NRO B60H3F
SUMMER 2005
NEUROSCIENCE I: CELL ANATOMY AND PHYSIOLOGY

Professors: Dr. Gwen O. Ivy and Dr. Janelle C. LeBoutillier

Offices: S569 and S557

Office Hours: Ivy: Tuesday: 3-4 p.m.; Thursday: 5-6 p.m., or by appointment.
LeBoutillier: Tuesday: 3-4pm; Thursday: 5-6pm, or by appointment

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Textbook: *Neuroscience* by D. Purves et al (eds). Third Edition, 2004
(may be purchased in the bookstore).

Lab Text: *The Sheep Brain: A Photographic Series* by C.H. Vanderwolf and Richard K. Cooley (may be purchased in the bookstore).

Lectures: ON LINE

Labs:

PRA6001	Th	6-8 p.m.	SW250
PRA6002	T	6-8 p.m.	SW250
PRA6003	T	4-6 p.m.	SW250
PRA6004	Th	6-8 p.m.	SW248

TA's: Dr. Janelle LeBoutillier is in charge of TA's in all of the labs.
Any lab concerns should be directed to Dr. LeBoutillier at
janelle@utsc.utoronto.ca or (416) 287-7430.

Course Description

Neuroscience is the scientific study of nervous systems. It includes study of the nature and functioning of the nervous system at all levels, from the molecules that make up individual nerve cells and the transfer of information from one nerve cell to another, to the complexities of how thoughts, emotions and behaviours are produced.

Neuroscience is at the interface between biology and psychology. It is unique in that it makes use of a variety of methods and investigations from a wide range of traditional disciplines. To understand the nervous system and how it works requires knowledge of anatomy, molecular biology, biochemistry, pathology, physiology, pharmacology, psychology and zoology.

Neuroscience I is a fairly sophisticated introduction to the field of neuroscience; a virtual springboard from which to enter all of the other Neuroscience courses in our program. As well, this course can provide a physiological foundation for many of our Psychology courses and interdigitates nicely with many of our biology courses. We will cover the gross as well as cellular structure and function of the nervous system in depth. In particular, we will study the cellular and molecular biology of nervous system components, including: neurons, glial cells, meninges, choroid plexus, blood brain barrier, ventricular and vascular systems. We will definitely focus on the major cell of the nervous system - the neuron!

We will explore neuronal physiology at the cell and molecular levels in order to better understand the complex mechanisms of intercellular communication in the nervous system, including electro-chemical transformations at the synapse, different types of receptor mechanisms and neuroregulation at the DNA level. Finally, we will briefly cover the development of the vertebrate nervous system.

The laboratory will cover gross and systems anatomy of the nervous system. We will dissect sheep brains and will examine a wide variety of nervous system structures in 3-D. The fine histology and function of several systems, as well as several neuroanatomical techniques will be discussed and/or demonstrated. Students should bring their own dissecting equipment. This usually consists of a small pair of scissors, tweezers, a scalpel and a □blunt dissection instrument□ like a small metal or plastic rod (certain coffee stirrers may work, or nail files). Glasses and safety glasses are strongly recommended. Gloves will be provided in the labs at a cost of 25□ per pair. Proper safety procedures, as detailed in your lab syllabus must be followed in the labs at all times. Non-compliance will result in a failing lab grade.

Altogether, this course lays the framework for understanding subsequent neuroscience courses. We will begin to understand how the activity of even small groups of neurons can lead to the activity of circuits specialized for all of our sensations, movements, specific goal directed behaviours, emotions, and ultimately, we hope, cognition.

Grading

20% Midterm Exam I:

Multiple choice, short answer. 2 hours.
Week of June 13, 2005. TBA by the Registrar.
[Material covered to date from lectures & text chapters 1, 2 and 3 as far as covered.]

25% Midterm Exam II:

Multiple choice, short answer. 2 hours.
Week of July 11, 2005. TBA by the Registrar.
[Material covered **SINCE** first midterm from lecture & text.]

30% Lab Exam:

Labs begin this week and continue for 8 lab sessions (weeks 1-8 of this 12 week course). Your lab exam will be cummulative in the Week of July 18 TBA by the Registrar

There are 3 components to the lab test, all equally weighted.

1) Written portion based on lab lectures.
2) Written portion based on atlas.
3) "Practical bell-ringer" component.

25% Final Exam:

Multiple choice, short answer. 3 hours.
During Final Exam Period TBA by Registrar (Aug.15-26).
[Material from lectures & text (not from Labs) covered **SINCE** Midterm Exam II.]

Itinerary - NRO B60H3F

WEEK OF

MAY 9	Introduction to course (no labs this week).
	Chapter 1: Studying the Nervous Systems of Humans and Other Animals.
May 16	Chapter 1 (cont'd.)
	Chapter 1 (cont'd.). Begin Chapter 2.
May 23	Chapter 2: Electrical Signals of Nerve Cells.
	Chapter 2 (cont□d.)
May 30	Chapter 3: Voltage-Dependent Membrane Permeability.
	Chapter 3 (cont'd.)
June 6	Chapter 4: Channels and Transporters.
	Chapter 4 (cont'd.)
June 13	Chapter 4 (cont'd.)
	Chapter 4 (cont'd.)
June 20	Chapter 5: Synaptic Transmission.
	Chapter 5 (cont□d.)
June 28 - July 1	Reading Week
July 4	Chapter 5 (cont'd)
	Chapter 6: Neurotransmitters.

July 24 - last day to drop class <u>without academic penalty</u>.

July 11	Chapter 6 (cont'd.)
	Chapter 6 (cont'd.)
July 18	Chapter 6 (cont'd.)
	Chapter 7: <u>Neurotransmitter Receptors and Their Effects</u>.
July 25	Chapter 7 (cont'd.)
	Chapter 7 (cont'd.)
August 1	Chapter 7 (cont'd.)
	Review for Final Exam.
August 8	***Last Day of Classes***
August 15-26	***Final Exam Period, date TBA*** ***25% of grade***

Lab Schedule

Week of	Topic	Atlas Pages
May 9 (1)	Assignment of sheep brains Basic gross anatomy Removal of meninges	15, 42-48
May 16 (2)	Finish removing meninges Major sulci and gyri Ventral surface structures	16,-20, 80, 81, 102
May 23 (3)	Cranial nerves and functions Mid-sagittal section Identification of mid-sagittal structures	69 21,22
May 30 (4)	Dorsal and lateral dissections	23,24,25,26,
June 6 (5)	Horizontal Section	28,29,30
June 13 (6)	Rostral coronal sections Practice bell ringer stations	28,31-33
June 20 (7)	Caudal coronal sections Practice bell ringer stations	34-37; 94-99
June 27	Reading Week	
July 4	Cerebellar coronal sections Practice bell ringer stations	38-40 82-83
July 11	Review Practice bell ringer stations	
July 18	Lab test NOTE: EXACT DATE TO BE SCHEDULED BY THE REGISTRAR	
July 25	Pick-up Lab Tests	
Aug 1	No labs	