

# Cells and Circuits of the Nervous System Fall 2010

## NEUR 1500

### Course Goals and Content

This course will provide an overview of the mammalian nervous system with an emphasis on the structure and function of the human brain.

Students will acquire an understanding of brain structure and function ranging from molecular mechanisms to specialized circuits for particular facets of perception, action, and thought. Students will learn the basis of a wide variety of neurological disorders.

The course begins with the study of nerve cells: their structure, the propagation of nerve impulses and transfer of information between nerve cells, the effect of drugs on this process, and the development of nerve cells into the brain and spinal cord. We then move to the sensory systems such as hearing, vision and touch and discuss how physical energy is converted by each system into neural signals, where these signals travel in the brain and how they are processed. Next we study the control of voluntary movement. Finally, we cover brain mechanisms involved in brain rhythms, sleep and consciousness, learning and memory, and psychiatric disorders.

### Prerequisite

Introductory biology

### Instructors

The instructors are all professors in the Department of Neuroscience at Brown University:

Diane Lipscombe, Ph.D.

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Michael Paradiso, Ph.D.

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David Sheinberg, Ph.D.

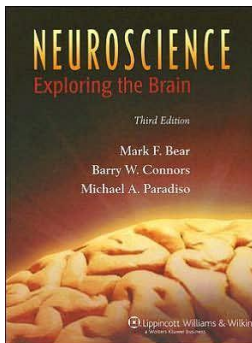
[David\\_Sheinberg@brown.edu](mailto:David_Sheinberg@brown.edu), 401-863-9575

### Exams and Grades

The course grade will be based on scores from a midterm exam (50% each) and a final exam (50%).

### Textbook

*Neuroscience: Exploring the Brain, Third Edition*  
by Bear, Connors and Paradiso



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<b>Date</b>	<b>Topic</b>	<b>Lecturer</b>	<b>Reading</b>
Sept. 1	Neurons, Glial Cells, Ion Channels	Lipscombe	Ch 2, 3
Sept. 8	Action Potentials	Lipscombe	Ch 4
Sept. 15	Brain Structure and Methods	Sheinberg	Ch 7
Sept. 22	Synapses	Lipscombe	Ch 5, 6
Sept. 29	Genes and Psychiatric Disorders	Lipscombe	Handouts
Oct. 6	General Concepts in Neural Systems	Sheinberg	Handouts
Oct. 13	Midterm Exam Chemical Control of Neural Systems	Paradiso	15, 16
Oct. 20	Visual System	Paradiso	Ch 9, 10
Oct. 27	Auditory System	Paradiso	Ch 11
Nov. 3	Somatosensory System	Sheinberg	Ch 12
Nov. 10	Motor Control System	Sheinberg	Ch 13
Nov. 17	Brain Rhythms, Epilepsy, Sleep	Paradiso	Ch 19
Nov. 24	Thanksgiving – no class		
Dec. 1	Learning, Memory, Plasticity	Paradiso	Ch 24, 25
Dec. 8	Final Exam		