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

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

Course Coordinator(s): Nathan Delson

Textbooks/Materials:
1. Soft reserves course-pack with chapters covers:
   a. The Design Process,
   b. CAD
   c. Teamwork
2. Online Tutorials covering:
   a. Mechanical Components
   b. Application of Energy Analysis to Machine and Mechanism Design
   c. Rapid Prototyping Use in the Design Studio

Catalog Description: Introduction to design process through a hands-on design project performed in teams. Topics include problem identification, concept generation, project management, risk reduction. Engineering graphics and communication skills are introduced in the areas of: Computer-Aided Design (CAD), hand sketching, and technical communication.

Prerequisites: Phys 2A or 4A. Priority enrollment given to engineering majors.

Course Type: Required

Course Objectives:
(Number in parentheses refer to the specific MAE Program Outcomes)

1. To teach students the basic principles of engineering graphics and CAD tools. (1, 2, 6, ME8, ME9)

2. To train students to identify design problems, and design a system to meet desired needs. (2, ME11)

3. To train students in graphical, written, and oral communication (3)

4. To introduce students to the design process through hands-on experience (2, ME11)
5. An ability to function on teams (5)

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