

Programming and Problem-Solving in MATLAB (equivalent to C-ID ENGR 220)
3 Units (2 Lecture + 1 Lab), typically 80 – 85 contact hours (16-17 weeks x 5 hrs/week)
Prerequisite: Calculus 1

Course description: This course utilizes the MATLAB (or equivalent) 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.

The course resources are structured around a flipped approach where students watch video lectures at home and engage in programming activities during class time. Therefore, optimum scheduling is two weekly class periods of roughly equal duration.

Course objectives: There are essentially four major overlapping objectives in the course,

1. Reinforce a structured, top-down approach to formulate and solve problems.
2. Introduce common approaches, structures, and conventions for creating and evaluating computer programs, primarily in a procedural paradigm, but with a brief introduction to object-oriented concepts and terminology.
3. Apply a variety of common numeric techniques to solve and visualize engineering-related computational problems.
4. Introduce the MATLAB software environment.

Learning Outcomes: By the end of this course, students should 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.

Resource Links:

This course was originally developed as a [4-unit course described here](#).

[Detailed course learning objectives for students.](#)

[Sample Course Syllabus:](#) textbook info, course requirements, course content, etc.

[Topic Sequence:](#) with links to all student resources (videos, slides, labs, HW)

[Course Documents:](#) Directory containing all documents (.doc and .pdf files)