NEUROSCIENCE M202--CELLULAR NEUROPHYSIOLOGY

Fall Quarter, 2009

Instructors: Gordon L. Fain, Professor of Physiological Science, X64281, gfain@ucla.edu
Thomas O'Dell, Professor of Physiology, X46626, todell@mednet.ucla.edu
Riccardo Olcese, Associate Professor of Anaesthesiology, X62214,
rolcese@ucla.edu

TA: Kellen Winden kwinden@ucla.edu

Lectures: MWF 9:00-9:50 AM Botany 325

Discussion Sections: M 4:00-5:50 PM Botany 325

Textbook: Molecular and Cellular Physiology of Neurons, Harvard University Press, G. L. Fain

Schedule of Lectures:

Sept 25:	*Introduction and Passive Electrical Properties of Neurons* Reading: Chapters 1 and 2	Fain
Sept 28 & 30:	*Passive Electrical Properties of Neurons* Reading: Chapter 2	Fain
Oct 2 & 5:	*Ion Permeability and Membrane Potentials* Reading: Chapter 3	Fain
Oct 5:	**Turn in first problem set during Discussion Section**	
Oct 7 & 9:	*Ion Pumps and Homeostasis* Reading: Chapter 4 (pp. 95-118) and 13 (pp. 440-450)	Fain
Oct 12, 14, & 16:	*Action Potentials: The Hodgkin-Huxley Experiments* Reading: Chapter 5	Fain
Oct 12:	**Turn in second problem set during Discussion Section**	
Oct 19 & 21:	No class–Neuroscience Meeting	
Oct 23 & 26:	*Voltage-gated Channels: Activation and Inactivation* Reading: Chapter 6	Olcese
Oct 26:	**Midterm I (Material of Chapters 1-4), 4-6 pm, Botany 325**	

Oct 28, 30 & Nov 2:	*Voltage-gated Channels: Molecular Structure and Diversity* Reading: Chapter 7	Olcese
Nov 4, 6, & 9:	*Presynaptic Mechanisms of Synaptic Transmission* Reading: Chapter 8	O'Dell
Nov 9:	**Midterm II (Material of Chapters 5-7, 4-6 pm, Botany 325)**	
Nov 11:	No class–Veteran's Day	
Nov 13, 16 & 18:	*Excitatory Transmission* Reading: Chapter 9	O'Dell
Nov 20:	*Inhibitory Transmission* Reading: Chapter 10	O'Dell
Nov 23, 25 & 30:	*Metabotropic Synaptic Receptors and Second Messengers* Reading: Chapters 11-13	O'Dell
Nov 27:	No class–Thanksgiving Holiday	
Nov 30, 4-5 pm:	*Long-term potentiation* Reading: Chapter 14	O'Dell
Dec 2:	*Mechanoreceptors and Hearing* Reading: Chapter 15	Fain
Dec 4:	*Photoreceptors and Olfactory receptors* Reading: Chapter 16	Fain
Final Exam:	Monday, December 7, 2009, 3:00pm-6:00pm	

Examinations and Grading

There will be two midterms and a final.

Midterm I: the first midterm on Monday October 26 will cover the material of chapters 1-4 of the text and the lectures from Sept 25 through Oct 9.
Midterm II: the second midterm on Monday Nov 9 will cover the material of chapters 5-7 of the text and the lectures from Oct 12 through Nov 2.
Final: The final will cover only the lectures from Nov 4 through Dec 4 and the reading for the second half of the course.
Grading: The final grade will be computed as follows: Midterms I and II, 20% each; final, 40%; lab reports and class participation in discussion sections, 20%. **Please note however the**

following fine print: (1), students must perform at a level of B or above on both the first half of the course (Midterms I and II) and on the final examination in order to pass the course, regardless of how well they do on lab reports and class participation; (2), students who finish the first two Midterms with a grade of B- or below will be asked to drop the course; and (3), students who finish Midterms and Final with passing grades but who do not turn in the lab reports can still fail the class.

Laboratories

All laboratories are done with the program Nerve Works, which must be purchased at the book store. *Every student taking the course must purchase this program!* When you purchase the program, please save your receipt, since you will be asked to show it as evidence that you bought the program. The company that designed this program has made this a condition of our using it. The program for either PC or Mac can be loaded from the same diskette, but I advise you to use a PC if you can. Lab reports are due unless otherwise mentioned. For many (but not all) of the labs, there are yellow worksheets in your program manual, and these can be submitted if you wish. However, most of you will probably find it easier to do the lab on a word processor and use Excel to plot out the data whenever plotting should be necessary. Students who have never made graphs with Excel or any other program should learn how to do this, and there is no time like the present. *All lab reports are due Wednesday of the week they are assigned*, except the first week, when they are due Friday. That is, the report for the week of Sept 28 is due on Friday, Oct 2, but the report for the week of Oct 5 is due Wednesday Oct 7, and so on for the other weeks. Here are the assignments:

Week of Sept 28: Recording_101 lab and Passive_Properties_of_Neurons lab.

Week of Oct 5: Review carefully Making_NerveWorks_Solutions.lab (lab report not required). Then within "Studying_Cell_Resting_Potential", do the two labs Basic_Resting_Potential_I.lab and Advanced_Resting_Potential_I_GHK.lab. Lab reports are required for both labs, but you do not have to do the last page (The final concept) of the first lab or any of the "challenges" of the second.

Week of Oct 12: In "Voltage_Clamp_Basics" do Voltage_Clamp_Basics_I.lab with challenges. Be sure you get the correct lab (I *not* II). Then, in "Action_Potentials", do HH_VoltageClamp.lab.

Week of Oct 19: In "Action_Potentials", do HHNa_Inactivation.lab (skip "A conceptual exercise" but do the "challenge exercise"), and I-V_Relations.lab (skip the "challenge experiment").