SAN JOSÉ STATE UNIVERSITY
Department of Mechanical and Aerospace Engineering

ME 195B Senior Design Project II

Prerequisites: ME 195A with Grade C- or better

Credit Units: 3 units, 9 hours laboratory

Class hours: Wednesdays, 1:30 – 4:15

Instructors/Meeting Room: Section 1 (20378): Prof. Raghu Agarwal, Room E135
Section 2 (20379): Prof. B. Furman, Room E133
Section 3 (20380): Profs. Barez and Hsu, Room E192
Section 4 (20724): Profs. Yee, Room E111 and Okamoto, Room E114

Course coordinator: Professor Raghu Agarwal (E-mail: Raghu.agarwal@sjtu.edu)

This course satisfies SJSU Studies area V when taken in conjunction with Engr 195a/b.

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 2013-2014, edited by Dr. Fred Barez, MAE
Department available at: www.engr.sjsu.edu/bjfurman/courses/ME195/ME195pdf/ME195coursemanual.pdf

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
• (15%) Writing assignments, quizzes, and monthly progress reports
• (45%) End-of-semester report and accomplishments (including prototype)
• (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.

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.
E123 Shop Access:
The shop in E123 will be made available for students for fabrication purposes during the hours posted on the door. Access beyond those hours for assembly purposes only (no machining) will be granted on a case-by-case basis by petition. Access to the shop will be given under two circumstances: 1) you have taken ME/Tech 41 and received a B- or better, or 2) you can demonstrate the ability to run the machinery safely. Please see the department office for forms to request access.

University Policies

Academic integrity
Your commitment as a student to learning is evidenced by your enrollment at San Jose State University. The University’s Academic Integrity policy, located at http://www.sjsu.edu/senate/S07-2.htm, 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 is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism (presenting the work of another as your own, or the use of another person’s ideas without giving proper credit) will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU’s Academic Policy S07-2 requires approval of instructors.

Campus Policy in Compliance with the American 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 requires that students with disabilities requesting accommodations must register with the Disability Resource Center (DRC) at http://www.drc.sjsu.edu/ to establish a record of their disability.

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.
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.

**Environmental, Economic, and Safety 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.

**GE Learning Objectives**

12. Area V SLO #1: Students shall be able to compare systematically the ideas, values, images, cultural artifacts, economic structures, technological developments, or attitudes of people from more than one culture outside the U.S.
   - Recommend how they would change their designs, if at all, if their projects were to be implemented in a country with a distinctly different culture than in the
United States.
13. Area V SLO #3: Students shall be able to explain how a culture outside the U.S. has changed in response to internal and external pressures.

COURSE SCHEDULE
(subject to change)

<table>
<thead>
<tr>
<th>Wk. No.</th>
<th>Date</th>
<th>Place</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/28</td>
<td>E285</td>
<td>General session on Overview of ME 195B. Individual sessions.</td>
</tr>
<tr>
<td>2</td>
<td>2/4</td>
<td>Labs</td>
<td>Individual sessions.</td>
</tr>
<tr>
<td>3</td>
<td>2/11</td>
<td>Labs</td>
<td>Individual sessions.</td>
</tr>
<tr>
<td>4</td>
<td>2/18</td>
<td>Labs</td>
<td>Project presentation No. 1.</td>
</tr>
<tr>
<td>5</td>
<td>2/25</td>
<td>TBA</td>
<td>Seminar: <strong>On Global Economy and Social Impacts</strong>; Quiz No.1., Writing Assignment</td>
</tr>
<tr>
<td>6</td>
<td>3/4</td>
<td>Labs</td>
<td>Individual sessions.</td>
</tr>
<tr>
<td>7</td>
<td>3/11</td>
<td>Labs</td>
<td>Individual sessions; Writing Assignment Due</td>
</tr>
<tr>
<td>8</td>
<td>3/18</td>
<td>Labs</td>
<td>Individual sessions.</td>
</tr>
<tr>
<td>9</td>
<td>3/25</td>
<td>Labs</td>
<td>Instructors’ meeting – No scheduled sessions</td>
</tr>
<tr>
<td>10</td>
<td>4/1</td>
<td>Labs</td>
<td>Spring Break – No classes</td>
</tr>
<tr>
<td>11</td>
<td>4/8</td>
<td>Labs</td>
<td>Project Presentation 2</td>
</tr>
<tr>
<td>12</td>
<td>4/15</td>
<td>Labs</td>
<td>Individual sessions.</td>
</tr>
<tr>
<td>13</td>
<td>4/22</td>
<td>Labs</td>
<td>Spring recess</td>
</tr>
<tr>
<td>15</td>
<td>5/6</td>
<td>Labs</td>
<td>Instructors’ meeting – no scheduled sessions</td>
</tr>
<tr>
<td>16</td>
<td>5/8</td>
<td>Labs</td>
<td>Student Conference Day presentations</td>
</tr>
</tbody>
</table>

5/13/15: Prototype Evaluation Day

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 unless they have a university-authorized excuse. Absence from these sessions without the Section Instructor’s permission will affect a student’s individual performance evaluation.

NOTE
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.