepts and synthesize new data to solve new types of challenging problems. Office hours are a big help!

Quizzes:
There will be 2 quizzes given during this course. The first quiz covers Lectures 1-5 while the second covers Lectures 6-13.

Effort:
This part of your grade will be determined by your attendance, engagement, and effort, both in and out of class.

In class assignments:
There will be one in-class assignment regarding the cardiac physiology lecture

Grading:
Quizzes- The goal of quizzes are to keep you on top of the material leading up to major exams. There will be 2 quizzes throughout the semester.

- Quiz 1-25 pts
- Quiz 2-50 pts

Assignments- Cardiac physiology assignment- 25 pts

Group Presentations- Follow the guidelines for presentations and you will do great!- 150 points

Effort- 50 points

Midterm- 100 points

Final Exam (See final exam schedule)- Includes everything past the mid-term AND basic concepts from the presentations given by your classmates throughout the ENTIRE semester- 150 points

TOTAL 550 points

I Look Forward to Working with Each and Every One of You!

See Next Page For Class Schedule…

1-5-2020	Lecture 1: Introduction to Neurophysiology		
1-7-2020	Lecture 2: Resting Membrane Potential and Ion Channels		
1-12-2020	Lecture 3: Ion channels and Action Potentials		
1-14-2020	Lecture 4: Motor Systems I		
1-19-2020	Lecture 5: Motor Systems II		
1-21-2020	Lecture 6: Motor Systems III	Quiz #1	
1-26-2020	Lecture 7: Autonomic Nervous System I		
1-28-2020	Lecture 8: Autonomic Nervous System II		
2-2-2020	Review for Midterm Exam		
2-4-2020	Midterm Exam		
2-9-2020	Lecture 9: Touch, pain and proprioception I		
2-11-2020	Lecture 10: Touch, pain and proprioception II		Group 1
2-16-2020	Lecture 11: Cardiac Physiology I---CLASS CANCELLED		
2-18-2020	Lecture 12: Cardiac Physiology I	Worksheet	Group 3
2-23-2020	Lecture 13: Cardiac Physiology II		Group 4
2-25-2020	Quiz #2		Group 2
3-2-2020	Lecture 15: Vision I		Group 5
3-4-2020	Lecture 16: Vision II		Group 6
3-9-2020	Lecture 17: Smell and Taste		Group 7
3-11-2020	Review for Final Exam		