MCB/PYSCH C64 SYLLABUS
Exploring the Brain: Introduction to Neuroscience
SUMMER 2018

Lecture: Tues, Thurs 2-4pm in Genetics & Plant Bio room 100
Discussion section: Wed or Fri 2-4pm in Dwinelle or Latimer (check your enrollment)

Instructor:
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Graduate Student Instructors:
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Course goals: This is a lower level, introductory course into the structure and function of the nervous system at the cellular and systems levels. Throughout the course, we will cover cellular physiology of neurons, the various sensory systems, motor systems and a few "higher" brain functions such as sleep, learning and memory. We will discuss how the brain manages to coordinate all these various functions, as well as examine examples of what happens when the brain "fails" at its job (illusions, diseases, etc). We will also discuss how scientists learn about the nervous system, focusing on the tools that past and current neuroscientists use to figure out how the brain works. The pre-requisites for this class are high school chemistry or Chemistry 1A and high school biology or Biology 1A. Biology 1AL is not required. A working knowledge of the principles of biology is assumed during lectures.

Important note: *Students will **not** receive credit for Molecular and Cell Biology/Psychology C64 after taking Molecular and Cell Biology C61/Letters and Science C30W, Molecular and Cell Biology C104, 100A/Chemistry C130, Molecular and Cell Biology 110, 130A, 136, 160, C160/Neuroscience C160, or Integrative Biology 132.*

Required Textbook: Neuroscience: Exploring the Brain 4th Ed. Mark F. Bear, Barry W. Connors, Michael A. Paradiso. ISBN: 978-0781778176. This book is available at UC Bookstore; however, it can also be purchased from other sources.

Important Dates

Start of instruction	Tuesday, June 19
Last day to withdraw (with refund)	Sunday, June 24
Last day to change grade option	Friday, July 27
4th of July – No class	Wednesday, July 4
Last day of class (Final Exam)	Thursday, Aug 9

Readings: Students are expected to read the materials before coming to class.

bCourses: You should be enrolled in the MCB C64 web site, which can be found at bcourses.berkeley.edu. Electronic copies of all course materials except the textbook are available from the bCourses site.

Discussion Sections: Each student must be enrolled in a discussion section. **Discussion sections are compulsory and attendance will be taken**. In them, the instructors will help you review topics covered in lecture and address your questions. The instructors will lead activities, promote discussion, assign short projects, and address your questions. Students will prepare a short presentation for a discussion section (during the last 3 weeks of the course).

Quizzes: Short, multiple-choice quizzes will be given online most weeks (see course calendar). These brief quizzes will allow you to assess your understanding of the material thus far and also help us to know where students are struggling and which topics might need more attention/time. The lowest quiz will be dropped (this is in part to account for cases of forgetting to do the quiz or not having internet, etc). **Quizzes will be due Mondays at midnight (PST).**
To keep in mind about quizzes: bCourses sometimes runs into trouble. If you run into problems with your quiz, you should contact your discussion section instructor with a copy of your answers *before* the quiz deadline. So keep track of your answers as you do the quiz! If you don't do this, we can't guarantee a score in the quiz!! If you miss a quiz for any reason, you will receive a 0.

Literature summary: During the semester, we will read 2 primary literature articles in neuroscience. **See course calendar for reading discussion dates** (you must go to read the paper prior to the paper discussion dates)**.** Additionally, you will choose only 1 of these papers about which to write a literature summary. The summary should indicate *1) what the question was that the authors addressed, 2) what the experiments they performed were, and 3) what conclusions they came to, and how these were based on evidence, and 4) what future experiments might be required to address the questions left unanswered by this paper*. Your summary should be limited to 1 page single spaced or 2 pages double spaced (standard fonts and margins, please). Your literature summary must be **submitted online through bCourses by midnight Thursday August 2nd.** If for any reason you have difficulty submitting online, you must email your discussion section instructor with your literature summary by the same due date.

The PDFs of these papers can be found on bCourses.

Article #1 reference: Chen X *et al.* (2011) A gustotopic map of taste qualities in the mammalian brain. *Science.*

Article #2 reference: Scoville W and Milner B. (1957) Loss of recent memory after bilateral hippocampal lesions. *J. Neurol. Neurosurg. Psychiat.*

Presentation (or report) on a neurological disease or a drug's action on the brain: During discussion section, you will give a 4-5-minute oral presentation on a neurological disease or drug, with an additional 2 minutes allotted for questions from your peers and your instructor. Your topic must be pre-approved by your discussion section instructor. This presentation will be graded on both style and substance (presentation skills and background research). More information about this presentation will be discussed during discussion section. Presentations (or reports) will be **due either on Wednesday, July 25th or on a date to be determined by your discussion section instructor**.

Exams: All exams are closed book. Exams test your learning from lectures, discussion and readings. Exams will be a combination of multiple choice, labeling and short answer questions. The final will contain some material from the entire course (25%) but will be heavily weighted on the material following the midterm (75%).

Policy on make-up exams: If a legitimate written excuse is provided, make-up exams will be conducted on a date agreed upon between the student and the instructor(s), no later than a week after the original exam date. Examples of legitimate excuses: police accident report, doctor's note explicitly saying you were bedridden, etc. Reminder: there are no make-up quizzes.

Grading:

- **Midterm: 30%**
- **Final: 35%**
  - The final will cover 75% new material from after the midterm and 25% previous material from 1st half of class
- **Quizzes: 10%**
  - Quizzes are online and they will be due/close at midnight (PST) on the indicated Monday nights (see course schedule). Only the best 5 out of 6 will count towards your grade. If you miss one quiz that will be your dropped quiz grade. There are no make-up quizzes and no excuses or exceptions to the quiz policy will be allowed.
- **Literature summary: 10%**
  - You will be assigned 1 paper in the 1st half of the class and 1 paper in the 2nd half of the class, which will each be discussed in section. You'll write a literature summary about 1 of these 2 papers (your choice). Due Thurs August 2nd.
- **Presentation: 10%**
  - 5-minute presentation in section about a disease or a drug that impacts the brain, plus 2 minutes for questions.
  - Topics must be pre-approved by instructor.
- **Section attendance & participation: 5%**
  - 1 section can be missed without penalty.

Your letter grade in the course will be determined according to absolute standards of performance. You will not be in competition with your classmates for the grades nor will the class be curved to a predetermined distribution. It would be wonderful if everyone would get an A in the class. However, note that letter grades are based upon the points that you EARN (not based upon needs or wants).

Grades are usually assigned following the guidelines below:

A (some form of an A)	100-89.5%
B (some form of a B)	89-79.5%
C (some form of a C)	79-69.5%
D (some form of a D)	69-59.5%
F	59-0%

Nevertheless, in the event that some examinations have been unusually difficult, the cut-offs for letter grades may be lowered (but only by a few percentage points, and only if deemed necessary).

We strongly recommend that you focus on learning and enjoying the material! If you are enjoying the class and excited about the material we are discussing, good grades will follow!

Policy on Cheating

Cheating is absolutely forbidden. The following constitutes cheating:

Plagiarism: It is defined as using another person's words without quotation marks and/or reference. In preparing problem sets, you may paraphrase written information from texts or articles but you must use your own words, clearly cite the source and identify the text that was paraphrased, and demonstrate that you understand that information. If you quote directly or nearly directly from a source, you must indicate this with the use of quotation marks and cite the source of the information.

Attendance: Signing in for another student to make it appear that they are attending class is considered cheating.

Copying: Copying answers or using notes during an exam is considered cheating. Please keep your eyes on your own paper.

Altered Answers: Changing an answer on a problem set or exam, then trying to have the grade changed is considered cheating.

Impersonation: False representation of yourself as someone else in this course is a gravely serious offense. Please be prepared to show photo identification preferably a student ID card or driver's license, if asked.

False Grade Change: Forging or altering a grade change form is also a gravely serious offense. The Registrar's Office is wise to this; they carefully check signatures and send copies of all grade change requests to the faculty member.

Consequences: A person cheating on a problem set or exam will receive a 0 (zero) for that assignment or exam; their name and a description of the offense will be sent to the Dean of Students. Cheating offenses are punished by disciplinary probation, suspension, or expulsion. These actions are noted on your transcript! Please see the website of the Center for Student Conduct (http://campuslife.berkeley.edu/conduct/code-of-conduct/policies) for more information on student cheating and penalties.

If You See Cheating: If you think a fellow student is cheating, we urge you to discretely tell us about it. We will maintain your anonymity.

Course calendar and assignments

Date	Lecture	Readings	Quiz
6/19 (Tues)	Introduction to the class, Introduction to the nervous system, Ungraded pre-test & Phineas Gage (1)	Ch 1	n/a
6/21 (Thurs)	Cellular elements & organization of the nervous system (2)	Ch 2, 7, NY Times "Brain Soup" article	n/a
6/26 (Tues)	Resting membrane potentials & ion channels (3)	Ch 3	**Due Mon 6/25**
6/28 (Thurs)	Action potentials & action potential propagation (4)	Ch 4	n/a
7/3 (Tues)	Synaptic transmission & neurotransmitters (5)	Ch 5, 6	**Due Mon 7/2**
7/5 (Thurs)	Chemosensory systems (6)	Ch 8 & ***Article #1***	n/a
7/10 (Tues)	Modern neurobiology techniques & midterm review (7)	textbook pgs 50-51: genetics, pg 33: microarrays, pg 83 & 95: electrophysiology, pg 86-87: channelrhodopsins, pg 145-147: immunocytochemistry, in situs, pg 131 & 149-153: neuro-pharmacology, pg 350-351: calcium imaging, pg 186-191: "new views of the brain" & MRI, PET & fMRI, pg 646-651: EEG & MEG	**Due Mon 7/9**
7/12 (Thurs)	**Midterm exam** (in class)	n/a	n/a
7/17 (Tues)	Visual system (8)	Ch 9, 10	n/a
7/19 (Thurs)	Auditory & vestibular systems (9)	Ch 11	n/a
7/24 (Tues)	Motor systems (10)	Ch 13, 14	**Due Mon 7/23**
7/26 (Thurs)	Somatosensory system guest lecture: Dr. Jamie Schwendinger-Schreck (11)	Ch 12	n/a
7/31 (Tues)	Plasticity in the brain, learning & memory (12)	Ch 24, 25, ***Article #2***	**Due Mon 7/30**
8/2 (Thurs)	Plasticity in the brain, learning & memory continued (13)	Ch 24, 25 (+ Ch 23 pg 814-820)	**Literature summary due 8/2**
8/7 (Tues)	Sleep & circadian rhythms & exam review (14)	Ch 19	**Due Mon 8/6**
8/9 (Thurs)	**Final exam** (in class)	n/a	n/a

Discussion section calendar

Wednesday	Wednesday discussion section topics
6/20	Introductions, pre-test review, & Phineas Gage discussion
6/27	Cells review & resting potentials review
7/4—Holiday	Holiday—No section
7/11	Action potentials, neurotransmission, chemosensory systems & neuroscience techniques review & article #1 discussion
7/18	Sensory systems review, presentation & literature research skills and best practices
7/25	Sensory & motor systems review & presentations
8/1	Sensory & motor systems & plasticity/memory review, article #2 discussion & presentations
8/8	Pre-final exam review (& presentations if needed)

Friday	Friday discussion section topics
6/22	Introductions, pre-test review, Phineas Gage discussion, & cells review
6/29	Resting potentials review & action potentials review
7/6	Action potentials, neurotransmission, chemosensory systems review & article #1 discussion
7/13	No Section
7/20	Sensory systems review, presentation & literature research skills and best practices
7/27	Sensory and motor systems review & presentations
8/3	Plasticity and memory review, article #2 discussion & presentations
8/10	No section