

SAN JOSE STATE UNIVERSITY
Mechanical Engineering Department

ME265 - Computer-Aided Mechanical Engineering Design

Fall 2022

Instructor: Prof. Ken Youssefi **Office: E-247**
Class room: Online (Zoom) **Office hrs. : M 9-10 (in person)**
Class time: Lecture: MW 4:30 - 5:45 pm **MW 5:45 – 6:45 (Zoom ID 886 7599 9225)**
Class code: 24442 **Email: kyoussefi@aol.com**
Final Exam: Wednesday Dec. 14, 2:45 -5:00 pm **Course website: [Canvas](#)**

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., group design project. 3 hours of lecture/laboratory - 3 units.

Prerequisite: BSME or consent of instructor

- References:**
- 1 - Zeid, I., "Mastering CAD/CAM", McGraw-Hill
 - 2 - Lee, Kunwoo "Principles of CAD/CAM/CAE Systems", Addison/Wesley
 - 3 - Chang, T. Wusk, R. Wang, H., "Computer-Aided Manufacturing" 3rd edition, Pearson
(Printice-Hall)
 - 4 - Adams, V. and Askenazi A., "Finite Element Analysis, Building Better Products",
Onword Press,
 - 5 – David and Marie Planchard "A Commands Guide Tutorial for SolidWorks 2020/2021",
SDC publication.
 - 6 – Paul M. Kurowski "Engineering Analysis with SoidWorks Simulation 2019"
SDC publications

Homework: homework assignments are posted on Canvas with the due date. Late homework, will not be accepted.

Design Project: This is a group project consisting of 4-5 members. Form your group as soon as possible. Email me the list by Wed. August 31, 11:59 pm. See project description for detail.

Grading: Homework 55%, Design project 45%

Letter grade distribution:

A+	98-100%	B+	84-86%	C+	71-73%	D+	57-59%
A	90-97%	B	77-83%	C	63-70%	D	49-56%
A-	87-89%	B-	74-76%	C-	60-62%	D-	46-48%
						F	45% and below

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](http://www.sjsu.edu/senate/docs/S07-2.pdf) 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](http://www.sjsu.edu/studentconduct/) is available at <http://www.sjsu.edu/studentconduct/>.

Collaboration on homework assignments are encouraged but the work you submit must be yours. Plagiarism will not be tolerated, you will receive a grade of F for the work and if repeated you will fail the course. Students who are suspected of cheating will be referred to the Student Conduct and Ethical Development office and depending on the severity of the conduct, will receive a zero on the assignment or a grade of F in the course. Grade Forgiveness does not apply to courses for which the original grade was the result of a finding of academic dishonesty.

Campus policy in compliance with the Americans with 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](http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf) 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](http://www.sjsu.edu/aec) (AEC) at <http://www.sjsu.edu/aec> to establish a record of their disability.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's [Catalog Policies](http://info.sjsu.edu/static/catalog/policies.html) section at <http://info.sjsu.edu/static/catalog/policies.html>. Add/drop deadlines can be found on the current academic year calendars document on the [Academic Calendars webpage](http://www.sjsu.edu/provost/services/academic_calendars/) at http://www.sjsu.edu/provost/services/academic_calendars/. The [Late Drop Policy](http://www.sjsu.edu/aars/policies/latedrops/policy/) is available at <http://www.sjsu.edu/aars/policies/latedrops/policy/>. Students should be aware of the current deadlines and penalties for dropping classes.

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU's policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See [University Policy S90-5](http://www.sjsu.edu/senate/docs/S90-5.pdf) at <http://www.sjsu.edu/senate/docs/S90-5.pdf>. More detailed information on a variety of related topics is available in the [SJSU catalog](http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html), at <http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html>. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Technology Requirements

Students are required to have an electronic device (laptop, desktop or tablet) with a camera and built-in microphone. SJSU has a free equipment loan program available for students: <https://www.sjsu.edu/learnanywhere/equipment/index.php>

Students are responsible for ensuring that they have access to reliable Wi-Fi during tests. If students are unable to have reliable Wi-Fi, they must inform the instructor, as soon as possible or at the latest one week before the test date to determine an alternative. See Learn Anywhere website for current Wi-Fi options on campus. <https://www.sjsu.edu/learnanywhere/equipment/index.php>

Zoom Classroom Etiquette

- If possible have your webcam on during the lecture. Or at least have your picture as the background.
- Mute Your Microphone: To help keep background noise to a minimum, make sure you mute your microphone when you are not speaking.
- Be Mindful of Background Noise and Distractions: Find a quiet place to “attend” class, to the greatest extent possible.
 - Avoid video setups where people may be walking behind you, people talking/making noise, etc.
 - Avoid activities that could create additional noise, such as shuffling papers, listening to music in the background, etc.
- Limit Your Distractions/Avoid Multitasking: You can make it easier to focus on the meeting by turning off notifications, closing or minimizing running apps, and putting your smartphone away (unless you are using it to access Zoom).
- Use Appropriate Virtual Backgrounds: If using a virtual background, it should be appropriate and professional and should NOT suggest or include content that is objectively offensive or demeaning. Make sure your name and your picture is displayed.

Recording of Zoom Classes

All lectures will be recorded and posted on Canvas. Students are permitted to only view the recordings, not to download the videos.

You must obtain permission in advance to record any course materials. Such permission allows the recordings to be used for a student’s private, study purposes only. Students will not be permitted to share any class recordings with someone who isn’t enrolled in the class or without permission. The recordings are protected by instructor’s copyright.

Any student that needs accommodations or assistive technology due to a disability should work with the Accessible Education Center (AEC), and the instructor.

This course or portions of this course (i.e., lectures, discussions, student presentations) will be recorded for instructional or educational purposes. The recordings will only be shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording). Students are not allowed to record without instructor permission. Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

Technical difficulties

Internet connection issues: Canvas autosaves responses a few times per minute as long as there is an internet connection. If your internet connection is lost, Canvas will warn you but allow you to continue working on your exam. A brief loss of internet connection is unlikely to cause you to lose your work. However, a longer loss of connectivity or weak/unstable connection may jeopardize your exam.

Other technical difficulties: Immediately email the instructor a current copy of the state of your work/exam and explain the problem you are facing. Your instructor may not be able to respond immediately or provide technical.

Contact the SJSU technical support for Canvas:

COURSE SCHEDULE

Week/Date	Subject	Assignments
1	8/19	First day of semester - No class
2	8/22	Introduction, course organization, project and homework 1 discussion
	8/24	An overview of computer-aided design (CAD), Manufacturing (CAM) & Engr Analysis (CAE)
3	8/29	Product development using CAD/CAM/CAE system and concurrent engr.
	8/31	An overview of SolidWorks, Creo and NX (Unigraphics),
4	9/5	Labor Day – Holiday, campus closed
	9/7	Geometric modeling – Curve entities; analytic and synthetic (Hermite cubic spline, Bezier curve, and B-spline curve)
5	9/12	Geometric modeling – Spline command in SW and NX
	9/14	Introduction to the first design project
	9/14	Geometric modeling – Surface entities; Ruled, tabulated, Coons, Bezier, and B-spline surfaces
6	9/19	Geometric modeling – Advance Surface modeling, in SW, Creo and NX, design project.
	9/21	Sweeps and Loft in SW, Variational sweep in NX
7	9/26	Geometric modeling – Methods of creating solid models: Boundary Representation (B-rep), Euler op., Euler/Poincare formula
	9/28	Parametric Modeling, feature-based modeling, design intent,
8	10/3	Basics of assembly, Top-Down and Bottom-Up design, degrees of freedom, mating components, SW, Creo and NX assembly commands
	10/5	Review of mechanism design topics: various mechanisms, degrees of freedom
9	10/10	Analytical and graphical analysis: kinematics and kinetics analysis
	10/12	Motion analysis, computer animation with SW
10	10/17	Motion analysis using SW
	10/19	Formulation of Finite Element Method, Rayleigh-Ritz energy method, stiffness matrix
11	10/24	Finite element modeling and analysis; Formulation, Pre-processing, Solver, Post-processing, mesh (beam, shell and solid elements),
	10/26	CAD modeling for FEA, boundary conditions
12	10/31	Thermal analysis using SW
	11/2	Design project – group project
13	11/7	Design Optimization: design variables, objective function and design constraint
	11/9	Design Optimization: Problem formulation, size, shape and topology optimization, examples.
14	11/14	Computer-aided manufacturing (CAM); Process planning (computer-aided programs),
	11/16	Production (NC machine tools), inspection and assembly phases.
15	11/21	Intro. to NC machine tools. CNC machines, controllers, tool path, part programming.
	11/23	Wed. 11/23 – Thanksgiving holiday
16	11/28	Videos of CNC, EDM, Laser and Rapid Prototyping
	11/30	Design project presentation (group project) – groups 1, 2, 3, 4
17	12/5	Design project presentation (group project) – groups 5, 6, 7, 8
		Tuesday 12/6 is the last day of the semester, Group Project Report due date, 12/6

Group project report due date (12/6), upload one report for the group to Canvas by 11:59, no late report will be accepted.