

**BIOLOGY 450**  
**INTRODUCTION TO NEUROBIOLOGY**  
**Fall Semester, 2010**

**Course summary:** Neurobiology is a vast, rapidly-progressing field of life science that focuses on the brain and nervous system. This course will provide an overview of principles, concepts, and current research in neurobiology and related fields. Lectures will encompass diverse topics such as cellular neurophysiology, neuroethology (the neurobiology of animal behavior), behavioral and sensory physiology, molecular neuroscience, neuroanatomy, learning and memory, brain rhythms, and the neurobiological basis of human psychiatric disorders.

**Instructor (first half of course):** Dr. Ken Lohmann, G30 Wilson Hall, 962-1332  
KLOhmann@email.unc.edu

**Instructor (second half of course):** Dr. Craig Roberts  
Craig.Roberts@duke.edu

**Lectures:** 11:00 to 11:50 a.m. on Monday, Wednesday, and Friday in room 107 of Wilson Hall. This course has no lab.

**Textbook:** Neuroscience: Exploring the Brain by Bear et al. (3<sup>rd</sup> ed.). Supplementary readings on specific topics will also be assigned; these will be available as PDFs on Blackboard.

**Office Hours:** Dr. Lohmann's office hours are Mondays from noon to 1 p.m. In addition to the scheduled office hours, Dr. Lohmann will be available to answer questions for a short time immediately after each lecture.

**E-mail contact:** You are free to send e-mail to your instructors, but please be aware that professors often receive more than a hundred e-mail messages every day and cannot always respond promptly. A face-to-face conversation remains the most reliable and effective mode of communication and should be used whenever possible.

**Grading:** Grading will be based on the following:

3 hourly exams (100 points/each) .....	300
Final Exam .....	100
<b>Total Points</b> .....	<b>400</b>

Note: In accordance with UNC policy, the final exam can only be taken at the designated time.

**Exam Dates:**

Monday, September 20  
Wednesday, October 13  
Third exam date TBA  
FINAL EXAM: Tuesday, December 14 at 8 a.m.

**TENTATIVE LECTURE SCHEDULE FOR FIRST HALF OF COURSE (expect changes):**

W 8-25 Introduction to the course; anatomy of neurons

F 8-27 Electrical properties of neurons I: resting potentials, Nernst equation

M 8-30 Electrical properties of neurons II: Goldman equation, ion pumps, ion channels

W 9-01 Ion channels, electrical gradients, and behavior; paramecium movement

F 9-03 Action potentials, tetrodotoxin, and the strange case of zombies

**M 9-06 No class: Labor Day Holiday**

W 9-08 Action potential propagation; myelin and saltatory conduction

F 9-10 Electrophysiology: intracellular and extracellular recordings; EEG; MEG

M 9-13 Electrical and chemical synapses; neurotransmitters

W 9-15 EPSPs, IPSPs, summation

Introduction to neural circuits: the escape swim of the sea slug *Tritonia*

F 9-17 Invertebrate nervous systems

**M 9-20 Hourly Exam I**

W 9-22 Behavioral physiology: detection of ocean waves by sea turtles

F 9-24 Neuroethology of the cockroach escape response

M 9-27 The concept of Umwelt; introduction to sensory systems

W 9-29 Hearing I: sound perception and the mammalian ear

F 10-01 Hearing II: tuning curves, auditory threshold functions

M 10-04 Hearing III: auditory specializations

W 10-06 Electroreception I: electrocytes; producing and detecting electric fields

F 10-08 Electroreception II: active and passive electroreception

M 10-11 Magnetoreception: perception of magnetic fields

**W 10-13 Hourly Exam II (cumulative exam; covers first half of class)**

Note: A syllabus for the second half of the semester will be provided later.