



Course Name: ENR-125 Computer Programming for Engineers

Date Updated: 2/2022

Credit Hours/week: Lec. 2 hrs., Lab 1 hr./wk. – 3 cr.

BEGINNING: SPRING 2022

Catalog Description: A course in structured and object-oriented programming, emphasizing engineering applications and numerical methods in assignments. Program assignments are coded and are implemented on personal computers.

Prerequisite: MAT-123 Precalculus

Text: MATLAB & Simulink Student Version/CD Introduction to MATLAB for Engineers L MathWorks MathWorks Required L Palm McGraw-Hill

MATLAB for Engineers L Moore Prentice Hall (Recommended)

MATLAB: A Practical Introduction to Programming & Problem Solving L Attaway Elsevier (Recommended)

Supplementary Material: Specialized equipment, supplies, facilities, for classes limited by enrollment or restricted by accreditation and/or equipment limitations: (Information will be used to determine differential funding category.)

Laboratory component requires one personal computer, equipped with the MathWorks MATLAB IDE, for each student. (Current Class Size: 20)

Syllabus:

Topics
Introduction to: Computers, Program Algorithms, Language Levels, and Language Processors
Demonstration Programs
Structured Transfer of Control
Numerical Methods
Array Data Structures, Subscripted Variables, Array Element I/O and Manipulation
Curve Fitting
Multidimensional Arrays and Matrix Operations
Equation Solving
Overview of Sorting Algorithms (time permitting)

Format for Offering this Course: Traditional

Students are expected to adhere to the policies of the County College of Morris. These can be accessed at: (insert link here)

Statement of Expected Course LEARNING OUTCOMES

- Develop the capacity to describe an algorithm using structured pseudocode or a structured flow diagram
- Be able to implement an algorithm that is described using either pseudocode or a structured flow diagram in modern programming code. (ENR 125 is currently using the Java language.)
- Demonstrate the ability to use standard programming structures to generate algorithm steps for accomplishing a described problem task.
- Obtain the computer lab skills necessary to enter, store, edit, and execute, and debug program files using a modern operating system (currently Windows XP), development environment software (currently NetBeans IDE), and a language processor (currently, Java SE).
- Use an acquired library of numerical algorithms for root-finding, curve fitting for interpolation and extrapolation, equation solving, determination of tangent slope, and area under a curve. (Current selections include method of bisection, the secant rule, linear least-squares fit, Lagrange polynomial fit, Gauss-Seidel iteration, trapezoidal approximation, and numerical evaluation of the difference quotient.)
- Apply the concepts of classes, objects, and methods to create and implement a described class in Java and to construct an object-oriented program that utilizes the class objects and methods to solve a specified problem.

Statement of Relation to Curriculum(s):

Required for Engineering Science major, elective for Mathematics and Science majors.