Prerequisites: ME 195A with Grade C- or better
Credit Units: 3 units, 9 hours laboratory
Class hours: Wednesdays, 13:30 – 16:15
(Each student is expected to commit at least 10 hrs/week to his/her project)
Class codes: See below
Instructors/Meeting Room: Section 1 (20471): Prof. Raghu Agarwal, Room E135
Section 2 (20472): Prof. Winncy Du, Room E192
Section 3 (20473): Prof. Nicole Okamoto, Room E114A
Section 4 (20908): Prof. Raymond Yee, Room E111
Course coordinator: Professor Raghu Agarwal (E-mail: Raghu.agarwal@sjsu.edu)
Office Hours: Check with your instructor

COURSE DESCRIPTION:
Second half of a one-year team project carried out under faculty supervision. Project will proceed from problem definition to analysis, design and validation, experimentation including possible construction and testing.

Required Text: Senior Design Project Manual, edited by Dr. Fred Barez, MAE Department available at: http://www.sjsu.edu/me/programs/bsme/bsme_seniorproject/

Grading (overall): A letter grade will be assigned to each student by the section instructor at the end of the semester and will be based on evaluation of the following course requirements:
  • (25%) Delivery of at least three oral presentations on achievements and timely progress
  • (10%) Class and seminar/guest speaker participation, quizzes, and assignments
  • (50%) End-of-semester report and prototype evaluation
  • (15%) Individual performance evaluation

Work Area:
  • Do NOT leave trash in the area. Hazardous materials are to be kept in safe containers.
  • Do NOT leave equipment running unattended.
  • Your work area must be cleaned up before your final semester grade will be released.
Safety: **NO STUDENT IS PERMITTED TO WORK ALONE IN A WORK AREA WITH EQUIPMENT OR HAZARDOUS MATERIAL PRESENT.** Refer to the Safety Rules in your manual and posted in each Laboratory.

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. **Academic Integrity**

Students in this course are expected to maintain high ethical standards in all matters pertaining to the course, including, but not limited to, examinations, homework, course assignments, presentations, writing, laboratory work, team work, treatment of class members, and behavior in class. Cheating and plagiarism are violations of the SJSU Policy on Academic Dishonesty (S98-1) and will not be tolerated in the class. Students are expected to have read the Policy, which is available at:

[http://www2.sjsu.edu/senate/S04-12.pdf](http://www2.sjsu.edu/senate/S04-12.pdf)

Plagiarism is defined as, *the use of another person’s original (not common-knowledge) work without acknowledging its source.*\(^1\) Thus plagiarism includes, but is not limited to:\(^2\):

- copying in whole or in part, a picture, diagram, graph, figure, etc. and using it in your work without citing its source
- using exact words or unique phrases from somewhere without acknowledgement
- putting your name on a report, homework, or other assignment that was done by someone else

Students are expected to familiarize themselves with how to avoid plagiarism. Several helpful resources can be found at:

[http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm](http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm)

**Course Goals**

The overall goals for the course are to:

1. Provide senior students a capstone experience in design from concept to fabrication and validation of the final product.
2. Familiarize students with general industry practices, such as planning, budgeting, part procurement, fabrication, assembly, and functional tests.

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\(^2\) Adapted from, “Avoiding Plagiarism,” [http://owl.english.purdue.edu/handouts/research/r_plagiar.html](http://owl.english.purdue.edu/handouts/research/r_plagiar.html).
3. Develop students’ creative abilities in solving open-ended design problems.
4. Develop students’ engineering judgment as well as their confidence in making and accepting responsibility for design decisions.
5. Develop students’ oral and written communication skills necessary to describe the assumptions, methods, and results of engineering analysis, synthesis, and decision making associated with their design.
6. Make students aware of the importance of teamwork in the design of products and provide them with an opportunity to develop team and leadership skills.
7. Develop students’ understanding of professional practices, engineering ethics, as well as global and societal issues.

Learning Objectives

By the end of the course each student should be able to:

**Design Skills**

1. Apply the complete product development process including:
   - Defining the problem/societal need, carrying out market study/economic and budget analyses
   - Developing a complete set of functional specifications the design solution must meet
   - Generating solution concepts
   - Selecting the most promising design concept using structured methodologies
   - Developing design models and/or drawings for prototype and final design components
   - Procuring, fabricating, and assembling prototype and final design hardware
   - Evaluating, testing, and analyzing prototype and final design components and systems
   - Identifying future modifications and improvements that could be made to the design based on test data
   - Writing a project report and making presentations
2. Develop a schedule and meet schedule and budget constraints.
3. Interact effectively with vendors, suppliers, and shop personnel.

**Communication Skills**

4. Write high quality design reports (i.e., using correct language and terminology, correct technical information, and professionally prepared graphs and tables).
5. Give clear, informative, technically correct oral presentations using professionally prepared visual aids.

**Team Skills**

6. Work harmoniously and effectively on a team to complete a design project.

**Contemporary Issues**
7. List several examples of contemporary issues related to their project, and articulate a problem statement or position statement for each.

8. Identify possible solutions to these contemporary problems, as well as any limitations of such strategies.

**Global and Societal Issues**

9. Evaluate and describe accurately the environmental impact of your product.

10. Evaluate and describe accurately any environmental and economic tradeoffs of your product.

11. Evaluate and describe accurately the health, safety, and economic tradeoffs of your product.

**Engineering Ethics**

12. Demonstrates knowledge of the ASME code of ethics.

13. Given a job-related scenario that requires a decision with ethical implications, identify possible courses of action, discuss the pros and cons of each one, and decide on the best one.

**COURSE SCHEDULE**

<table>
<thead>
<tr>
<th>Wk. No.</th>
<th>Date</th>
<th>Place</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/29</td>
<td>E285-287</td>
<td>General session on Overview of ME 195B. Individual sessions.</td>
</tr>
<tr>
<td>2</td>
<td>2/5</td>
<td>Labs</td>
<td>Project presentation No. 1. Individual sessions.</td>
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<tr>
<td>3</td>
<td>2/12</td>
<td>Labs</td>
<td>Project presentation No. 1. Individual sessions.</td>
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<tr>
<td>4</td>
<td>2/19</td>
<td>Labs</td>
<td>Project presentation No. 1. Individual sessions.</td>
</tr>
<tr>
<td>5</td>
<td>2/26</td>
<td>E189</td>
<td>Seminar on “Energy and Environmental” Quiz No.1.</td>
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<tr>
<td>6</td>
<td>3/5</td>
<td>Labs</td>
<td>Project presentation No. 2. Individual sessions.</td>
</tr>
<tr>
<td>7</td>
<td>3/12</td>
<td>Labs</td>
<td>Project presentation No. 2. Individual sessions.</td>
</tr>
<tr>
<td>8</td>
<td>3/19</td>
<td></td>
<td>Instructors’ meeting – No scheduled sessions</td>
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<tr>
<td>9</td>
<td>3/26</td>
<td></td>
<td>Spring Break – No classes</td>
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<tr>
<td>10</td>
<td>4/2</td>
<td>Labs</td>
<td>Project presentation No. 3. Individual sessions.</td>
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<td>11</td>
<td>4/9</td>
<td>Labs</td>
<td>Project presentation No. 3. Individual sessions.</td>
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<tr>
<td>12</td>
<td>4/16</td>
<td>Labs</td>
<td>Project presentation No. 3. Individual sessions.</td>
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<tr>
<td>14</td>
<td>4/30</td>
<td></td>
<td>Instructors’ meeting – no scheduled sessions</td>
</tr>
<tr>
<td>15</td>
<td>5/7</td>
<td>Labs</td>
<td>Preparation for Student Conference Day presentations</td>
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**Note:** Student Conference Day presentations by each project teams will be scheduled by the ME Department, and they will be held at assigned locations.

**Important Notes:**

1. Each project team will make at least three oral presentations during the scheduled individual section meetings at times to be arranged by the section instructor.
2. Students’ participation in ALL scheduled individual and general sessions is mandatory. Absence from these sessions without the Section Instructor’s permission will affect a student’s overall marks.