

NRO C69F The Synaptic Organization of the Brain

Fall, 2005; Room B264; M 3-5 p.m.

Instructor: Professor Gwen O. Ivy

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Office Hours: M 5-6, T 4-5, TH 5-6 or by appointment

NOTE: T and TH, I teach until 5:00 p.m. and may be detained by students asking questions after class.

COURSE DESCRIPTION

Synaptic organization may be defined as the study of principles underlying the organization of neurons and synapses into circuits that mediate the functional operations of different brain regions. It is a multidisciplinary subject, requiring the integration of results from studies in molecular neurobiology, neuroanatomy, neurophysiology, neurochemistry, neuropharmacology, development and behavior, as well as theoretical studies of computational neural models and neuronal networks. It is also a multilevel subject, beginning with the properties of the individual synapse and building up through microcircuits and neurons to the local circuits characteristic of a given region and finally, to the interactions between various circuits that form a given system, and even to system-system interactions. Such multi-system interactions must surely underlie complex thought processes such as art, music and science appreciation, analytical thinking, creativity and self-awareness!

TEXT

The Synaptic Organization of the Brain. Fifth Edition. Gordon M. Shepherd (ed.), Oxford University Press, New York, 2004. NOTE: The 4th edition used last year is still fine for the course.

ORGANIZATION

The course will meet weekly for two hours and will consist of lectures by the instructor and extensive class discussions. The textbook will be the major source of information, supplemented by illustrations and concepts provided by the instructor in class. Lecture notes will be available on the intranet but do not really substitute for the more extensive explanations given in lecture.

EVALUATION

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| *Midterm Exam - Week of Oct. 24, TBA by Registrar, 2hrs
(multiple choice, short answer, label diagrams, draw circuits) | 30% |
| *Final Exam - Final exam period, TBA by Registrar, 3hrs.
(same format as midterm; emphasis placed on material after midterm) | 40% |
| *Exam questions will be taken from both the book <u>and</u> the lectures | |
| Term Paper - Due Dec. 5 (Last day of class)
15-20 pages, not including references, topic of your choice approved by instructor. Possible topics will be provided. Format will be provided. | 30% |

**2005 NRO C69F
Schedule of Topics**

DATE :			TOPIC :
M	Sept.	12	Introduction to the course Begin Chapter 1: Introduction to synaptic circuits
M		19	Chapter 1
M		26	Chapter 2: Membrane properties and neurotransmitter actions
M	Oct	3	Chapter 2: (cont=d.)
M		10	Thanksgiving – NO CLASS!
M		17	Chapter 2: (cont=d.)
M		24	Chapter 5: Olfactory Bulb
MIDTERM: week of Oct. 24, TBA by Registrar, 2hrs			
M		31	Chapter 5: (cont=d.)
M	Nov	7	Chapter 7: Cerebellum
M		14	Chapter 7: (cont=d.)
M		21	Chapter 11: Hippocampus
M		28	Chapter 11: (cont=d.)
M	Dec	5	Chapter 11: (cont=d.): Last day of class, Term paper due
Th	Dec	10 - 21	Final exam period, date TBA 40% of grade