**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)