MECH / MECA 440A – Capstone Design I
Mechanical & Mechatronic Engineering
Course Syllabus
Fall 2016
Sustainable Manufacturing
Chico State University

Professor: Greg Watkins, Ph.D., PE
Contact: O’Connell 416 / 530-898-4388 gkwatkins@csuchico.edu

Course Description: Design methods applied to mechanical / mechatronic systems. Group design projects. Project planning and management, manufacturing cost control, and environmental and social impact. Oral and written presentation of design results. Needs, resources, and technology for continuing self-education as professional engineers. Initial stage of the capstone design project to be continued in MECH / MECA 440B.

Prerequisites MECH 440A: GE A2 course with a grade of C- or higher, MECH 200, MECH 340 with a grade of C- or higher. Recommended: MECA 380, MECH 308, MECH 338.
Prerequisites MECA 440A: GE A2 course with a grade of C- or higher, EECE 237, MECH 200, MECH 340 with a grade of C- or higher. Recommended: MECA 380.

Course Objectives:
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. Exercise project planning, budgeting, and cost management.
5. Understand professional ethical responsibility.
6. Recognize the need for, and acquire an ability to engage in lifelong learning.

Class Meetings: Section 01 – Lecture – MW – 8:00 to 8:50 – O’Connell 254
Section 02 – Supervision – H – 5:00 to 7:50 – Langdon 302

Lecture: The lecture sessions will be used to present material related to the design process. Topics include overview of the design process, customer requirements, specifications, conceptual design, project planning, cost estimating, budgets, documentation, etc.

Supervision: The supervision section is utilized for sponsor presentation night and for the three required student presentations (Project Proposal, Preliminary Design Review, and Final Design Review). The remaining Thursday night class meetings may be utilized for additional topics such as motor sizing or CNC workshops.
This class will make use of the Blackboard Learn course management system. Primary content will include lectures, handouts, and an on-line gradebook. Other content, such as non-urgent announcements, may be posted as needed throughout the term.

In the event I need to contact members of the class or make urgent announcements regarding presentations, class cancellations, etc., it will be done via your WildcatMail email account. I do not plan to use this method of communication frequently, but I do expect that information sent this way will be received. University policy requires students to monitor their WildcatMail accounts. If you have another preferred email provider, you may set up automatic forwarding of your WildcatMail to that address. Details are available at www.csuchico.edu/itss.

Academic integrity is taken seriously at the University, in this College, and Department, and by your professor. Violations will be referred to student judicial affairs and can result in penalties ranging from failure of the course to long term suspension from the university.

All project work in this class is team based, but students will receive individual grades for “Contribution to the Project.” The grade is determined by the faculty advisor and is based on peer evaluations, advisor meetings, general observations, and the content of the student’s design log book.

Students are required to submit documents at various times during the semester. Examples include project request documents, presentation evaluation forms, and peer evaluations. All of these submissions are accompanied by specific instructions and due dates. Failure to follow instructions and meet deadlines will result in the assignment of Kindergarten Points which correspond to a deduction in the student’s course contribution grade.

On time attendance is expected of all students at all class meetings and presentations. Attendance may be taken at any time during regularly scheduled class meetings. Absences and tardiness will result in the assignment of Kindergarten Points unless prior arrangements have been made.

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. ARC is located at Student Services Center 170 and may be reached at 530-898-5959 or arcdept@csuchico.edu.
### Course Syllabus

<table>
<thead>
<tr>
<th>Grading:</th>
<th>Topic</th>
<th>%</th>
<th>T/I</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Project Proposal Presentation</td>
<td>10%</td>
<td>I</td>
<td>Demonstrate that the design problem is understood, well defined, and justified.</td>
</tr>
<tr>
<td></td>
<td>Preliminary Design Review Presentation</td>
<td>15%</td>
<td>I</td>
<td>Demonstrate that a valid concept has been developed. Convince your customer to proceed with detailed design.</td>
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<tr>
<td></td>
<td>Final Design Review Presentation</td>
<td>20%</td>
<td>I</td>
<td>Demonstrate that the solution will meet the requirements and solve the problem. Convince your customer to proceed with prototype construction.</td>
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<tr>
<td></td>
<td>Draft Design Report</td>
<td>5%</td>
<td>T</td>
<td>Graded only for completeness</td>
</tr>
<tr>
<td></td>
<td>Final Design Report</td>
<td>25%</td>
<td>T</td>
<td>Content, organization, style, format</td>
</tr>
<tr>
<td></td>
<td>Contribution to Project</td>
<td>25%</td>
<td>I</td>
<td>Peer review and evaluation by faculty advisor</td>
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**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.

### Milestones:

- **Thursday 9/1**: Sponsor Presentations
- **Wednesday 9/7**: Projects and teams assigned
- **Thursday 9/22**: Project Proposal Presentations
- **Thursday 10/20**: Preliminary Design Review Presentations
- **Thursday 12/8**: Final Design Review Presentations
- **Friday 12/16**: Exam period – Final Design Reports Due