

California State University, Chico  
College of Engineering, Computer Science, and Construction  
Management  
Mechanical and Mechatronic Engineering and Sustainable  
Manufacturing

**MECH 440B/MECA 440B, Mechanical Engineering Design  
Project II, Sections 01 & 02, Fall 2019**

<b>Instructor:</b>	Assistant Professor David G. Alexander
<b>Office location:</b>	O'Connell (OCNL) 422
<b>Telephone:</b>	898-6491
<b>E-mail:</b>	<a href="mailto:dgalexander@csuchico.edu">dgalexander@csuchico.edu</a>
<b>Office hours:</b>	<a href="#">See MMEM Department Faculty and Staff website and current semester schedule</a>
<b>Class days and times:</b>	Lecture (LEC and SUP): T 5:00 PM – 8:50 PM
<b>Classroom:</b>	Lecture and Supervision: LANG 302
<b>Prerequisites:</b>	MECH 440A
<b>Recommended:</b>	CIVL 302, MECA 380, MECH 308, MECH 338

**Overview**

Mechanical engineering design provides students with a unique opportunity to apply knowledge acquired during their undergraduate engineering education and design, build, test and deliver a hardware solution to a sponsor or customer. This culminating, immersive experience is sometimes called senior capstone because it is the final layer of knowledge acquired by students before transitioning into professional careers. Like most professional organizations, this course requires students to work in teams and communicate design decisions, results, and refinements throughout the semester. There is a lot of autonomy, however, students work with a faculty advisor and customer throughout the semester. A series of presentations and reports are given throughout the semester with a final detailed design due at the end of the semester.

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. However, we all share 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 rubric presented at the end of this syllabus. Look at the expectations in the rubric to understand 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.

### **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.

#### **How to Succeed in this Class**

Here is some 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 upper-division engineering courses. A total of 12 hours should be scheduled outside of class every week for this course. Combined with the hours spent in class, a total of 16 hours per week should be dedicated to senior capstone to make it possible to earn a C or better grade. If an engineering student is taking four engineering classes, a total of 48 hours per week should be set aside in order 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.

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.

## **Course Description and Goals**

### **Catalog Description**

Continuation of the capstone design project from MECH/MECA 440A. Implementation of the capstone design project, including fabrication, testing, and evaluation of a working prototype. Must be taken the semester immediately following MECH/MECA 440A.

### **Course Goals**

#### **Student Learning Outcomes**

1. Learn and practice design methods applicable to mechanical / mechatronic 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

### **Semester Schedule**

#### **Senior Exit Survey**

Graduating seniors (defined as students enrolled in MECH/MECA 440B) are required to complete an exit survey. Data from the survey are used in program improvement plans and are an integral part of our accreditation process. To encourage participation, students must complete the survey in order to receive a

grade in 440B. Students that have not completed the survey by the deadline will receive an "I" (incomplete) for 440B and will not graduate.

## **Required Materials**

### **Course Website**

Course content, deliverables, and all resources needed are available through the course website, <https://sites.google.com/mail.csuchico.edu/mechmeca-440ab/home?authuser=0>. You will need to be logged into your student account to access all areas of the site.

### **Course Usage of Blackboard Learn**

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 by collecting in-class activities, saving assignments not picked up when returned, and attendance. Assignments will be returned in class only once. If a student is not available in class to pick up an assignment, it will be in my office and available to be picked up anytime during office hours. At the end of the semester, students will receive a one day absence for each assignment that is still in my office. A factor calculated from the number of lecture days minus the sum of assignments left in my office and recorded absences divided by the number of lecture days will be multiplied to a student's final score to determine their final grade. NO MAKE-UP IS AVAILABLE FOR IN-CLASS ACTIVITIES.

### **Assignment Policy**

LATE ASSIGNMENTS ARE ACCEPTED ONLY WITH AN APPROVED AND COMPLETED LATE ASSIGNMENT POLICY AGREEMENT. See below or Bblearn.

### **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.

<b>Grading Topic</b>	<b>%</b>	<b>T/I</b>	<b>Comment</b>
Individual Test Procedure Assignment	10%	I	Content, organization, style, and format
Testing	10%	T	Overall success of testing, data collection, reporting, etc...
Final Project Presentation	15%	I	Content, organization, and presentation technique
Poster and Video	5%	T	Appearance, clarity, completeness, etc...
Spring Design Report	20%	T	Content, organization, style, and format
Overall Project Quality	20%	T	Quality of solution relative to difficulty of project; evaluated by faculty advisor.
Contribution to Project	20%	I	Peer review & logbooks; evaluated 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. Don't be a cheater. 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](mailto: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.

## Rubric

Score \ Area	1 Beginner	2 Novice	3 Intermediate	4 Advanced	5 Professional
<b>Demonstrated Technical competency</b>	Many math errors, no units	Frequent math errors, seldom uses units and does not check for unit consistency	Few math errors, inconsistent use of units and some checks for consistency	0 or 1 math errors, applies units most of the time and checks for consistency	No math errors, carries units throughout and checks for consistency
<b>Demonstrated application of scientific and engineering principles</b>	Does not apply principles correctly	Mostly does not apply principles correctly	Applies principles inconsistently	Mostly applies principles correctly	Applies principles correctly and to areas outside assignment
<b>Organization and clarity</b>	No organization, unclear what or where the solution is	Little organization and incorrect process or explanation of solution process, answer is not clearly identified or if identified not clear how it was determined	Some organization but does not emphasize process with clear, meaningful content at each step. Answer is identified but sometimes unclear how it was determined	Mostly organized with statements at each step explaining solution process; answer is clearly identified	Clear organization including identification of problem statement, goal, solution, and review; neat orderly; answer is clearly marked, identified and discussed
<b>Written communication</b>	Illegible and confusing, misspelled words and incorrect grammar and punctuation	Mostly incomplete sentences with no paragraph structure and misspellings	Mostly complete sentences but paragraph and sentence structure is awkward and difficult to follow.	Complete sentences and some paragraph organization but sometimes difficult to follow	Writes in complete sentences, uses clear opening sentences in paragraphs, and organizes subjects comprehensibly and clearly
<b>Review</b>	Provides no review or justification for results	Little review, justifies with, "seems right", "looks good", "seems reasonable", or etc.	Some review of answer and supports with data or logic/reason, Sometimes justifies results with "seems right", "looks good", etc.	Provides a review and supports results with data or logic/reason	Provides a clear and succinct review to the solution, results justified by data and/or logic/reason and/or basic principles

## Late Assignment Policy Agreement

The following policy and agreement applies to all assignments. Assignments include but are not limited to submitted artifacts, e.g. homework, reports, or exams, attendance in class or outside of class, and any other evaluated work that becomes the bases for receiving credit toward a course grade.

This agreement is non-negotiable and must be completed by each student requesting credit for any late assignment or exam. If this agreement and supporting documentation is not provided, there will be no credit for and no discussion about the particular circumstances that resulted in the late assignment.

An assignment is late if it is turned in after the day and time that it was due. If an assignment is turned in before the posted due date, it is not late and this policy does not apply.

Circle the appropriate answer to the questions below. If the answer to question (1) is Yes or the answer to both questions (2) and (3) are Yes, the assignment will be considered for credit.

1. Was the student involved in an accident, admitted to the hospital or seen by a medical professional on or within 24 hours of the assignment or exam due date?

Yes

No

2. Is it 48 hours in advance of the exam or homework due date?

Yes

No

3. Is the need to reschedule an assignment or exam due to a job interview, work schedule conflict, family emergency, childcare or health issue, or other related circumstance?

Yes

No

Provide documented evidence (physician's note, admission to a medical facility for care, or other documented evidence of accident or event) that includes the date and time of services or event and submit with this signed agreement to instructor.

For which assignment are you seeking credit:

---

If you did not answer Yes to question (1) or Yes to both questions (2) and (3), you will not receive credit for the late or missed assignment or exam. Do not turn in this agreement.

Name:

---

Signature:

---