

Engineering 7

Introduction to Computer Programming for Scientists and Engineers

University of California Berkeley

Summer 2017 (Session B, 10W)

Catalog Description

Elements of procedural and object-oriented programming. Induction, iteration, and recursion. Real functions and floating-point computations for engineering analysis. Introduction to data structures. Representative examples are drawn from mathematics, science, and engineering. The course uses the MATLAB programming language.

Course Objectives

By the end of this course, students will be able to

- identify applicable functions from documentation,
- generate code and documentation adhering to standard style guidelines,
- utilize the MATLAB graphical user interface to resolve errors and generate results, and
- translate science and engineering problems into MATLAB scripts.

Instructors

Role	Name	Email	Office Hours
Instructor	Dr. Heather Savoy	frystacka@berkeley.edu	Tu,Th 11am-4:30pm in Etcheverry 6161
GSI	Jason Simon	jasonsimon@berkeley.edu	M,W 5-8pm in Jacobs 10

Course Format

This course has lecture, lab, and discussion sessions.

- Lecture sessions are on Tuesdays and Thursdays. They will be used to introduce new material. Slides used in these sessions will be posted to bCourses afterwards, but they are minimal and thus not sufficient replacements to coming to lecture.
- Lab sessions are on Mondays and Wednesdays. They will be used to work on weekly problem sets with the aid of the GSI. Note that the GSI office hours and the lab sessions are the same thing.
- The discussion session is on Fridays. It will be used to work through example problems and stressing best practices.

The course as a whole will focus on learning both how to program and how to apply that programming skill to scientific and engineering problems. The first five weeks will have a greater focus on learning MATLAB syntax and general best-practices in programming. The second five weeks will focus more on how to translate common numerical methods in science and engineering into MATLAB.

Course Websites

bCourses The problem sets will be posted on and submitted to the bCourses site. Assignment grades will also be recorded and displayed on bCourses. <https://bcourses.berkeley.edu/courses/1461930>

Piazza You may post any questions you have regarding the assignments, course logistics, or programming in general to the Piazza site. piazza.com/berkeley/summer2017/engin7

Assignments

There will be multiple weekly assignment types:

Problem sets These will be due on Thursdays by 11:59pm via submission to bCourses. These problem sets will be primarily MATLAB coding exercises and the submissions will be the MATLAB files you create. You may discuss the problems with others during the lab sessions, but you must write and upload your own code. You will receive a zero for a problem set that has any portion of it copied.

Quizzes Either bCourses or hard copies will be used during lecture to administer short quizzes.

Discussion exercises During discussion sessions, we will work together to tackle applied problems. You will submit either electronic or hard copy results.

Grading

Problem sets: 40%

Quizzes: 5%

Discussion exercises: 5%

Midterm: 20%

Final: 30%

Grading policies: Problem sets turned in a day late (on Friday) will be deducted 8 points. Submissions after Friday will not be accepted (you will get zero points). If you will miss a discussion session, you must email me beforehand to arrange how to make-up the exercise for credit. Late quizzes won't be accepted unless arranged beforehand by email. If you have any concerns with a grade you received, email me within a week of receiving the grade if you want your grade to be re-considered.

Tentative Schedule

Week	Due	Topics
W1: 6/5 - 6/9	PS0	Course introduction; MATLAB GUI, scripts, and formatting; Variable formats and reading files
W2: 6/12 - 6/16	PS1	Functions: formal, anonymous, subfunctions, nested
W3: 6/19 - 6/23	PS2	Operators, conditions, and control statements
W4: 6/26 - 6/30	PS3	Plotting 2D and 3D, animations
W5: 7/3 - 7/7	-	Holiday on Tuesday, Midterm on Thursday
W6: 7/10 - 7/14	PS4	Linear algebra and curve fitting
W7: 7/17 - 7/21	PS5	Numerical Differentiation and Interpolation
W8: 7/24 - 7/28	PS6	Numerical integration and differential equations
W9: 7/31 - 8/4	PS7	Statistics and image processing
W10: 8/7 - 8/11	-	Review on Tuesday and final exam on Thursday