University of Pittsburgh at Greensburg
Engr 0011
Introduction to Engineering Analysis
Department Syllabus

UPG Catalog Description:

Introduces students to basic topics in engineering, the role of the computer in engineering, real-world problem-solving and report writing. Includes material on the use of unix, html, spread sheets, and MatLab. Data analysis and curve fitting is done in both Excel and MatLab. The goals are: basic presentation of what engineering is and what engineers do, and to highlight the importance of a collaborative environment. The course will provide an overview of how material in the basic sciences and mathematics is applied by engineers to solve practical problems of interest to society. The writing component includes a project and an oral presentation.

Corequisite: MATH 0200.

Current Text: Introduction to Engineering Analysis by D. Budny

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Topics to cover:

- Introduction to University Computing system
- EXCEL Spreadsheets
  - Basic Operations and built in functions
  - Plotting
  - Equation Solving (Goal Seek) Solving
  - Curve Fitting
  - Matrix Operations, Linear Algebra
- UNIX
  - Introduction
  - File System
  - Commands
- HTML
  - Basic Coding
  - Markup, Lists, Formatting Tags
  - Linking, Images
  - Tables
  - Frames, Forms
  - Basic Java Scripts
- MAPLE and *Mathematica* Fundamentals
  - Mathematical Operations
  - Plotting
- General
  - Introduction to Engineering Problem Solving
  - Working in Teams
  - Use of Word as a text and equation editor

The course will cover material that falls within the realm of specific topics in engineering, emphasizing the art of problem solving using various computer tools to solve engineering problems, and the skills necessary to research and present a technical research paper.
The course will also illustrate how engineering differs from science and mathematics.

University of Pittsburgh at Greensburg
Engr 0012
Introduction to Engineering Computing
Department Syllabus

UPG Catalog Description:

Introduces students to social topics in engineering (security), the role of the computer in engineering, real-world problem-solving and report writing. Includes material on the use of MatLab and C++. Fundamentals of computing in engineering, including program design, program development, and debugging. Applications to problems in engineering analysis with topics selected from ENGR 0011. The writing component includes a project and an oral presentation.

Prerequisite: *ENGR 0011.*

Current Text: Introduction to Engineering Analysis by D. Budny

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Topics to cover:

- Fundamentals of MatLab
    - Basic operations
    - Mathematical functions
    - Basic commands
    - Introduction to arrays
    - External data files
    - Array operations
  - MatLab Scripts
    - I/O commands
    - Introduction to branching
    - If statements
    - While Loops
    - Use of matrices to solve linear equations
    - Introduction to Statistical Operations
  - Plotting
    - Introduction to Curve Fitting
    - Linear Regression
    - Error Analysis
    - Estimation
    - Polynomial Curve fitting
    - Splines
    - Curve fitting (Semi-log, Log-log)
      - Data Filtering
    - Modular design
      - Function calls
    - Problem Solving
- Fundamentals of C
  - Getting started with C
  - Data types
  - Mathematical operations
  - Program Control - Looping and Branching
  - File I/O
  - Functions
  - Pointers
  - Programming Applications
- General
  - Use of Power Point as a tool for the project oral presentation