

BISC 230xg: The Biology of the Brain: Current Topics in Neuroscience (4 units)

Spring Semester 2016

Course Description:

The brain is unique when compared to other organs in the human body. Neurons are the cells that make up the brain, and while they share most of their fundamental characteristics with other body cells, neuronal activation can lead to complex perceptions and behaviors. We will explore how the properties of brain cells allow this and how their activities underlie their functions. (For topics to be covered, see the lecture schedule below.)

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Blackboard:

<https://blackboard.usc.edu>

Textbooks:

(MM): *The Mind's Machine* by Watson and Breedlove.
Publisher: Sinauer. ISBN: 9780878939336.
(SP): *Sensation and Perception* by Wolfe *et. al.*
Publisher: Sinauer ISBN: 9781605352114

Lectures: MW 12:00-1:50 PM, THH 201

PowerPoint slides of the lectures will be posted to Blackboard in advance of each class meeting. The contents of these slides will be drawn largely from the textbook readings but may also contain information from other sources. A successful learning strategy is to read over the lecture notes before class so that class time can be efficiently spent learning the material in greater depth.

Lecture Exams:

There will be four in-class exams that will consist of a mix of short-answer, multiple choice, true/false, fill-in-the-blank and matching type questions. Exams will cover information given in lectures only; laboratory performance will be covered separately in the labs (see below). The final exam is not cumulative.

Grading (there is no “extra credit” so please, don’t ask):

Lecture Exam 1 (Wednesday, February 10)	100 points
Lecture Exam 2 (Wednesday, March 9)	100 points
Lecture Exam 3 (Monday, April 11)	100 points
Final Exam (Friday, May 6)	100 points
Laboratory (see lab schedule below for point breakdown)	90 points
Term paper	75 points
Oral presentation	35 points
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Total	600 points

Final Grade Determination:

Final letter grades will be determined by the following scheme. The mean point total of the top 10% of students will be determined. Students who earn a certain high percentage of that mean will earn an A or A-. Students whose totals fall below the A-level but above a certain lower percentage will earn a B+, B, or B-. Students below the B- level but above an even lower percentage will earn a C+, C, or C-, etc. An important consequence of this scheme is that, for the most part, grading is not competitive in this class. There are not fixed numbers of As and Bs to dole out. The more the totals cluster toward high values, the more As and Bs will be assigned.

Lecture Schedule:

Lecture	Date	Topic	Reading
1	M 1/11	Introduction to and overview of the course	
2	W 1/13	How did we get here? (Evolution of the brain)	MM: Chapter 1
3	W 1/20	What’s up there between our ears? (Structure and organization of the nervous system)	MM: Chapter 2 SP: Chapter 1
4	M 1/25	What exactly is that three pounds of flesh and how did it get that way? (Cells and development of the nervous system)	MM: Chapters 2,13 SP: Chapter 1
5	W 1/27	The brain is cordless and rechargeable (Electrical properties of neurons)	MM: Chapter 3 SP: Chapter 1
6	M 2/1	Neurons signal faster than you can drive (Neurophysiology)	MM: Chapter 3; SP: Chapter 1
7	W 2/3	Neurons have their own language (Synaptic transmission)	MM: Chapter 4
	M 2/8	Review for Exam 1	
	W 2/10	EXAM I (covers lectures 1-7)	

8	W 2/17	How did I feel that? (The somatosensory system)	MM: Chapter 5 SP: Chapter 13
9	M 2/22	Say what? (Sound and hearing)	MM: Chapter 5 SP: Chapters 9,10
10	W 2/24	Why rollercoasters are so much fun (The vestibular system)	MM: Chapter 5 SP: Chapter 12
11	M 2/29	Yummy! (Olfactory and gustatory systems)	MM: Chapter 5 SP: Chapters 14,15
12	W 3/2	The eyes have it (The visual system)	MM: Chapter 7 SP: Chapter 2,3
	M 3/7	Review for Exam 2	
	W 3/9	EXAM 2 (covers lectures 8-12)	
13	M 3/21	How did I see that? (The retina and color vision)	MM: Chapter 7 SP: Chapter 2,3,5
14	W 3/23	Is that what I think I see? (Perception of objects)	MM: Chapter 4
15	M 3/28	Seeing near and far (Binocular vision)	MM: Chapter 6
16	W 3/30	Pay attention, this will be on the exam (Attention and consciousness)	MM: Chapter 14 SP: Chapters 7,8
17	M 4/4	What could possibly go wrong? (Brain anomalies).	MM: Chapter 12
	W 4/6	Review for Exam 3	
	M 4/11	EXAM 3 (covers lectures 13-17)	
18	W 4/13	I learn but do I remember? (Learning and Memory I)	MM: Chapter 13
19	M 4/18	Oh, yeah, now I remember (Learning and Memory II)	MM: Chapter 13
20	W 4/20	Wake me when it's over (Biological rhythms and sleep)	MM: Chapter 10
21	M 4/25	We have two brains (Language and the divided brain)	MM: Chapter 15
22	W 4/27	Forget the gonads: the brain is the largest sex organ (hormones and sex)	MM: Chapter 8
		FINAL EXAM (covers lectures 18-22) Friday, May 6, 2016 11AM-1PM	

Pass/No Pass Policy:

Students taking this course with the Pass/No Pass option must have a final score equivalent to "C minus" or better to receive a "Pass." "No Pass" will be assigned for final scores less than the equivalent of a "C minus."

Re-Grading of Exams:

If you wish to have one or more exam questions re-graded you must submit a *written* request within one week of when your exam was returned to you. The entire

answer will be re-graded, not just the part you think deserves more credit. Your score may go up or down as a result of a re-grade.

Missed Exams: No make-up exams will be given. Students who are unable to take an exam at the scheduled time must give written notification as soon as possible, preferably in advance. Students who miss an exam for medical reasons must provide proof of illness shortly afterward. If the student has a valid, documented reason for missing the exam, the average score on the remaining exams will be weighted to compensate for the missed test.

Exam days: Be sure to arrive early on exam days. If you arrive late for an exam and another student has already finished the exam and left the exam room, you will not be permitted to take the exam and will receive a score of zero for that exam.

Students with Disabilities: Any student requesting academic accommodations based on a disability is required to register with the Office of Disability Services and Programs (DSP, STU 301, 213-740-0776) each semester. You must deliver an approved DSP letter as early in the semester as possible. For additional and pertinent policies not covered here please see SCampus:

<http://www.usc.edu/dept/publications/SCAMPUS/>

Term paper and oral presentation: The term paper is due on April 8th.

General Guidelines

Both a term paper and an oral presentation of that paper are required. These are worth a combined 110 points. The term paper should be 7-10 pages in length (no shorter and no longer), double spaced and machine-printed in a manner that is normal for formal presentations (use a Times Roman, Calibri or Cambria Font of 12 point). The term paper will be written in the scientific style. Guidelines for this will be given in lab.

Each paper must be annotated with 4-10 references to the scientific or popular literature. Of these references, at least one must be as recent as 2012. The references must demonstrate evidence that you have read at least two articles from a scientific journal or one of the sources listed below. The presentation must be your original work, and must have been verified using TurnItIn.

Plagiarism is strictly forbidden and will be treated with the usual University rules if it is encountered. For information about the University's policy of plagiarism, go to:

<http://www.usc.edu/dept/publications/SCAMPUS/gov/gov05.html>

And for information regarding Academic Dishonesty Sanction Guidelines, go to:

<http://www.usc.edu/dept/publications/SCAMPUS/gov/gov11.html>

The recommended sanction for plagiarism is an F for the course.

Subject Matter

The choice of subject for the term paper is up to you, but must be related to some aspect of neuroscience. If you are in doubt as to whether a subject is suitable, please consult one of the instructors for advice.

Sources of Material

A wide variety of different reference sources is available. This includes, for example, the following popular level scientific magazines:

Scientific American	Science
American Scientist	Discover
Science News	Nature

Any of these sources can serve as a rich supply of ideas and information. You may use references from any of them freely. You will often find good articles in newsweeklies such as Time, Newsweek, and US News and World Report; daily newspapers (particularly the New York Times and the Los Angeles Times that both have sections dedicated to science topics on selected days); and other news periodicals. Most of these are now available online.

In addition to the popular magazines concerning science, there are a number of more formal scientific journals used by the professionals in the field. You may find these articles too advanced to be read easily, but you are certainly free to use them if you wish. In particular, review articles in journals such as Trends in Neuroscience and Trends in Pharmacology are often of value.

Wikipedia may also be used to gather information but you'll need to cite the references used by the Wikipedia entry. (Beware of relying too much on Wikipedia since, as you undoubtedly know, it is un-refereed and often contains factual errors.)

Other web sites of potential use are:

medlineplus.gov; cdc.gov; www.fda.gov; nih.gov; ncbi.nih.gov

Turnitin

The following statement provided by USC's Center for Scholarly Technology applies. "USC is committed to the general principles of academic honesty that include and incorporate the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. By taking this course, students are expected to understand and abide by these principles. Please note the academic integrity standards of the University as explained in SCampus. All submitted work for this course may be subject to an originality review as performed by Turnitin technologies (<http://www.turnitin.com>) to find textual similarities

with other Internet content or previously submitted student work. Students of this course retain the copyright of their own original work, and Turnitin is not permitted to use student-submitted work for any other purpose than (a) performing an originality review of the work, and (b) including that work in the database against which it checks other student-submitted work.”

The term paper is due April 8th at 5:00PM. You will need to upload your paper through the assignments tab on Blackboard. When you upload your term paper properly you will receive an email confirmation. If you do not receive an email confirmation...you will need to resubmit your paper. You can only submit a paper once...so make sure you are uploading your final version. A paper received at 5:01 PM is late. Given that blackboard can be temperamental, it would behoove you to submit your paper well before 5:00. Term papers receive a 20% late penalty for every 24 hours that they are late (this includes weekends). For example a paper that is five days late is worth zero points. It is your responsibility to make sure that your term paper has been submitted (and that it is the correct version). *Only an electronic version submitted and received via the term paper assignment link in Blackboard will be accepted...no hard copies, no emails, etc.*

Oral Presentation

An oral presentation must be developed individually for delivery during the latter part of the semester in the lab. The subject matter of the oral presentation will be the same as that of the term paper. This presentation should be ten minutes in length. It will be followed by a discussion period of five minutes, during which other students are urged to ask questions and to consider the material. The use of visual aids is expected (e.g. PowerPoint slides) in the presentation. Grades will be assigned on the basis of significance of the topic, quality of the material, and the quality of the presentation. More detailed guidelines will be provided later. All presentations will be made during the final three lab sessions (see lab schedule below).

Week of	Laboratory Exercise Topics
Jan 11 th	No Lab
Jan 18 th	No Lab
Jan 25 th	Introduction/Scientific Method
Feb 1 st	Discussion on Results of Scientific Method Experiment
Feb 8 th	Discussion on Term Paper – Topic Assignment
Feb 15 th	The Nervous System
Feb 22 nd	Discussion on Literature – Primary Papers Assignment
Feb 29 th	The Senses
Mar 7 th	Discussion on Presentations – Group Assignment – Mini presentation

Mar 14 th	Spring Recess
Mar 21 st	Group Presentations
Mar 28 th	Adaptation Experiment
Apr 4 th	Discussion on Results of Adaptation Experiment
Apr 11 th	Presentations
Apr 18 th	Presentations
Apr 25 th	Presentations

The Laboratory portion of the course totals 90 points.

Number	Points	Exercise	Total Points
1	10	Term Paper Topic	10
1	15	Literature Assignment	15
1	15	Group Presentation	15
3	10	Lab handout	30
1	20	Lab Participation	20