

ENGR20/CSCI20: MATLAB Programming (3.0 Units)



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Introduction MATLAB, short for MATrix LABoratory, is an industry standard piece of software in engineering and scientific computing. This course will focus on utilizing this software to solve engineering problems. You will learn how to code in MATLAB, visualize data, create functions and algorithms, and learn how to use code to solve complex problems. This is a late start course, so the material in this course will be given at a slightly faster pace.

Text I have created a ‘textbook’ for the course that is an expansion of previous course notes with more examples, practice problems, and suggested Midterm and Final exam study guides and project ideas. I will also have some Zero Cost online textbooks linked for more resources. If you find any resources you find valuable, please share them with me and I will make sure it’s available for everyone else as well.

Required Software This class requires a copy of R2025a MATLAB (previous versions work but there may be significant differences in code you see in class and what you can do at home). You can purchase the license for \$49.99 at [Purchase MATLAB](#). There is a \$99 option, but I mainly only recommend that for MechE and Aero students preparing to transfer, as Simulink is beyond the scope of this class.

Expectations Programming is not a spectator sport. You can only truly learn the material by working with it and solving problems. This course is also a Hybrid course, with only one meeting a week. As a 3-unit course, the average expected workload outside of class is 9 hours (3 units x 3 hours/unit). This means you should be budgeting approximately 11 hours a week on additional reading and homework. This is an average; some weeks will require less or more. See the course outline below for the projected reading schedule.

SLO's Student learning outcomes (SLOs) are listed here as a sampling of the types of learning that a student will be expected to master in this course.

- Students will be able to apply a top-down design methodology to develop computer algorithms.
- Students will be able to use MATLAB effectively to analyze and visualize data.
- Students will be able to apply numerical methods techniques in a MATLAB program to analyze and solve engineering-related problems.

Homework and Code Demonstration Days As it currently stands, with the advent and use of Large Language Models (LLMs), homework has been reduced to suggested practice problems. In spirit of students gaining practice, there will be a lot of code demonstration days in class where you will code something and show me for credit. In addition, there will be weekly quizzes based off the reading, due the Sunday before lecture to ensure you have enough time to see the material before practicing it.

Exams There will be a midterm and final exam. (*Note: Partial credit will be given, so you must show all work.*) **Exams will be taken in class.** There will be a written portion as well as a programming portion to each exam. Exams will be closed note, with only the help of MATLAB Help documentation. We will discuss this in more detail before the midterm exam. A list of suggested problems and concepts will be in the book provided.

Project This class will have two projects, due at the midterm and final, respectively. There will be a list of possible project ideas available in the book.

Evaluation:	Weekly Quizzes	10%	Scale:	90-100%	A
	In-Class Demos	10%		80-89%	B
	Midterm Exam	30%		70-79%	C
	Projects (2)	20%		60-69%	D
	Final Exam	30%		Below 59%	F

Attendance: This class is an in-person class. Although I will not be taking attendance, there will be in-class demonstrations of coding ability that need to be completed which will mostly rely on material specifically covered in lecture that day.

How to Succeed To succeed in this course, you must be willing to set a schedule and practice programming at least twice a week. Many of you will be experiencing programming for the first time; it will feel overwhelming at times with all you need to know. Some tips:

- When starting a project or complicated problem, always start on paper/tablet. Write out what your objective is, draw some pictures, and describe the behavior or end-goal of what your code should be doing.
- Do not memorize – it is tempting to do this at first, but once you see that programming is more a game of knowing what patterns to recognize, you can focus on the higher-level idea of what you are doing rather than memorizing specific commands.
- MATLAB Help and Documentation are your best friends.
- Comment your code often – focus on the why, not what.
- Practice, practice, practice!
- Ask your SI for practice problems and clarify concepts with them.
- **Come to office hours, please! It is a lot of fun to talk code with students! (If the hours do not work, please feel free to email me)**

Conduct: Please refer to the Catalogue or Student Handbook for Code of Student Conduct. Cheating is a violation of the Code of Student Conduct and will not be tolerated in class; to do so may result in a grade of "F". It can lead to permanent expulsion from this college. Cheating includes allowing someone to copy from your work.
**You may not use a Calculator that has a Qwerty keypad on the exams.

Course Schedule (Tentative)

Week	Reading Required	Class Activity	Due Dates
Week 1: 8/11 – 8/17	Chapter 1 – all	Syllabus, Introduction to MATLAB	Chapter 1 Quiz: Due 8/17
Week 2: 8/18 – 8/24	Chapter 2 – all	Chapter 1 review, chapter 1 code demonstrations	Chapter 2 Quiz: Due 8/24
Week 3: 8/25 – 8/31	Chapter 3 – all	Chapter 2 code demo	Chapter 3 Quiz: Due 8/31
Week 4: 9/1 – 9/7	Chapter 4 – all	Chapter 3 code demo	Chapter 4 Quiz: Due 9/7
Week 5: 9/8 – 9/14	Chapter 5 – all	Chapter 4 code demo	Chapter 5 Quiz: Due 9/14
Week 6: 9/15 – 9/21	Chapter 6 – all	Chapter 5 code demo	Midterm Project Assigned – 9/15
Week 7: 9/22 – 9/28	Midterm Review	Midterm Review	Practice Midterm – Due 9/28
Week 8: 9/29 – 10/5	Chapter 7 - all	Midterm Exam 9/30	Midterm Project Due: 9/29 Chapter 7 Quiz: Due 10/5
Week 9: 10/6 – 10/12	Chapter 8 – all	Game of Life – Live Code Demo	Finish the code/suggested optimizations from class
Week 10: 10/13 – 10/19	Chapter 8 – all	Chapter 7 code demo	Chapter 8 Quiz: Due 10/12
Week 11: 10/20 – 10/26	Chapter 9 – all	Chapter 8 code demo	Chapter 9 Quiz: Due 10/19
Week 12: 10/27 – 11/2	Chapter 10 – all	Chapter 9 code demo	Chapter 10 Quiz: Due 11/2
Week 13: 11/3 – 11/9	Chapter 11 – all	Chapter 10 code demo	Chapter 11 Quiz: Due 11/9 Final Project Assigned
Week 14: 11/10 – 11/16	Veterans Day		
Week 15: 11/17 – 11/23	Chapter 12 – all	Chapter 11 code demo App Designer Intro	-
Week 16: 11/24 – 11/30	Thanksgiving		
Week 17: 12/1 – 12/7	Final Review	Final Review	-
Week 18: 12/8 – 12/14	Finals	Final Review	Final Project: Due 12/10 Final Exam: 12/11 6:10 – 8:00 pm