

# EE 110 Introduction to Engineering Computation

**Credits:** 3

**Instructor(s):** Gurdal Arslan, James Yee

## **Textbook and Other Required Materials:**

Stormy Attaway, *MATLAB: A Practical Introduction to Programming and Problem Solving (fifth edition)*, Attaway, 2018.

**Designation:** Elective

## **Catalog Description:**

Engineering problem solving using MATLAB. Basic programming concepts include input/output, branching, looping, functions, file input/output, and data structures such as arrays and structures. Matrix operations for solving linear equations. Engineering computations and visualization.

**Pre- and Co-requisites:** EE and CENG majors only. A-F only. Pre: MATH 241 (or concurrent) or MATH 251A (or concurrent) or consent.

**Class/Lab Schedule:** 2 lecture hours and one 3 hour lab per week.

## **Topics Covered:**

- Introduction to MATLAB
- Vectors and Matrices
- Introduction to MATLAB Programming
- Selection Statements
- Loop Statements and Vectorizing Code
- MATLAB Programs
- String Manipulations
- Data Structures: Cell Arrays and Structures
- Sights and Sounds (image and audio signal processing)

### **Course Objectives and Relationship to Program Objectives:**

Students should be able to (i) understand and analyze a broad range of engineering problems and (ii) design algorithms to solve these problems and meet design specifications [1, 2, 4].

### **Course Outcomes and Their Relationship to Program Outcomes**

The course outcomes are closely related to the topics covered

- Gain an understanding of the MATLAB programming environment. [7]
- Learn basic linear algebra (as applied to vectors and matrices) and the application of these methods to simple engineering problems. [1,7]
- Algorithm development, scripting, and function development in MATLAB. [1,2,6,7]
- Classic selection statements as represented in MATLAB. [1,2,6,7]
- Loop statements and the desirability of vectorizing code. [1,2,6,7]
- Advanced MATLAB programming concepts. [1,2,6,7]
- Analyzing and generating symbol strings. [1,2,6,7]
- The use of unique data structures specific to MATLAB: Cell Arrays and Structures. [1,2,6,7]
- Image, video and audio signal processing with MATLAB. [1,2,6,7]

### **Contribution of Course to Meeting the Professional Component**

Engineering topics: 100%.

### **Computer Usage:**

Matlab is used throughout the course.

**Person(s) Preparing Syllabus and Date:** Todd R. Reed, 10/2/14. Modified by M. Fripp, 1/21/21.