

California State University, Chico
College of Engineering, Computer Science, and Construction
Management

Mechanical and Mechatronic Engineering and Advanced
Manufacturing and Applied Robotics

**MECH 440AW/ MECA 440AW/ AMAR 440AW – Capstone
Design I, Sections 01 & 02, Spring 2022**

Instructor:	David G. Alexander
Office location:	O'Connell (OCNL) 422
Telephone:	898-6491
E-mail:	dgalexander@csuchico.edu
Office hours:	Tuesday and Wednesday 2:00 to 4:00 PM
Class days and times:	Lecture (LEC): MW 12:00 PM – 12:50 PM Presentations (SUP): Th 5:00 PM – 7:50 PM
Classroom:	Langdon 300 Zoom available upon request only during scheduled class time (synchronous). Zoom will not be recorded.
Prerequisites:	Completion of GE Written Communication (A2) requirement, MECH 200, and MECH 340
Recommended:	CIVL 302, MECA 380, MECH 308, and MECH 338

Overview

Capstone Design I/II is the culminating course in a mechanical engineering, mechatronic engineering, and/or advanced manufacturing and applied robotics undergraduate degree. Cross-disciplinary student teams work on real-world projects for sponsors that require hardware solutions. This course is sometimes called senior capstone because it is the final layer of knowledge acquired by students before graduating. Like most professional organizations, this course requires teamwork and communication throughout the semester. There is a lot of autonomy, however, students work with a faculty advisor and sponsor. A series of presentations and reports are given throughout the semester with a final detailed design report due at the end of the semester. The goal of Capstone Design I is to have a design completed and ready for fabrication that meets the sponsor's requirements.

Years of time, effort, and expense have resulted in everyone in this class being here, now. Yet, we all traveled uniquely different paths to get here. We all share in the responsibility of making this class and individual projects what they become. Embrace this responsibility. Be motivated to reach outside of your comfort zone. Share and get to know one another and find the common humanity that we all share and make these next two semesters a memorable and honorable experience.

I have high expectations of all students. Assignments will be evaluated based on the rubrics provided in the course materials. Look at the expectations in the rubric and use the criteria to achieve the grade consistent with the grading scale. Come to class prepared and ready to engage in discussion and exploration in various topics about engineering, teamwork, project management, design, prototyping, and various other topics.

I want to help all students develop into outstanding, productive engineers where one's sense of curiosity is supported and celebrated. My teaching style is casual and informal. I want my classroom to be dynamic, contributory, inquisitive, and fun. I also ask that you act professionally and respect me and everyone else in class.

How to Succeed in this Class

Practical advice for succeeding in this class. A minimum of 3 hours of outside class work is required for every 1 hour of in-class work for most 3-unit upper-division engineering courses. A minimum of 9 hours should be scheduled outside of class every week for this course. Combined with the hours spent in class, a total of 12 hours per week should be dedicated to senior capstone to make it possible to earn a B or better grade. If a student is taking 12 units of engineering classes, a total of 48 hours per week should be set aside to do well in all classes. If one does not have these many hours because of work or other obligations, then one's level of understanding and grades will likely suffer. So, there is a choice to be made.

Open and constructive group communication is essential to succeed in this course. Everyone must be focused on supporting one another and the sponsor/customer. Decisions must be made in order to move forward. Each team will be faced with having to make decisions for which there are no "right" answers. Be diligent in understanding the problems that are identified and decisions that need to be made, but do not let issues sit unresolved, do not make decisions knowing little about what the expected outcome will be, and do not sit idle, watching the rest of the team work for fear of failure or success. Everyone has a contribution. This is not a spectator's profession. This is engineering, and engineering is doing. Doing requires failure, so fail early and often on the path toward success.

Seek out the help that you need. Talk to your instructors and peers. Talk to your parents or friends or aunts and uncles. Chat online with an expert. Submit a question on a forum or discussion page. Do anything proactive to answer the most pressing questions that you have. Embrace this time of open-endedness and forge ahead.

Classroom Protocol

Respect

Students in this class are encouraged to speak up and participate during class meetings. Because the class will represent a diversity of individual beliefs, backgrounds, and experiences, every member of this class must show respect for every other member of this class. (Reference: <http://www.csuchico.edu/diversity/>)

Safe Zone Statement

I am part of the Safe Zone Ally community network of trained Chico State faculty/staff/students who are available to listen and support you in a safe and confidential manner. As a Safe Zone Ally, I can help you connect with resources on campus to address problems you may face that interfere with your academic and social success on campus as it relates to issues surrounding sexual orientation/gender identity. My goal is to help you be successful and to maintain a safe and equitable campus.

LGBTQ Equality Statement

I am firmly committed to diversity and equality in all areas of campus life, including specifically members of the LGBTQ community. In this class I will work to promote an anti-discriminatory environment where everyone feels safe and welcome. I recognize that discrimination can be direct or indirect and take place at both institutional and personal levels. I believe that such discrimination is unacceptable and I am committed to providing equality of opportunity for all by eliminating any and all discrimination, harassment, bullying, or victimization. The success of this policy relies on the support and understanding of everyone in this class. We all have a responsibility not to be offensive to each other, or to participate in, or condone harassment or discrimination of any kind.

Course Description and Goals

Catalog Description

AMAR 440AW

Design methods applied to manufacturing systems in group design projects. Project definition, planning, and management. Design for manufacture, cost considerations, budgets, and teamwork. Oral and written presentation of design results. Initial stage of the capstone design project to be continued in AMAR 440B.

MECA 440AW

Design methods applied to mechatronic systems in group design projects. Project definition, planning, and management. Design for manufacture, cost considerations, budgets, and teamwork. Oral and written presentation of design results. Initial stage of the capstone design project to be continued in MECA 440B.

MECH 440AW

Design methods applied to mechanical systems in group design projects. Project definition, planning, and management. Design for manufacture, cost considerations, budgets, and teamwork. Oral and written presentation of design results. Initial stage of the capstone design project to be continued in MECH 440B.

2 hours lecture, 3 hours supervision. This is an approved Graduation Writing Assessment Requirement course; a grade of C- or higher certifies writing proficiency for majors. This is an approved Writing Course.

Course Goals

Student Learning Outcomes

1. Learn and practice design methods applicable to mechanical, mechatronic, or manufacturing systems as members of multidisciplinary teams.
2. Acquire a skillset progressing from problem definition, to conceptual design, to detailed design.
3. Present findings orally and in writing.
4. Develop skills for effectively managing a team, communicating technical information, listening and collaborating, planning projects and tasks, budgeting, and managing project costs.
5. Understand professional ethical responsibility.
6. Recognize the need for, and acquire an ability to engage in lifelong learning

Milestones

Event	Date
Sponsor Presentations	2/3/2022
Project Proposal Presentations	3/3/2022
Preliminary Design Review Presentations	4/7/2022
Draft Design Reports Due	4/25/2022
Final Design Review Presentations	5/12/2022
Final Design Report Due	5/18/2022

Required Materials

Course Usage of Blackboard Learn

Copies of the course syllabus and major assignments are found on Blackboard Learn. You are responsible for regularly checking the online resources, which is accessed through the Chico State Portal at <http://portal.csuchico.edu>.

Some assignments will be administered online through Blackboard Learn. Deadlines for the last date and time to take and submit the assignment will be provided in Blackboard Learn. Once the deadline is reached the assignment will no longer be available. All assignment grades are final after the deadline.

Blackboard will be used to send announcements and emails to the entire class on occasion. Students are responsible for knowing and checking regularly the email account associated with their Chico State portal.

Grading Policy

Attendance and In-Class Activities

Attendance in class is extremely important to learning. Attendance will be monitored through various means including Polleverywhere.com, in-class attendance, in-class discussions once I get to know individuals and teams, among other methods. **No make-up is available for missed in-class activities.**

Assignment Policy

Assignments are due on the day and time that I assign. Due dates are communicated in class, on Blackboard, or in email. Due dates may change from time to time but will never be early than a previously communicated date and time.

No matter the situation, if an assignment is turned in after the day and time that it was due, it will receive a zero grade. To prevent receiving a zero-grade due to turning in an assignment late, I must be notified by phone, email, or text message before the assignment due date and time. The notification must include the assignment and the student's name. When the assignment is turned in it must include a completed Late Assignment Policy. No exceptions.

CSUC Definition of Grading Symbols

A - Superior work; a level of achievement so outstanding that it is normally attained by relatively few students.

B - Very good work; a high level of achievement clearly better than adequate competence in the subject matter/skill, but not as good as the unusual, superior achievement of students earning an A.

C - Adequate work; a level of achievement indicating adequate competence in the subject matter/skill. This level or higher will usually be met by a majority of students in the class.

D - Minimally acceptable work; a level of achievement which meets the minimum requirements of the course.

F - Unacceptable work; a level of achievement that fails to meet the minimum requirements of the course. Not passing.

Grading

Topic	%	T/I	Comment
Project Proposal Presentation	10	I	Demonstrate that the design problem is understood, well defined, and justified.
Preliminary Design Review Presentation	15	I	Demonstrate that a valid concept has been developed. Convince your customer to proceed with detailed design.

Final Design Review Presentation	20	I	Demonstrate that the solution will meet the requirements and solve the problem. Convince your customer to proceed with prototype construction.
Draft Design Report	5	T	Graded only for completeness.
Final Design Report	25	T	Content, organization, style, format.
Contribution to Project	25	I	Peer review and evaluation by faculty advisor.

Note: If warranted, the course instructor, with input from the faculty advisor, may issue a failing grade regardless of a student's computed final average.

Grade Disputes

Final grades are non-negotiable. If you think a grading error has been made for any graded assignment throughout the term, you must bring this to my attention within two weeks of the date the grade was posted. Grade disputes brought up after final grades are posted will not be considered.

Cheating

Engineering is an honorable profession. Cheating is not honorable. Anyone caught cheating on any assignment will receive an automatic F for the course, a report will be submitted to Student Judicial Affairs, and retaking the course for forgiveness may not be possible.

University Policies and Campus Resources

Dropping and Adding

You are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. found <http://www.csuchico.edu/catalog/>. You should be aware of the new deadlines and penalties for adding and dropping classes.

Academic integrity

Students are expected to be familiar with the University's Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found on the Student Judicial Affairs web site, <http://www.csuchico.edu/sjd/>.

IT Support Services

Computer labs for student use are located on the first and fourth floor of the Meriam Library, Room 116 and 450, Tehama Hall Room 131, and the Bell Memorial Union (BMU) basement. You can get help using your computer from IT Support Services; contact them through their website, <http://www.csuchico.edu/itss>. Additional labs may be available to students in your department or college.

Student Services

Student services are designed to assist students in the development of their full academic potential and to motivate them to become self-directed learners. Students can find support for services such as skills assessment, individual or group tutorials, subject advising, learning assistance, summer academic preparation and basic skills development. Student services information can be found at:

<http://www.csuchico.edu/current-students>.

Americans with Disabilities Act

If you need course adaptations or accommodations because of a disability or chronic illness, 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. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations.

Accessibility Resource Center

<http://www.csuchico.edu/arc>

530-898-5959

Student Services Center 170

arcdept@csuchico.edu

Student Learning Center

The mission of the Student Learning Center (SLC) is to provide services that will assist CSU, Chico students to become independent learners. The SLC prepares and supports students in their college course work by offering a variety of programs and resources to meet student needs. The SLC facilitates the academic transition and retention of students from high schools and community colleges by providing study strategy information, content subject tutoring, and supplemental instruction. The SLC is online at <http://www.csuchico.edu/slc>. The University Writing Center has been combined with the Student Learning Center.

Reminder: The CSU requires students to be fully vaccinated and boosted against COVID-19 by **February 28, 2022**, unless you have an approved exemption. Currently, Chico State is requiring everyone on campus to wear an approved face covering in **all** indoor campus spaces. Accordingly, all students are required to wear an appropriate face mask covering the nose and mouth in order to participate in this course. Policies and requirements regarding COVID-19 are subject to change pursuant to campus, local, state and/or federal guidelines.

Please note that dishonesty relating to the vaccination policy and/or your failure to comply with any other COVID-19 related safety policy or mandate, including the face covering requirement, may result in disciplinary action against you through the office

of Student Conduct, Rights and Responsibilities, which can include suspension or expulsion from the California State University system.

Individuals unable to wear a face covering due to a medical condition should contact the Accessibility Resource Center by phone at (530) 898-5959 or by email at arcdept@csuchico.edu.

Late Assignment Policy

The following policy and agreement apply to all assignments. Assignments include but are not limited to submitted artifacts, e.g. homework, reports, exams, attendance in class or outside of class, and any other evaluated work that is the bases for the course grade. This agreement is non-negotiable and must be completed by anyone requesting credit for a late assignment. An assignment is late if it is turned in after the day and time that it was due. There are no exceptions.

If you rescheduled an exam or assignment, it is not late. Do not submit this document. Rescheduling an exam or assignment must be done at least 48 hours in advance of the due date and must include my confirmation in writing (email is acceptable).

If this agreement and supporting documentation does not accompany the late assignment, no credit will be given for the assignment, and I will not discuss the situation that resulted in the late assignment.

No credit will be given if the answer to the question below is **No**. Do not submit the assignment for credit and do not discuss the situation with me even though it may be unique or special.

If the answer to the question below is **Yes**, the assignment will be considered for credit.

Circle your answer to the below question.

Were you involved in an accident, admitted to the hospital, seen by a medical professional, presenting flu or flu-like symptoms, or experiencing a personal or family crisis on or within 24 hours of the assignment or exam due date or did an unexpected or unplanned interview or phone call for a job or potential job offer occur at the time of the assignment or exam due date?

Yes

No

Explain the event which resulted in work being late. Provide details that you feel comfortable sharing. If I need additional information, I will let you know. Submit the late work and this signed agreement to me.

For what assignment are you seeking credit?

When was the assignment due?

What date was the assignment submitted?

Explain briefly the reason that the assignment is late:

Name:

Signature:

Date:
