I.   **CATALOG DESCRIPTION**
Course Number: ENGR1020
Course Title: MATLAB Programming and Problem Solving
Prerequisite(s):   A grade of 'C' or higher in MATH1150 or higher or appropriate score on the math placement test.
Catalog Description: This course introduces students to the engineering problem solving process in the context of high level structured computer programming. The course consists of a sequence of programming assignments that require students to write computer programs to solve engineering problems. All of the computer assignments will be written in MATLAB.
Credit Hours: 3.0
Class Hours: 45
Lab Hours: 0
Total Contact Hours: 45

II.   **COURSE OBJECTIVES**: *Course will*:
A.   Train students to apply problem solving skills to the computer solution of engineering problems.
B.   Train students to be able to write, debug and demonstrate the accuracy of computer programs written in MATLAB.
C.   Train students to be able to write structured programs, including the use of function calls and file input and output.
D.   Train students to effectively utilize data structures such arrays and linked lists in computer programs.

III.   **STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES**
A.   Student Learning Outcomes**:** *Student will be able to:*
1.   Learn necessary programming skills needed for Engineering majors.
2.   Use the skills learned in the course to be solve practical engineering problems.
B.   General Education Learning Outcomes
1.   GELO #3: Critical Thinking & Problem Solving
Outcome: Collect, identify, interpret and analyze data.
Outcome: Synthesize information to arrive at reasoned solutions to problems.
Outcome: Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.
2.   GELO #5: Analytical, Quantitative, and Scientific Reasoning
Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.
Outcome: Understand and create logical arguments supported by quantitative and scientific evidence and communicate those arguments in a variety of formats.
Outcome: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.
Outcome: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.

IV. **CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information*)**
   A.   Introduction to computers and programming (chap 1)
   B.   Introduction to MATLAB variables, expressions, matrices (chap 1 and 2)
   C.   Overview of MATLAB programs, functions, and plotting (chap 3)
   D.   Selection, looping, and vectorizing code (chap 4, 5)
   E.   Programming with functions, recursion (chap 6, 10)
   F.   String manipulation (chap 7 – partial coverage)
   G.   Data structures: cell arrays and structures (chap 8)
   H.   Advanced file input and output (chap 9)
   I.   Sets, sorting, searching, indexes (chap 12)
   J.   Handle graphics, creating Graphical User Interfaces (chap 11.5, 13)

V. **INSTRUCTIONAL MATERIALS**
   A.   Required Text(s):
      1.   Attaway, Stormy, *MATLAB: A Practical Introduction to Programming and Problem Solving*, 4th ed., Elsevier, 2016. ISBN: 978-1118807330.

VI. **METHODS OF PRESENTATION/INSTRUCTION**
   A.   Methods of presentation typically include a combination of the following:
      1.   Lecture
      2.   Small group discussions
      3.   Lab activities using MATLAB

VII. **METHODS OF EVALUATION**
   A.   Labs (top 10): 50%
   B.   Tests (three): 45%
   C.   Attendance/Participation: 5%
   D.   SCC GRADING SCALE

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VIII. **SPECIFIC COURSE REQUIREMENTS**
   A.   None.