

NRO B60
Summer 2006
NEUROSCIENCE I: CELL ANATOMY AND PHYSIOLOGY

Professor: Dr. Janelle LeBoutillier

Office: S557

Office Hours: Thursday 10-12 am

Phone: 287-7430

E-mail: leboutillier@utsc.utoronto.ca

Textbook: *Neuroscience* by D. Purves et al (eds). Third Edition, 2004
New and used copies available in the bookstore.

Lab Text: *On-line atlas; link available through the INTRANET*

Lectures: on-line

Labs:

PRA6001	T	5-7 p.m	SW328
PRA6002	T	7-9 p.m.	SW328
PRA0003	T	3-5 p.m.	SW328
PRA0004	T	6-7 p.m.	SW326
PRA0005	F	7-9 p.m.	SW326

Course Description

Neuroscience is the scientific study of nervous systems. It includes the 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.

The laboratory will cover gross and systems anatomy of the nervous system. Students participating in a practical lab section 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. Basic dissecting equipment will be provided but if you plan to continue in other science labs you may wish to purchase a dissecting kit. Glasses and safety glasses are strongly recommended. Gloves will be provided in the labs at a cost. 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.** Details of the lab schedule for both the on-line and practical lab sections will be outlined during the first week of labs.

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: 2 hours.
Week of June 12, 2006 requested. Exact date TBA by the Registrar.
[Material covered to date from lectures & text chapters 1,2 and 3.]

25% Midterm Exam II: 2 hours.
Week of July 15, 2006 requested. Exact date TBA by the Registrar.

[Material covered SINCE first midterm from lecture & text chapters 4 and 5.]

25% Final Exam:

2 hours.

During Final Exam Period TBA by Registrar

[Material covered SINCE midterm test 2 from lectures & text chapters 6 and 7.]

Note: Lecture tests may include the following testing format: Multiple choice, short answer, labelling, fill in the blank, matching

30% Lab

A detailed lab syllabus is posted on the INTRANET and will be reviewed at the first lab. A brief summary of the grading procedures for the labs follows.

Labs begin in the second week of class. Your lab exam will be given during the 9th week of term as assigned by the registrar. The lab exam will consist of three parts worth a total of 15%:

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

If you miss the final lab exam OR you are not satisfied with your grade, you will have the option to retake this test in Week 11. No make-up tests will be given for any missed lab work.

The remainder of the lab grade will be comprised of weekly quizzes
(5) X 3% = 15%

Each weekly quiz will be comprised of both an on-line component and a practical bell-ringer component. Detailed information on the testing procedure will be given at the first lab.

Six quizzes will be given and only your best 5 will count. You may choose to write only 5 quizzes if you are satisfied with your scores. No make-up quizzes will be given and any missed quizzes will be assigned a mark of zero. All quizzes will be given at the start of the lab period.

Tentative Itinerary - NRO B60H3F Lectures

NOTE: Please pay close attention to the content of lecture tests as outlined both above and below. Lecture tests are not cumulative in this course for example, once you have been tested on the content of chapters 1,2 and 3 in the text for test 1, you will not be tested on this content specifically in test 2 or 3.

WEEK OF

- May 8 Introduction to course (no labs this week).
Chapter 1: Studying the Nervous Systems of Humans and Other Animals.
- May 15 Chapter 1 (cont'd.). Begin Chapter 2.
- May 22 Chapter 2: Electrical Signals of Nerve Cells.
- May 29 Chapter 3: Voltage-Dependent Membrane Permeability.
- June 5 Chapter 4: Channels and Transporters.
- June 12 Midterm Exam One Requested, Exact date TBA by Registrar
NOTE: Only Chap 1,2 and 3 AND corresponding lectures will be covered.
- June 19 Chapter 5: Synaptic Transmission.
- June 26 Chapter 5 (cont'd)
- July 3 READING WEEK NO CLASSES
- July 10 Chapter 6: Neurotransmitters
- July 17 Midterm Exam Two Requested, Exact date TBA by Registrar
NOTE: Only Chap 4 and 5 AND corresponding lectures will be covered
- July 24 Chapter 6 (Cont'd)
- July 31 Chapter 7: Neurotransmitter Receptors and Their Effects