

Matlab for Biologists
Bio 410/510 Spring 2016

Lecture: 9:00-9:50am Weds

Pre-lab orientation: 9:00-9:50am Fri

Lab: 10:00am -12:50pm Fri

Instructor: Cristopher Niell

Email: cniell@uoregon.edu

Office Hrs: Thurs 1-2pm (LISB 214) *starting April 7*

GTF: Nick Ponvert

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Office Hrs: During lab section

Description

Scientific programming is an essential skill for biological research in the 21st century. This course will provide an introduction to programming, using the Matlab environment, for students with none to minimal previous experience. We will focus on tools and applications relevant to biology, but the skills will be applicable to a wide range of scientific endeavors. Furthermore, the basic programming knowledge should greatly facilitate learning other languages such as python or R. However, it should be noted that this course is meant to be a practical “how-to” introduction, rather than the theoretical foundation that would be provided in a computer science course.

Each week, new concepts will be introduced in a lecture on Wednesdays, which will include direct demonstration of the use in Matlab. “Lecture notes” will be provided, which consist of the Matlab script generated through the course of the lecture. On Fridays, there will be a hands-on lab session to work through several problems that will be provided. The lab will be preceded by a short lecture including a review of the week’s concepts and an outline of the lab problems.

Requirements

Homework – After each Friday lab session I will distribute a homework set consisting of 1-2 programming problems, as well as occasional written questions. These should be completed and returned by midnight on the following Thursday. Programming problems should be submitted as matlab scripts.

Exams – There will be two exams, which will be in a similar format to the homework assignments, but will be completed during Friday lab sections.

Grading

Homework 30%

Midterm 30%

Final Exam 40%

Schedule

Mar 30 Lecture: Variables and mathematical operations

April 1 **No Lab**

Apr 6 Lecture: Plotting

Apr 8 Lab: Computations and plotting

Apr 13 Lecture: Data input/output

Apr 15 Lab: Data input/output

Apr 20 Lecture: Control structures

Apr 22 Lab: Control structures

Apr 27 Lecture: Creating functions

Apr 29 Lab: Functions

May 4 Midterm review

May 6 **Midterm exam**

May 11 Lecture: Statistics

May 13 Lab: Statistics

May 18 Lecture: Image processing

May 20 Lab: Image processing

May 25 Lecture: Analyzing real biological data

May 27 Lab: Neural data

June 1 - Overview

June 3 – **Final Exam**