

Instructor: Bill Roberts 225 Huestis 346-4961 billr@uoregon.edu

Website: <https://blackboard.uoregon.edu/> All assignments, course materials and announcements will be posted on Blackboard

Office hours: Tuesday and Thursday after class (3:30-4:30), or by appointment. Send me an E-mail or call to set up appointment. I can also answer questions by Google chat, E-mail or over the phone.

Useful refs (not required): Nicholls, Martin, Wallace & Fuchs, From Neuron to Brain (in the bookstore).
Hille, Ion Channels of Excitable Membranes (possibly in the bookstore).
Kandel et al, Principles of Neural Science (in the bookstore).

Prerequisites: This is an advanced course for students who have already completed a basic course in Neurobiology (BI 360). If you don't know the basic material (for example, how action potentials are produced, what the Nernst equation is, or what the Golgi apparatus does), you shouldn't try to take this class. Undergraduates who have taken the prerequisite are usually well prepared for this class. In the past, I have sometimes allowed graduate students from other departments to take this course without the prerequisites. These students have had a very hard time catching up.

Instructional philosophy: This course is primarily a literature reading course. The main goal is to explore the experimental evidence behind some of the major advances in Neurobiology since 1950 by reading the original research reports. Most of the material was covered at a superficial level in BI 360. The main focus will be on the questions: What is the experimental evidence that supports each hypothesis or theory? How well does the evidence support the conclusion? Are there viable alternative explanations?

Most of the course will be spent covering the two topics that are the main focus of neuroscience research: (1) signaling mechanisms in individual neurons (e.g., action potentials) and (2) synaptic transmission between neurons. Because this course is concerned with how scientific knowledge progresses, the topics will be covered chronologically (more-or-less). These two topics have distinctly different characters. The main questions concerning action potentials were solved by the 1980's, while research into the mechanisms of synaptic transmission continues, and is very hot right now.

Reading the original literature is difficult. Unlike textbooks, which strive to package information in the most palatable form possible, the original literature reflects the authors' struggle to understand Nature. You will likewise have to struggle understand the assigned papers. Although I have tried to select papers that can be grasped (at least the main points) by anyone who has completed the prerequisite, probably no one in the class (including the professor) will have the background to understand every detail in the assigned papers. This should not discourage you. It is an unpleasant reality of life, which we must face all the time. Your goal should be to carefully read the assigned papers and try to understand as much as you can. The lectures should then provide the important missing pieces. In the end, I believe that you will find the result worth the effort.

Lecture format: About 2/3 of the class time will be lectures, with time for discussion. The remaining class time will be devoted to discussion of the reading assignments, problem sets, previous lectures, etc.

Reading assignments will be posted on Blackboard. I will assume that students come to each lecture having read the required readings. It is highly recommended that you take notes while reading and bring them to class to aid in discussions.

Grading: Three take-home midterm exams, worth (30% each), problem sets (10%). **No final exam.**