1. Department, Course Number, and Course Title:

MECHANICAL ENGINEERING

ME 103 INTRODUCTION TO MECHANICAL DESIGN

2. Designation:

Required	☑	Elective	☐
Lower Division	☑	Upper Division	☐

3. Course Description: Introduction to mechanical design; engineering drawing; engineering experiment; computer aided design; introduction to finite element analysis software.

4. Prerequisites: None

5. Text and Materials: Engineering Graphics Principles w/ GD&T, E. Max Raisor FIAE, SDC Publications
Engineering Design with SolidWorks, Planchard, SDC Publications Engineering Analysis with COSMOSWorks Software, Kurowski, SDC Publications

6. Course Objectives: Understand engineering graphics as a form of communication; Understand the principals of orthographic, pictorial, and auxiliary projection; Exposure to standard dimensioning; Build basic aptitude in 2D and 3D solid CAD modeling (SolidWorks); Exposure to the Finite Element Analysis (FEA, SolidWorks/COSMOS)

Course Outcomes

- knowledge of the product design process.
- ability to draw and read engineering drawings.
- ability to use of finite element analysis software for solving engineering problems.
- ability to prepare and deliver an oral presentation.

7. Topics Covered: (in Order of Presentation)

- Introduction to SolidWorks (1 session)
- SolidWorks, Basic Functions (2 sessions)
- Orthographic Projection (2 sessions)
- Auxiliary Views (1 session)
- Isometric Views / Section Views (1 session)
- Dimension & Tolerance (2 sessions)
- GD&T / Assembly (1 session)
- Introduction to Structural Analysis (1 session)
- Material Strength Experiment (1 session)
- Finite Element Analysis (2 sessions)
- Introduction to Fluid Dynamics (1 session)
- Wind Tunnel Experiment (1 session)
- Computational Fluid Dynamics (2 sessions)
- Presentation (1 session)

8. Class Schedule:

Number of Sessions per week:	2
Duration of each session:	3 hours

9. Contribution of course to meeting the professional component:

This course is part of the lower-division required courses.

Other	3 units

10. Relationship of course to program objectives:

This course relates to the program objectives by contributing to the following measurable outcomes at the level indicated for all engineering graduates:

Knowledge outcomes:

- an ability to apply knowledge of mathematics, science, and engineering (abet a)
- the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context (abet h)
- a knowledge of computer aided design and simulation software
- a knowledge of measurement and manufacturing techniques
- 7. a knowledge of how mechanical engineering integrates into inter-disciplinary systems

Skill outcomes:

- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (abet c)
- an ability to function on multidisciplinary teams (abet e)
- an ability to communicate effectively (abet g)
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice (abet k)
- an ability to select materials and manufacturing processes
- an ability to visualize designs from engineering drawings
- an ability to think in a logical sequential process

Attitudes Outcome:

- an understanding of professional and ethical responsibility (abet f)
- a recognition of the need for an ability to engage in lifelong learning (abet i)
- an understanding of responsibility and accountability
- a desire to be a professional that exhibits values, dedication and a need for continual improvement
- a desire to be a flexible and adaptable team player (collaborative attitude)

11. Prepared by: Sangbum Choi and Maj Mirmirani 12/2005