ME021 –Engineering Computing

Syllabus for ABET

February 19, 2013

Designation:
Lower division required undergraduate course

Credits:
4

Targeted Audience:
Freshmen of mechanical engineering and other engineering major

Catalog Description:
Introduction to Fortran and Matlab. Concepts of formatted input/output, data types, variables, arrays, strings, variable scopes, logic statements, loops and repetition, functions and subroutines, and data graphing. Computing examples are drawn from mechanical engineering topics including linear algebraic equations, root search, two and three-dimensional graphics. Laboratory included.

Reference Books:
- Introduction to Programming with Fortran with coverage of Fortran 90, 95, 2003 and 77 (2006) by Ian Chivers, Jane Sleightholme, Springer.
- Solving Applied Mathematical Problems with MATLAB (2008) by Dingyu Xue and YangQuan Chen, CRC Press.

Course Objectives and Learning Outcome:

After successful completion of this class, students will be able to:
- Learn basic knowledge of programming for engineering computations
- Learn basic skills to formulate engineering computing problems in Fortran and Matlab
- Gain ability to continue to learn advanced computing and programming skills
- Apply programming skills to studies of various engineering subjects
- Gain an understanding of the importance of computing in modern engineering
- Practice and demonstrate the computer programming skills in programming assignments. They will demonstrate their proficiency formally in the programming projects.

Prerequisites by Topic:

None.

Topics:

Computer programming with Fortran and Matlab in different computing environment including Windows and Linux.

Formatted input/output, data types, variables, arrays, strings, variable scopes, logic statements, loops and repetition, functions and subroutines, and data graphing with graphic library.

Concepts of vectors and matrices.

Iterative solution methods.

Linear algebraic equation, root search, integrals and differential equations derived from engineering problems.

Professional Component:

Engineering problem formulation, ***description of engineering problem*** in computer language and computational analysis skill.

Class/laboratory Schedule:

Lecture	2 credit hour lectures weekly
Laboratory	2 credit hour programming labs weekly

Grading Scheme:

Letter grade only.

Homework	(50%)
Project	(50%)

Grading Policy:

TBD.