Mechanical Engineering and Mechanics

MEM 201 Fundamentals of Computer-Aided Design Fall, Winter, Spring, Summer 2006-2007

- **Designation:** Required
- **Catalog Description:** Basic understanding of technical graphics communication and computeraided design for engineering applications. By using computer-aided design/drafting software AUTOCAD 2006, students will learn basic principles of geometric modeling and descriptive geometry to assist in problem visualization and solution.

Prerequisites: Sophomore standing

Textbook(s) and other required material:

Required: "Engineering Graphics with AutoCAD 2006," James D. Bethune, Prentice-Hall, Inc., 2006, ISBN 0-13-171391-4 Web Page : <u>http://www.pages.drexel.edu/~sunwei/MEM201-CAD/MEM201-001-Fall-AY0607.htm</u>

Course Objectives:

- 1. Define engineering standard views for 3D objects.
- 2. Define engineering standard dimensioning and geometrical tolerance.
- 3. Use AutoCAD to make geometrical model with appropriate views
- 4. Use AutoCAD to make design drawing, including appropriate dimensioning, tolerance, drawing formats, title block, tolerance block, part list, and detail drawings
- 5. Use AutoCAD to make 3D CAD models, including wireframe, surface and solid models
- 6. Use AutoCAD to represent design assemble consisting of multiple components

Topics:

- 1. Introduction to CAD, computer hardware and software for CAD system
- 2. Basics of engineering design, design modeling and CAD for design model representation
- 3. Fundamentals of engineering graphic communication, geometrical entities, and 3D isometric, oblique and perspective views
- 4. Fundamentals of orthographic view, sectional views and auxiliary views
- 5. Fundamentals of dimensioning and geometrical tolerances
- 6. Working drawing, assemble and part detail drawing in CAD
- 7. Fundamentals of 3D CAD Drawings and 3D CAD view representation
- 8. Introduction to 3D CAD wireframe modeling, surface modeling and solid modeling

Class Schedule: 1 hour/week lecture (1 credits); 3 hours of lab (2 credit)

Contribution to Professional Component:

MEM 201 is designed to develop selected core technical skills, to produce several distinct outcomes required by the accrediting body, (Criteria 3 a-k), to contribute to the MEM educational objectives, and to satisfy professional components specified by ASME. In particular, prepare students to develop knowledge in understanding basic engineering graphic language, views, dimensioning and geometrical tolerance, understanding basics of CAD and role of CAD in engineering design, and develop expertise in using CAD for engineering design and modeling.

Relationship to Program Outcomes:

Outcomes a - k	Content	Explanation	Evidence*
a. An ability to apply knowledge of mathematics, science and engineering	0	N/A	N/A
 b. An ability to design and conduct experiments as well as to analyze and interpret data 	1	Homework on tolerance and final project on component and assembly design requires students to analysis and data processing.	Homework, lab assignments, and final project and report.
 c. An ability to design a system, component or process to meet desired needs 	2	The assigned design problems are always required to meet the desired needs.	Final project and project report.
d. An ability to function on multidisciplinary teams	0	N/A	N/A
e. An ability to identify, formulate and solve engineering problems	2	The problems and project require students to identify, formulate and solve engineering problems.	Homework, exams, final project
f. An understanding of professional and ethical responsibility	1	This is emphasized as part of the engineer's overall responsibility.	Classroom discussion; text book
g. An ability to communicate effectively	1	Final project	Final project and report
h. The broad education necessary to understand the impact of engineering solutions in a global/societal context	1	The impact of engineering design on the economy and society are covered.	Classroom discussion, text book, and final project requirement,
 A recognition of the need for and ar ability to engage in lifelong learning 	1	Needs for update CAD software	Classroom discussion and lecture handouts
j. A knowledge of contemporary issues	2	Latest CAD/CAM/CAE knowledge and software are introduced in the class	Homework, lecture notes, exams, final projects
k. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice	2	Computers and software packages are used to train students' skills and solve real world problems.	Homework; lecture notes, final projects, and exam.

0 = No content; 1 = Some content; 2 = Significant content

Prepared by:

Dr. Wei Sun, 5 November 5, 2006