

IME 325 Computer Tools for Engineers

Designation: Required

Catalog Data: IME 325 Computer Tools for Engineers (3) Computer hardware fundamentals, Software design concepts including structured programming and object oriented programming, Visual Basic programming, Excel Macro programming, LabView experiment design, applications in engineering, case study. (Lec. 3) Pre: EGR 106, MTH 141.

Textbook:

Deitel, Deitel, Nieto, “Visual Basic.NET, How to Program, Second Edition,” Prentice Hall, 2001

National Instruments “LabVIEW 7 Express, Student Edition” (software plus text), Prentice Hall; Student & CD edition, December 2003, ISBN: 0131239260

Prerequisites by Topic:

1. Basic knowledge of computers and spreadsheets.
2. Intermediate Calculus and Analytical Geometry.

Course Objectives:

After successful completion of this course, students will have the following:

Objective	Link to Curriculum Objective
1. An understanding of computing tools, how they work, how they can be used and their limitations in an engineering environment.	1, 2
2. An understanding of computer software concepts, programming languages and best practices in program design.	2
3. An ability to simulate an engineering process and collect and analyze data from that simulation	1, 9, 10
4. The ability to communicate effectively both orally and in writing.	14

Topics Covered:

1. Introduction to computer hardware, computer components, binary arithmetic, Boolean algebra, digital logic design, micro-coding and memory concepts.

2. Introduction to programming languages, program structure, programming environments and object oriented programming. Selecting an appropriate software design environment.
3. Programming in Visual Basic. Language constructs, variables, expressions, control statements. Program modules and subprograms.
4. Use of the Excel Macro Language. Working with spreadsheet objects and automating tasks in Excel.
5. Programming in LabView. Virtual Instruments, visual program design in LabView, instrument setup for conducting experiments. Concepts of analog to digital conversion including data resolution, dynamic range of input signals, and sampling issues.

Contribution to Professional Component:

Engineering Science: 1.5 credits or 50%.

Engineering Design: 1.5 credits or 50%.

Course Outcomes:

Department Outcome	Indicator
A. An ability to solve engineering problems by applying knowledge of mathematics and basic science.	Homework Assignments, Tests, Design Project, Class Participation
B. An ability to use modern computing tools and techniques to effectively solve industrial engineering problems	Homework Assignments, Tests, Design Project
G. An ability to understand and design engineering experiments.	Homework Assignments, Design Project, Class Participation
M. An ability to take an assigned engineering problem, analyze it and formulate and implement a solution.	Homework assignments, Design Project.
N. An ability to effectively contribute to a team solution of a complex engineering problem	Design Project.
T. An ability to present engineering information clearly and succinctly in written form	Homework assignments, Design Project.
U. An ability to make clear oral presentations	Design Project

Prepared/revised by: Gregory Jones

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