SAN JOSE STATE UNIVERSITY
Mechanical Engineering Department

ME265 - Computer-Aided Mechanical Engineering Design Spring 2016

Instructor:	Dr. Ken Youssefi	**Office: E-137**	
Class room:	149B DMH	**Office hrs. : M 11-1, W 10-12**	
Class time:	Lecture: MW 6:00 - 7:15 pm	**Email: kyoussefi@aol.com**	
Class code:	28426	**Course website: Canvas**	
Final Exam:	Wed. May 18th, 5:15-7:30		

Course Description:
A practical approach to computer-aided design, analysis and manufacturing. Introduction to concurrent engineering. Advance surface and solid modeling methods, motion and finite element analysis using CAD software. Introduction to computer-aided manufacturing, process planning, computer numerical control (CNC), rapid prototyping, CAD/CAM integration, and design optimization using computers, an individual design project and final written report. 3 hours of lecture/laboratory - 3 units.

"Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of forty-five hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practical. Other course structures will have equivalent workload expectations as described in the syllabus."

ME265 satisfies the criteria for Graduation Writing Assessment Requirement (GWAR)

Prerequisite: BSME or consent of instructor

Homework: homework problems will be assigned a week before the due date. Homework is due at the start of the lecture. Late homework will not be accepted.

Grading: Homework 10%, Progress report 1 & 2 15% each (10% technical content, 5% writing quality and professionalism), Final design project report 60% (40% technical content, 20% writing quality and professionalism)

Grade distribution:

Grade A	90 - 100
Grade B	80 - 89
Grade C	65 - 79
Grade F	64 and below

Although much of the success in this course requires technical proficiency, it is also critically important to communicate one's results with excellent written communication. 30% of the course grade depends on writing quality and professionalism.

Design Project and Report: There will be an individual design project and the final report must be an individual original work.
The report must be written according to professional standards, and in general should follow ASME and APA (American Psychological Association) guidelines https://www.asme.org/shop/proceedings/conference-publications/author-templates, including citation format. Exceptions to this format (e.g. IEEE, MLA) may be acceptable, but must be approved in writing. The report requires a minimum of 3000 words (approximately 12 pages), not including pictures, figures, tables, front and back materials. The required technical components of the report are detailed in a separate document.

References: 1 - Zeid, I., "Mastering CAD/CAM", McGraw-Hill, 2005

2 - Lee, Kunwoo "Principles of CAD/CAM/CAE Systems", Addison/Wesley, 1999

3 - Chang, T. Wysk, R. Wang, H., "Computer-Aided Manufacturing" 3rd edition, Pearson (Printice-Hall), 2006

4 - Adams, V. and Askenazi A., "Finite Element Analysis, Building Better Products", Onword Press, 2001

5 – David and Marie Planchard "A Commands Guide Tutorial for SolidWorks 2011/12", SDC publication.

Academic Integrity

Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Department Policy on Computer Lab Use

Use of the department and college computer labs is a privilege that can be lost by abuse. The following are grounds for loss of lab privileges:

- Unauthorized copying of software, either from the computer, or using the computer. To assure that you are not accused of this, you must obtain specific permission from the instructor of your class to do ANY copying of software in the lab.
- Installation of any software, media, or files that are not specifically required to do your class activities. You may not install messenger, music, gaming, or any other software program on computers in the lab.
- Abuse of computers or hacking or modifying the operating system, user interface, or desktop in any way.

COURSE SCHEDULE

Week	Date	Subject	Assignments
1	1/28	Thursday, no class	
2	2/1	Introduction, course organization, project and homework 1 discussion	
	2/3	An overview of computer-aided design (CAD), manufacturing (CAM) and Engineering analysis (CAE)	
3	2/8	Product development using CAD/CAM/CAE system and concurrent engineering.	
	2/10	An overview of SolidWorks, Creo 2.0 and NX (Unigraphics),	**HW #1 – due 2/10**
4	2/15	Geometric modeling – Curve entities; analytic and synthetic (Hermite cubic spline, Bezier curve, and B-spline curve)	
	2/17	Geometric modeling – Spline command in SW and NX. Design project progress report format	**Design project proposal - due 2/17**
5	2/22	Geometric modeling – Surface entities; Ruled, tabulated, Coons, Bezier, and B-spline surfaces	
	2/24	Geometric modeling – Advance Surface modeling, in SW and NX design project discussion.	**HW #2 – due 2/24**
6	2/29	Sweeps and Loft in SW, Variational sweep in NX	
	3/2	Geometric modeling – Methods of creating solid models: Boundary Representation (B-rep), Euler op., Euler/Poincare formula	
7	3/7	Constructive Solid Geometry (CSG), primitive solids, Boolean operations	
	3/9	Parametric Modeling, feature-based modeling, design intent, Design project discussion	**1st design project progress report - due 3/9**
8	3/14	Concept of sketching, sketching in SW and NX, Boolean vs. parametric modelers	
	3/16	Basics of assembly, Top-Down and Bottom-Up design, degrees of freedom, mating components, SW and NX assembly commands	**HW #3 – due 3/16**
9	3/21	Motion analysis, Computer animation with SW and NX	
	3/23	Formulation of Finite Element Method, Rayleigh-Ritz energy method, stiffness matrix	**HW #4 – due 3/23**
10	**3/28 – 4/1**	***Spring Recess***	
11	4/4	Introduction to Finite Element Analysis	
	4/6	Finite element modeling and analysis; Formulation, Pre-processing, Solver, Post-processing, mesh (beam, shell and solid elements),	
12	4/11	CAD modeling for FEA, boundary conditions Stress analysis with SW and NX	
	4/13	Design project discussion	**2nd design project progress report - due 4/13**
13	4/18	Design Optimization: design variables, objective function and design constraint	
	4/20	Design Optimization: Problem formulation, size, shape and topology optimization, examples.	
14	4/25	Computer-aided manufacturing (CAM); Process planning (computer-aided programs),	
	4/27	Production (NC machine tools), inspection and assembly phases.	**HW #5 – due 4/27**
15	5/22	Intro. to NC machine tools. CNC machines, controllers, tool path, part programming, videos	
	5/4	Rapid prototyping	
16	5/9	Design project presentation	
	5/11	Design project presentation	
17	5/16	Design project presentation	Last day of the semester

The final project report is due Monday. May 16, during the class period, no late report will be accepted.