

Purpose: This course is an introduction to programming with applications in engineering, which will be useful to anyone who processes data, simulates complex systems, or automates repetitive tasks.

Bulletin Description: Introduction to programming in MATLAB: numeric, Boolean, and string variables; flow control structures; vectors and matrices; and script and function files. MATLAB will be studied in the context of multiple engineering disciplines with applications. Credit Hours: 2. Prerequisites: None.

Course Website: <http://teaching.up.edu/EGR111>

Text: No textbook is required.

Software: MATLAB will be used extensively in the course. Students can access MATLAB from the computers in Shiley Hall, from any computer connected to the internet through the Virtual Desktop Interface (VDI), or can purchase the student version from mathworks.com (for about \$100).

Faculty:

Section	Time	Instructor	Phone	Email	Office*
A	8:40-9:35 TR	Dr. Tim Doughty	x8569	doughty@up.edu	237
B	9:45-10:40 TR	Dr. Tim Doughty	x8569	doughty@up.edu	237
C	1:35-2:30 WF	Dr. Robert Albright	x7115	albright@up.edu	216
D	2:30-3:25 TR	Dr. Matthew Kuhn	x7361	kuhn@up.edu	235
E	4:10-5:05 MW	Dr. Wayne Lu	x7140	lu@up.edu	234
F	12:55-1:50 TR	Dr. Tim Doughty	x8569	doughty@up.edu	237

*All offices are in Shiley Hall

Office Hours: Arranged by individual instructor.

Course Learning Objectives:

- To write MATLAB computer programs, including assignment, indexing, plotting, importing and exporting data, loops, branching, script files, and user-defined functions.
- To demonstrate skills in designing, implementing, documenting, testing, debugging, and analyzing programs in the context of engineering problems.
- To apply MATLAB to technical problems in multiple engineering disciplines with applications such as image and sound processing, heat transfer, and stress-strain analysis.

Assessment: Student learning will be assessed as follows:

Labs	25%
Midterm Exam	25%
Final Exam	25%
4 Quizzes	15%
Career Assignment	5%
Participation/Miscellaneous	5%
Total	100%

Crib Sheet Policy

Since engineers usually have access to reference material when they work, students will be allowed to use one 8.5x11 inch crib sheet (both sides) on quizzes and exams. Students can use the crib sheet to write notes about the material that is covered on the quizzes and exams.

University of Portland's Code of Academic Integrity

Academic integrity is openness and honesty in all scholarly endeavors. The University of Portland is a scholarly community dedicated to the discovery, investigation, and dissemination of truth, and to the development of the whole person. Membership in this community is a privilege, requiring each person to practice academic integrity at its highest level, while expecting and promoting the same in others. Breaches of academic integrity will not be tolerated and will be addressed by the community with all due gravity. (Taken from the University of Portland's Code of Academic Integrity.)

The complete code may be found in the University of Portland Student Handbook and as well the Guidelines for Implementation. It is each student's responsibility to be informed of the code and guidelines.

Students are strongly encouraged to help each other learn during the labs and outside of class, so the following activities are **not** considered cheating in this course:

- asking other students or the instructor questions about the labs
- answering questions regarding the labs
- discussing solutions to the labs

However, since copying does not help students learn, the following are examples of activities that **are** considered cheating in this course:

- copying the solutions to labs, quizzes, and exams
- providing the solutions to labs, quizzes, and exams to other students
- communicating with others during a quiz or exam in any form, verbally, non-verbally, electronically, in writing, etc.
- gaining access to a quiz, exam, or the solution before a quiz or exam
- changing an answer after a quiz or exam is returned, and then turning it in for a re-grade

Accommodation for Disability

If you have a disability and require an accommodation to fully participate in this class, contact the Office for Students with Disabilities (OSWD), located in the University Health Center (503-943-7134), as soon as possible. If you have an OSWD Accommodation Plan, you should make an appointment to meet with me to discuss your accommodations. Also, you should meet with me if you wish to discuss emergency medical information or special arrangements in case the building must be evacuated.

Assessment Disclosure Statement

Student work products for this course may be used by the University for educational quality assurance purposes and to research effective teaching techniques.

Specific Outcomes of Instruction: At the successful completion of this course, students should be able to do the following:

1. Use the MATLAB help facility
2. Plot data and functions
3. Use trig functions
4. Load, process, and listen to audio files
5. Manipulate complex numbers
6. Write and use functions
7. Use relational and logical operators
8. Write if-else-end statements
9. Write loops
10. Load, process, and view images
11. Write programs to solve engineering problems

Exam Schedule

Section	Class taught at	Instructor	Midterm	Final
A	8:40-9:35 TR	Dr. Tim Doughty	Th, Feb 19	TBD
B	9:45-10:40 TR	Dr. Tim Doughty	Th, Feb 19	TBD
C	1:35-2:30 WF	Dr. Robert Albright	Fri, Feb 20	TBD
D	2:30-3:25 TR	Dr. Matthew Kuhn	Th, Feb 19	TBD
E	4:10-5:05 MW	Dr. Wayne Lu	Wed, Feb 18	TBD
F	12:55-1:50 TR	Dr. Tim Doughty	Th, Feb 19	TBD

Course Schedule

Class Period	Topic
1	Course Overview
2	Intro to MATLAB
3	Plotting Data
4	Trig Functions
5	Audio Processing and Filters
6	Complex Numbers (Quiz 1)
7	Functions
8	Relational Operators and Conditional Execution
9	Loops (Quiz 2)
10	Fourier Series
11	Review for Midterm Exam
12	Midterm Exam
13	Image Processing
14	Heat Transfer
15	Stress-strain (Quiz 3)
16	Project 1
17	Project 1 (cont.)
18	Project 1 (cont.)
19	Project 2
20	Project 2 (cont.) (Quiz 4)
21	Project 2 (cont.)
22	Project 2 (cont.)
23	Project 3
24	Project 3 (cont.)
25	Project 3 (cont.)
26	Project 3 (cont.)
27	Review for Final Exam
28	Final Exam

Quizzes

Quiz 1 covers the labs up to and including Audio Processing

Quiz 2 covers the labs up to and including Conditional Execution

Quiz 3 covers the labs up to and including Heat Transfer

Quiz 4 covers the labs up to and including Project 1

Exams

The Midterm Exam covers the labs up to and including Conditional Execution

The Final Exam is comprehensive and covers all of the labs.