

MAE 3 Introduction to Engineering Graphics and Design

Designation: Required course

Catalog Data:

MAE 3 Introduction to Engineering Graphics and Design (4)

Introduction to the Design Process through a hands-on design project performed in teams. Design topics covered include: problem identification, concept generation and creativity, concept selection, project management, risk reduction, and learning from hardware performance. In addition Engineering Graphics and Communication skills are introduced in the areas of: Computer Aided Drafting (CAD), and technical Communication (Graphical, Written, and Oral). Engineering graphics topics include orthographic, isometric projections, and dimensioning. CAD tools, such as AutoCAD, are introduced for both 2D and 3D. CAD tools are also used for rapid prototype fabrication, and geometric analysis. Students use communication skills to present the results of their design projects.

Prerequisites: Grade of C- or better in Physics 2A or 4A (or concurrent enrollment). Priority enrollment given to engineering majors.

Prerequisites by topic: Elementary physics.

Textbook, Required Materials: Softreserves coursepack with chapters covers:

- The Design Process,
- CAD
- Teamwork

On-Line Tutorials covering:

- Mechanical Components
- Application of Energy Analysis to Machine and Mechanism Design
- Rapid Prototyping Use in the Design Studio

Class/Laboratory Schedule: 3 lecture hours per week and 3 lab hours per week

Course Topics:

1. Drawing Projections
2. Drawing Isometrics
3. Dimensioning
4. 2D and 3D CAD
5. Design Problem Identification
6. Prototype Fabrication Techniques (light duty shop skills and rapid prototyping)
7. Design Process (concept generation and creativity, concept selection, risk reduction strategies, and scheduling)
8. Learning from hardware performance (problem solving and redesign)
9. Teamwork
10. Detail Design Techniques (use of fasteners, couplings, and DC motors)
11. Graphical and written communication

Course Objectives:

(Numbers in parenthesis refer to MAE Program Outcomes)

Objective 1: To teach students the basic principles of engineering graphics and CAD tools (11k).

Objective 2: To train students to identify design problems, and design a system to meet desired needs (3c).

Objective 3: To train students in graphical, written, and oral communication (7g).

Objective 4: To introduce students to the design process through hands-on experience (3c).

Objective 5: An ability to function on teams (4d)

Methods of Evaluation:

1. Homework will be regularly collected and graded.
2. Projects done in individually and teams. Intermediate milestones in these projects will be evaluated and graded.
3. Oral and Written reports on projects
4. Peer evaluation for a component of team project grade

Prepared by: Nathan Delson, March 2000.

Revised: Nathan Delson, June 2007