

## Neurobiology (Bio 2135)

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### Course Summary and Objectives:

This course is designed to be a broad introduction to the study of Neurobiology. Therefore, after gaining a foundation in how neurons communicate with one another, we will be able to examine more complex systems such as sensory and motor systems as well as human and animal behaviors. We will also explore developmental factors that influence the growth of individual neurons and thus the structure of the entire brain. The objectives of this course are several-fold. 1) Learn the basic principles of neural systems, 2) become familiar with techniques used in the study of neuroscience, 3) examine neural systems from the molecular, cellular and systems levels, 4) gain experience interpreting primary journal articles, 5) learn to express yourself clearly in the language of neuroscience

### Textbook:

**Required:** Neuroscience: Exploring the Brain by Bear, Connors, and Paradiso, 3<sup>rd</sup> Edition

In addition, there will be a variety of readings posted on Blackboard

**Use of E-mail:** I'm happy to answer questions or set up appointments over e-mail. However, please do not expect late evening responses from me, and **I cannot grant extensions over e-mail.**

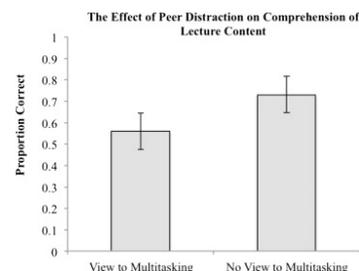
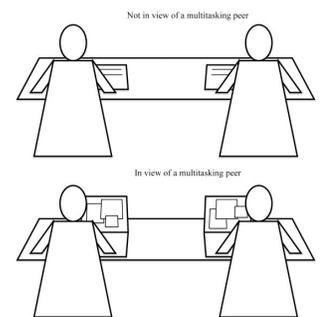
**Office Hours:** I will be available in my office Mondays from 2-4pm and most Wednesdays from 5-7pm. Occasionally I will have a parenting conflict on Wednesday evenings, and I will let you know if and when I have to shorten those office hours. If you cannot meet me during my scheduled office hours, please email me two times that will work for you. Please note that I try to reserve Tuesday and Friday afternoons for my NIH-research obligations, so I am typically unavailable during those times.

**Late work:** Assignments and papers are to be submitted on time unless a student specifically asks, *in advance*, for an extension. Alternatively, a student can submit a letter from their dean to request permission to turn in work late. Otherwise, 5 points (1/2 a letter grade) will be taken off for each day assignments, papers, or drafts are late.

**A note on classroom etiquette:** Over the last several years, it has become increasingly difficult to keep electronic devices from disrupting the learning environment of the classroom. From students checking Facebook or email while ostensibly taking notes on their computers to individuals leaving in the middle of class to deal with texts or calls, the classroom is currently full of assaults on our ability to concentrate.

It has been shown that multi-tasking students do less well on post-class tests than their non-multi-tasking peers. No big deal, right? Unfortunately, students who sit *behind* multi-tasking students *also* do less well than students who have no view of a computer screen (figure from Sana et al., 2013). Furthermore even when students restrict laptop use just to note taking, they are at a disadvantage. A recent study has shown that long hand note taking helps students process information at a deeper level and successfully reframe information in their own words (Mueller and Oppenheimer, 2014). Unless you have a compelling reason to use a laptop or to leave in the middle of class, **let's make this classroom a sanctuary from electronic distractions!**

(Inspired by <http://chronicle.com/blogs/linguafranca/2014/08/25/why-im-asking-you-not-to-use-laptops/>)



**Course Components:**

**Exams (44%):** There will be two in-class midterms (12% each) and a final, comprehensive exam (20%). The in-class exams have been designed to take 55 minutes, however, you will have the option of taking an additional hour following class.

**Lab (35%):** Through this weekly lab, you will become familiar with some of the basic research techniques scientists use to address questions in neuroscience. You are expected to maintain a lab notebook, which will help you prepare your lab reports. All lab reports will be in the form of a journal article, and one of these will go through the Writing Project drafting process. Steve Hauptman conducts the lab, and he will provide additional information at the start of your weekly lab sessions.

**Journal Article Quizzes (16%):** Textbook reading and lectures will be complemented with four Journal Article quizzes. In addition to learning new Neuroscience concepts, the objectives of these quizzes are 1) to gain experience reading primary research articles, and 2) to learn to think critically about experiments and interpreted results. You will need to read the assigned primary journal article in advance of the class in which the quiz is scheduled. Each quiz is worth 4% of your overall grade. First, individual students will take a multiple-choice test. This is handed in and is worth 35% of that quiz score. Next the exact same test is taken as a team. Teams discuss the questions, agree on an answer, and then get immediate feedback on the accuracy of their answer. Teams then have the opportunity to discuss and re-answer questions they got wrong. Team quiz scores contribute 65% of the quiz score for an individual. After the group quiz is completed, groups have the option of appealing questions they got wrong. Perhaps the group thinks the question wasn't clearly written or that there is an alternative interpretation. Groups will work together, with the reading material and "build a case" to support their appeal and the class will discuss.

**Class Preparation (5%):**

Since lectures will often include discussion, it is crucial that each student prepare for class by reading the assigned material ahead of time. In order to help motivate you in this process, **I will randomly select a few students at the beginning of each lecture to answer questions about the reading.** This, as well as your general class participation, will count towards "class preparation."

**Problem Sets (optional):** Periodically, I will post problem sets on blackboard that are designed to help you work through lecture concepts and practice answering test-like application questions. They will not be graded, but I sometimes use questions from these problems sets on exams. I strongly encourage you to first attempt these on your own, but then to work in groups to help you understand difficult concepts. I will post answers on blackboard.

**Grading:**

Midterms (2):	12% each (24% total)
Final:	20%
Lab:	35%
Journal Article Quizzes	16%
	35% individual
	65% team
Class preparation:	5%

