

MAE 3
Introduction to Engineering Graphics and Design (4 units)

Class/Laboratory Schedule: four hours of lecture, two hours of lab, six hours outside preparation.
12 hours/week total

Course Coordinator(s): Nathan Delson

Textbooks/Materials:

1. Soft-reserves Course-pack with chapters covers:

- The Design Process,
- CAD
- Teamwork

2. On-Line Tutorials covering:

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

Catalog Description: 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. Priority enrollment given to engineering majors.

Required Course

Technical Elective Course

Other: _____

Course Objectives:

(Numbers in parentheses 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)

Objective 6: To introduce students to basic machine design (ME14)

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

Prepared by: Nathan Delson, March 2000

Revised: Nathan Delson, June 2007

Reviewed: TWG, June 2010

Reviewed: TWG, August 2012

Updated by: Nathan Delson, June 2013