Quantitative Methods in Neuroscience

NEUBEH545/PBIO545

Course instructors: Wyeth Bair, Adrienne Fairhall, Fred Rieke

Teaching Assistants: Dean Pospisil
Office hours: TBA

Course Website: http://rieke-server.physiol.washington.edu/People/Fred/Classes/545/545.html

The course is organized into 2 week modules, each consisting of 4 class sessions. The first session of each module provides an introduction to a mathematical topic. The format is didactic. The second session provides more “hands on” exposure to the same topic. It will follow a less didactic format, with an agenda determined by student questions and interest. Emphasis in the second session will be questions based on the didactic lecture and Matlab tutorials. The success of this session depends on your questions! Sessions 3 and 4 consists of student-led discussion of scientific papers in which the mathematical concepts are applied to problems in neuroscience.

Grades
Class Project (due last week of class): 25%
Class Presentation: 25%
Class Participation: 25%
Tutorial Questions: 25%

We know students will come into the class with a wide range of mathematical backgrounds and experience with Matlab (see below). We will base grades as much as possible on effort. Class participation is a large part of the grade in the course; this will be based on questions asked during lecture, on questions you send in to help us organize the second class session of each module, and participation in discussion of in-class presentations by other students.

Matlab tutorials
We will use Matlab-based tutorials throughout the course. These require only a basic understanding of how to run functions in Matlab (no programming is required to run the tutorials). We will help those of you unfamiliar with Matlab by holding a brief introduction after the first lecture, by Dean holding a help session Wed specifically to run through the tutorial, and by being available during the first week. We highly recommend starting the tutorials early – before the first lecture of each module of the course.
Project
An important part of the course is the independent project. Successful projects will require substantial effort, and thus starting early is highly encouraged. Projects should build on the mathematical concepts introduced in class; this could include extensions of items introduced in papers we read in class or items in the tutorials. We will suggest topics throughout the course and feel free to ask at any point about potential projects. The project will consist of the following:
- Short (~1/2 page) project proposal due by March 2
- Discuss project with one of instructors or TA and get approval by March 4
- Final project due by noon March 10, to include:
  - project writeup (2-4 pages)
  - Matlab code and any associated data files
  - brief project presentation (normal class time March 10)

Journal Club Presentations
In the 2nd week of each 2 week block students will present papers illustrating the use (and perhaps misuse) of the mathematical concepts. Papers to be covered are listed on the course website.