

## MATLAB syllabus

*Instructor:* Mai Nguyen, mlnghuyen@princeton.edu

*Meeting time:* MW, 2-3:30pm from June 10-July 29

*Office hours:* by appointment, very flexible

### *Class overview*

This class is an introduction to scientific computing using MATLAB for students with little to no experience with programming or statistics. Weeks 1-4 will focus on programming fundamentals, and Weeks 5-8 will walk through a simple data analysis pipeline and touch on advanced topics. This is a highly compressed course and will not cover everything you will need to know to do your research. The goal is to cover the basics and learn “enough” to get started on figuring out what you need to do, while emphasizing best practices.

### *Class structure*

- Combination of lecture and working through class examples
- Weekly assignments (2-3 hours, maybe longer for later topics) assigned Friday, due following Tuesday. I'll provide written feedback/comments on assignments and will be available for one-one-one meetings
- *Update, 7/1/20:* The last two weeks will primarily consist of guest lecturers on advanced topics due to scheduling conflicts with Mai's new fellowship position.

### Week 1: June 10 and 12

- Lecture 1, Wed: Introduction to MATLAB, getting started, MATLAB as a calculator,
- Lecture 2, Fri: Variables, data types I (integer, float, string, 1 and 2D arrays), manipulating arrays I

### Week 2: June 17 and 19

*Note: Class will be held 3-4:30pm this week only*

- Lecture 3, Wed: Functions, scope, debugging
- Lecture 4, Fri: Logicals, control flow I (if/else, switch)

### Week 3: June 24 and 26

- Lecture 5, Wed: Control flow II (loops)
- Lecture 6, Fri: Plotting

### Week 4: July 1

- Lecture 7, Wed: Plotting II, Data types II, Pathing and IO
- Fri: no meeting for Fourth of July

### Week 5: July 8 and 10

- Lecture 8, Wed: Data analysis I – Initial visualization, normal distribution, p-values, comparing central tendency in 1 or more groups (t-test, ANOVA)

- Lecture 9, Fri: Data analysis II – regression, correlation, visualization

Week 6: July 15 and 17

- Lecture 10, Wed: Advanced topics – Classification (Guest lecturers: Elise Piazza and Cătălin Iordan, [epiazza@princeton.edu](mailto:epiazza@princeton.edu) and [mci@princeton.edu](mailto:mci@princeton.edu))
- Lecture 11, Fri: TBD

Week 7: July 22 and July 24

- Lecture 12, Wed: Advanced topics – Natural Language Processing (Guest lecturer: Zaid Zada, [zzada@princeton.edu](mailto:zzada@princeton.edu))
- Lecture 13, Fri: Advanced topics – Open science, code reproducibility, GitHub (Guest lecturer: Sam Nastase, [snastase@princeton.edu](mailto:snastase@princeton.edu))

Week 8: July 29

- Lecture 14, Wed: Wrap-up