

COURSE OUTLINE

ENES-100

Introduction to Engineering Design

3 Semester Hours

HOWARD COMMUNITY COLLEGE

Description

In this course, students are introduced to the engineering design process by working on a product design project. Working in teams, students will design and build a product that satisfies specified functional, or operational, requirements. The design will involve a variety of topics from engineering, technology and the sciences. Topics, with which students must become familiar in order to complete their project, will be drawn from various disciplines, such as mechanics, fluidics, energy concepts, thermodynamics, electrical circuits, and chemistry. In addition, students will use CAD software and other computer applications, such as word processors, spreadsheets and computer languages. Prerequisite: Eligible to enroll in MATH-131 or above. (2 hours lecture, 2 hours lab)

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Interpret design specifications and convert them into working drawings.
2. Sketch orthographic views, sectional views, auxiliary views, and pictorials of an object.
3. Using CAD, create detail drawings of parts and final assembly drawings.
4. Explain engineering design concepts and apply them in a product design project, including design tradeoffs and functional tests.
5. Work productively as a member of an engineering design team.
6. Use computer application software, such as word processing, spreadsheets, and graphing.
7. Solve engineering problems using a high-level computer language.

Major Topics

- I. **Introduction to Engineering**
 - A. Fields of Engineering
 - B. Ethics and Professional Responsibility
 - C. Engineering Design Fundamentals
 - D. Manufacturing Techniques
- II. **Engineering Graphics**
 - A. Sketching Techniques
 - B. Lettering
 - C. Orthographic Views
 - D. Dimensioning and Tolerancing
 - E. Screw Threads and Fasteners
 - F. Sectional Views
 - G. Auxiliary Views
 - H. Pictorial Drawings

III. **Computer-Aided Design** (CAD) - AutoCAD

- A. DRAWing Commands
- B. EDITing Commands
- C. Drawing Aids
- D. Layers
- E. BLOCKS
- F. Isometric Views

IV. **MathCAD**

- A. Numeric Calculations
- B. Symbolic Calculations
- C. Graphics
- D. Document Preparation
- E. Electronic Books

V. **Quattro Pro**

- A. Tables
- B. Computations

VI. **QBASIC**

- A. Problem Solving and Program Development Cycle
- B. Data Input
- C. Built-in Functions
- D. Subprograms
- E. DO Loops
- F. FOR-NEXT Loops
- G. Using Arrays

VII. **WordPerfect**

- A. Arrangement
- B. Tables

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will be based on classroom (lab) exercises, homework, quizzes, unit tests, final exam, and term project.

Writing: Specific writing assignments will be determined by the individual faculty member.

Other Course Information

This course is an Arts and Sciences elective.