Matlab for Biologists
Bio 410/510 Winter 2021

Lecture: 12:30-1:20pm Tues
Lab: 12:30-3:50pm Thurs

Instructor:
Cristopher Niell
Email: cniell@uoregon.edu
Office hrs: Mon 11am-12pm, and Fri 3-4pm

GEs:
Elliott Abe
Email: eabe@uoregon.edu
Office hrs: Fri 11am-noon
Mahboubeh Khoddam
Email: mkhoddam@uoregon.edu
Office hrs: Weds 9-10am

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 use 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 Tuesday, 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 Thursday, there will be a zoom-based lab session to work through problems that will be provided, during which Prof Niell and GE’s Abe and Khoddam will be available to provide guidance. 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 Thursday lab session I will distribute a homework set consisting of 1-3 programming problems, as well as occasional written questions. These should be completed and returned by noon on the following Tuesday. 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 Thursday lab sections.

Grading
Homework 30%
Midterm 30%
Final Exam 40%
Schedule

Jan 5 Lecture: Variables and mathematical operations
Jan 7 No Lab

Jan 12 Lecture: Plotting
Jan 14 Lab: Computations and plotting

Jan 19 Lecture: Data input/output
Jan 21 Lab: Data input/output

Jan 26 Lecture: Control structures
Jan 28 Lab: Control structures

Feb 2 Lecture: Creating functions
Feb 4 Lab: Functions

Feb 9 Midterm review
Feb 11 Midterm exam

Feb 16 Lecture: Statistics
Feb 18 Lab: Statistics

Feb 23 Lecture: Image processing
Feb 25 Lab: Image processing

Mar 2 Lecture: Analyzing biological data
Mar 4 Lab: Analyzing biological data

Mar 9 Overview
Mar 11 Final Exam