Course

ENGR 12100 – Computer Tools for Engineers

Type of Course

Required for all undergraduate engineering programs

Catalog Description

Introduction to computer software for solving engineering problems. Emphasis on problem-solving techniques with applications of modern high-level structured programming languages and spreadsheets: algorithm development, looping techniques, files and data structures, solving linear algebraic equations, simple statistical analysis, and plotting techniques.

Credits

2

Contact Hours

2 (plus supplemental instruction)

Prerequisite Courses

MA 15400 or MA 15900

Corequisite Courses

ENGR 120

Prerequisites by Topics

Algebra and Trigonometry

Textbook


Course Objectives

To develop students’ use of the computer as a tool to perform and communicate engineering solutions and write programs. To introduce students to arrays, functions, and data structures. To develop the students’ ability to produce graphs, construct empirical models from physical data, and calculate simple statistics.

Course Outcomes

Students who successfully complete this course will have demonstrated an ability to:

1. complete multi-step engineering calculations using appropriate software. (k)
2. communicate a solution based on computer calculations. (g)
3. understand arrays and array manipulations and their applications in formulating and solving engineering problems (e, k)
4. understand files, functions, and data structures (k)
5. write programs using logical expressions, conditional statements, and loop structures to solve engineering problems. (e, k)
6. produce clear and effective graphs. (g, k)
7. use computer tools to construct simple empirical models from...
8. use computer tools to calculate simple statistics (e, k)
9. find solutions to equations using computer tools (e)

Lecture Topics

1. Simple Calculations and Scripts
2. Functions
3. Vectors and Arrays
4. Files & Graphs
5. Structured Programming: Loops and conditionals
6. Descriptive Statistics
7. Empirical Model Building: Regression, Transformations & Matrix Calculations
8. Exams

Computer Usage

High

Laboratory Experience

None

Design Experience

None

Coordinator

Scott Moor, Ph.D., P.E.

Date

10 May 2011