

Catalog Description

An introduction to using computer applications to solve engineering problems. Learning the rudiments of MATLAB and Excel in order to design and/or visualize systems. Emphasis is on learning to use these applications appropriately and efficiently, with well structured code that is commented and includes checks to find errors. (3 credits).

Learning Objectives

During this course students will:

- learn basic functionality of MATLAB and Excel, from computing numerical answers to graphing results;
- learn how to use these applications properly and efficiently;
- learn how to apply math, science, and engineering concepts and principles to solve interesting problems;
- begin to learn about the design process; and
- learn how to check their answers, an essential skill for professional engineers.

Instructional Approach

Using programs correctly and efficiently. Developing techniques for checking, etc.

Instructor

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Office Hours: Any time I am in my office (check my schedule)

Prerequisites

A passing grade in MATH 132 (Calculus II) and PHYSICS 151 (Physics I) is required to enroll in this class.

Textbooks

There is no formal text for this course. Written materials will be provided as needed.

Resources and Components

Lecture Notes. From Fall 2018, with lots of sample scripts and workbooks.

MATLAB Exercises. There are 8 MATLAB exercises, designed to show you the fundamentals of

scripting with MATLAB. Each exercise is worth 12 points, with 3 "Mastery" points for a perfect solution uploaded at any time, and another 3 Bonus points for a perfect solution uploaded before a certain date. (Max = 120 points + 24 Bonus points)

Excel Exercises. There are 7 Excel exercises, designed to show you the fundamentals of setting up and organizing an Excel spreadsheet. Like the MATLAB exercises, each is worth 12 points, with 3 "Mastery" points for a perfect solution uploaded at any time, and another 3 Bonus points for a perfect solution uploaded before a certain date. (Max = 105 points + 21 Bonus points)

Projects. There are two projects, worth up to 75 points each, including Mastery points.

Bonus Project. Project 3 is completely optional. It is worth up to 20 Bonus points.

Midterm. There is one midterm, administered by Moodle, worth up to 125 points. Secure testing software will be used to guarantee individual accountability.

Final Exam. The Final Exam is worth up to 150 points. Secure testing software will be used for this exam as well.

Grading

There is a total of 650 points possible, including Mastery points, but not including Bonus points. To earn a D, you must earn 80 points on the MATLAB exercises, 70 points on the Excel exercises, 50 points on each of the Projects, and 165 points (combined) on the midterm and final exam.

Every 20 points is a grade increment, e.g., D to D+. Thus, 475 points are needed for a guaranteed C, and 605 points are needed for a guaranteed A.

These grading cutoffs are guaranteed. Therefore, you are not in competition for grades with your classmates. If you are close to meeting one of the minimum scores, the requirement will be waived and a small penalty will be assessed (to be fair to those who met all of the minimum criteria).

Exams / RPNow

There are one Midterm and a Final Exam. You will be using your computer during the exams, and you will be monitored using secure testing software called "RPNow" (Remote Proctor Now). This service costs \$40 for the course. If you have used RPNow for a previous course, you will need to use a different email address so that the system prompts you to pay another \$40.

During each exam, RPNow will record two videos, one using your web cam and another of your computer screen. The software does not prevent cheating. Instead, it verifies that you did not cheat. In other words, after the exam, each video is reviewed. If anything even mildly suspicious is found, the course instructor is notified, and a decision is made about what to do about it.

Accommodations

The University of Massachusetts Amherst is committed to providing an equal educational opportunity for all students. If you have a documented physical, psychological, or learning disability on file with Disability Services (DS), you may be eligible for reasonable academic accommodations to help you succeed in this course. If you have a documented disability that requires an accommodation, please notify me within the first

two weeks of the semester so that we may make appropriate arrangements.

Collaboration vs. Cheating

You are encouraged to work together, however, ultimately you must learn how to compute yourself, so do not rely too heavily on other students for help. You also may not work too closely with someone on the MATLAB and Excel exercises. In particular, you can brainstorm before you start programming, and you can compare results after you are finished, but you should not be sharing formulas or lines of code with each other. Occasionally, you might need or know a useful command or function, and you may collaborate. But the intent is that your script or spreadsheet is your own. It should reflect your own understanding and your own way of organizing the solution. If you need additional help, you should be asking me or the TA for help, not your classmates.

I will deal informally with most cases of academic dishonesty, however, I am required to report all cases, formal or informal, to the Ombuds Office. Note that the Ombuds Office is required, in turn, to inform the University administration if there are three or more reports of academic dishonesty regarding the same individual, who then decides if more serious disciplinary action is warranted.