

ENGR 5 – Programming and Problem Solving in MATLAB

Section #54550

Class:

Hybrid (Online and Face-to-Face)

Class meetings on Tuesdays/Thursdays, 8:00-9:15am, FEM-3

All online class materials posted on Canvas

Instructor:

Dr. John Heathcote

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Office Hours:

MW 9:00-9:50am

TThF 10:00-10:50am

If you cannot make regular office hours, feel free to make an appointment.

Welcome to ENGR 5, a brand-new course for Reedley College! In this course, you will learn how to use the MATLAB programming environment and applying it towards solving engineering problems. I have heard from many previous students that they wish that they had learned MATLAB before transferring. So, I am excited to join you in this journey in learning this useful skill!

Prerequisites: MATH 5A

Catalog Description: This course utilizes the MATLAB environment to provide students with a working knowledge of computer-based problem-solving methods relevant to science and engineering. It introduces the fundamentals of procedural and object-oriented programming, numerical analysis, and data structures. Examples and assignments in the course are drawn from practical applications in engineering, physics, and mathematics.

Textbook: Zybook, incorporated within our Canvas course shell: Programming and Problem-Solving in MATLAB, with content Andre Knoesen and Rajeevan Amirtharajah.
(You will be provided with a free access code to access this book.)

The readings from the textbook are interactive. When you are assigned a reading assignment, you must complete the participation and challenge activities. You will receive a grade based on your completion of these tasks.

Grading:	30%	Zybook Assignments
	40%	In-Class Labs
	30%	Quizzes and Tests

Zybooks Assignments: As previously mentioned, you will be given reading assignments from the Zybooks textbook. While reading each section, you will be asked to complete participation and challenge activities. These will help you to gain understanding on the material. These readings will typically be due the night before each class meeting.

In-Class Labs: During our face-to-face class meetings, we will work on the actual programming activities with MATLAB. These are very important and so they count for a large portion of the grade. There will be a number of programs and/or activities assigned at each of our class meetings. Typically, assignments from a Tuesday meeting will be due by Thursday night, and assignments from a Thursday meeting will be due by Monday night.

Lab Corrections: Since the programming skills are so important, you will have the opportunity to make corrections if you do not get a program correct the first time. If you do not receive full credit on a lab activity, you may resubmit your work with your corrections to gain the full points. The final day for corrections is set as two weeks after the initial assignment due date.

Late Work: Late assignments will be accepted but will not receive full credit.

Quizzes and Tests: There will be both short quizzes (covering single chapters) and full tests (covering several chapters) throughout the semester. These tests may involve both written work and MATLAB programming.

Grading Scale:	90-100%	A
	80-89.9%	B
	70-79.9%	C
	60-69.9%	D
	<60%	F

Accommodations for Students with Disabilities:

If you have a verified need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act (ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.

Add Date:	Friday, August 27	Last day to add a course
Drop Date:	Friday, October 8	Last day to drop this course
Holidays:	Monday, September 6	Labor Day
	Thursday, November 11	Veterans' Day
	Thursday-Friday, November 25-26	Thanksgiving Holiday
Final:	Thursday, December 9, 8:00-9:50 am	

Student Learning Outcomes:

Upon completion of this course, students will be able to:

1. Apply a top-down design methodology to develop computer algorithms.
2. Create, test and debug sequential MATLAB programs, as well as programs that use object-oriented techniques, in order to achieve computational objectives.
3. Apply numeric techniques and computer simulations to analyze and solve engineering-related problems.
4. Use MATLAB effectively to analyze and visualize data.
5. Demonstrate understanding and use of standard data structures.

Objectives:

In the process of completing this course, students will:

1. Use variables, expressions, and order of operation in MATLAB programs.
2. Use elementary functions in MATLAB programs.
3. Use arrays in MATLAB programs.
4. Learn to design and apply computational problem-solving methodology.
5. Use pseudocode, flowcharts, and documentation to explain the logic of programs.
6. Design programs that use formatted input and output.
7. Design programs that interact with external data files.
8. Use a MATLAB program to plot data.
9. Design programs that use selection programming structures.
10. Design programs that use repetition programming structures.
11. Use intrinsic MATLAB functions and user-defined functions in programs.
12. Design functions that use recursion.
13. Use standard data structures in programs.
14. Design and use sorting and searching algorithms.
15. Write programs that use object-oriented programming concepts.
16. Write programs that solve problems using the following numerical analysis techniques: a. Solving systems of linear equations b. Vector analysis c. Data interpolation d. Least-squares regression and linearization e. Numerical differentiation and integration f. Solving ordinary differential equations g. Series approximation and error h. Solving equations of one variable.