San José State University
Department of Electrical Engineering
EE 198A, Senior Design Project I, All Sections, fall, 2017

Instructor: Ping Hsu
Office Location: ENG257
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Email: ping.hsu@sjsu.edu
Office Hours: F 3pm-4pm.
Class Days/Time: F 10am-12:45pm (Lab)
Classroom: ENGR345

Prerequisites: EE Senior in good standing, ENGR 100W with a C or better, EE120, EE122, and EE128 with a C- or better
Co-requisites (These courses allow you to learn some of the skills required to do a real design. These are suggested, not required):
1. Analog Circuit design: 124, 223, 129, 174
4. Integrated Circuit: 129, 166
5. MEMS: 129, 169
6. Electromagnetic microwave: 172
7. Control/Power Systems: 130, 132

Course Description
Team Design Project Proposal, Business Plan, Oral Design Presentations of the initial phases of the Design Project, a written and oral defense of the proposed Design Project. Global and Social Issues in Engineering. Individual written reports on Professional Development plans. GE Area: S when taken as part of EE major sequence.

Prerequisite: EE Senior in good standing in Major, ENGR 100W (with grade of "C" or better), ENGR100W, EE120, EE122, and EE128 (with grades of "C-" or better. Passage of the Writing Skills Test (WST) or ENGL/LLD 100A with a "C or better" (C- not accepted), completion of Core General Education and upper division standing are prerequisites to all SJSU studies courses. Completion of, or co-registration in,

Co-requisite: ENGR 195A

Misc/Lab: Lab 3 hours.

Note: Meets GE Areas S and V when course is taken in combination with: EE 198B, ENGR 195A and ENGR 195B

Course Goals and Student Learning Objectives
Upon successful completion of this course, students will be able to:
1. Design a system, device or component (c,k)
2. Fabricate a system, device or component (c,k)
3. Test a system, device or component(c,k)
4. Work in a team (d)
5. Research an Electrical Engineering topic (i)
6. Estimate the ethical implications of an engineering project (f)
7. Write individual engineering reports (g)
8. Write final Engineering Team reports(g)
9. Orally present Engineering ideas and results(g,h)
10. Prepare a literature review (i,j)
11. Prepare a five year plan for to achieve professional goals (i,j)

GE/SJSU Studies Learning Outcomes (LO), if applicable

Upon successful completion of this course, students will be able to:

- GELO1: Describe how identities (i.e. religious, gender, ethnic, racial, class, sexual orientation, disability, and/or age) are shaped by cultural and societal influences within contexts of equality and inequality:
  - ENGR 195A Reflection Paper 3 (700-800 words): In this reflection paper, you are to critically engage the topic of the social construction of identity in your life. Please discuss and provide examples of how at least one of your identities (i.e., religious, gender, ethnic, racial, class, sexual orientation, disability and/or age, among others) is shaped, or has been shaped, by cultural and societal influences within contexts of equality and inequality. Please integrate course material (concepts, theories, discussions, lectures, readings). Please cite at least one course reading.
  - EE 198A 5 Year Plan: Based upon your response to Engr 195A Testimony 1, consider your identity as a future engineer. How is your identity as an engineer shaped by cultural and societal influences within contexts of equality and inequality? (minimum 750 words)
  - EE 198A: Silicon Valley Leader Symposia: Write one paragraph discussing how what you heard in the symposium might affect your perception of your identity as a future engineer. (minimum 200 words)

- GELO2: Describe historical, social, political, and economic processes producing diversity, equality, and structured inequalities in the U.S.:
  - ENGR 195A Reflection paper 2 (700-800 words): Consider technological innovations and developments in your field. In your paper: 1) Describe, in detail, an example of how one such innovation/development (using any example that you want post-1970) has either increased or decreased environmental or social justice and inequality in the U.S. Make sure to discuss what the technological development is and its environmental or social consequence(s). 2) Looking forward, can you predict any other possible unintended environmental and/or consequences from this branch of technology? 3) Next, discuss how your current or past projects have or will contribute to environmental and/or social justice or injustice in the United States. Include at least two citations. You can cite two course readings or you can have one citation from a course reading and one citation from the
movie "Secrets of Silicon Valley." Either way you need two. Citing lecture will not count as one of these citations for this paper.

- **EE 198A Oral Presentation:** Using the case studies provided in ENGR195A, describe how your project address a social issue in the U.S. *(10 minute speech)*

- **GELO3:** Describe social actions which have led to greater equality and social justice in the U.S. (i.e. religious, gender, ethnic, racial, class, sexual orientation, disability, and/or age).
  - ENGR 195A Reflection paper 2 (700-800 words): Consider technological innovations and developments in your field. In your paper: 1) Describe, in detail, an example of how one such innovation/development (using any example that you want post-1970) has either increased or decreased environmental or social justice and inequality in the U.S. Make sure to discuss what the technological development is and its environmental or social consequence(s). 2) Looking forward, can you predict any other possible unintended environmental and/or consequences from this branch of technology? 3) Next, discuss how your current or past projects have or will contribute to environmental and/or social justice or injustice in the United States. Include at least two citations. You can cite two course readings or you can have one citation from a course reading and one citation from the movie "Secrets of Silicon Valley." Either way you need two. Citing lecture will not count as one of these citations for this paper.
  - EE198A Adviser Meeting Reflection paper 1: Meet with advisor and go over draft of reflection paper one, and well as S&V aspects of project. *(minimum 750 words)*
  - **EE 198A Reflection paper 1:** Describe how the push for a lead free standard in electronic products (RoSH) increased social justice in the US. *(minimum 750 words)*

- **GELO4:** Recognize and appreciate constructive interactions between people from different cultural, racial, and ethnic groups within the U.S.
  - Engr 195A Reflection Paper 3 *(500 words)*: Students will read excerpts from Ernest Callenbach’s *Ecotopia*. Students will apply this reading to their current lived experience in the U.S. Beyond fulfilling the S-LO4, students will address the specific course learning objective “identify, compare, and contrast how local community organizations, groups, and agencies address social issues relevant to the environment and quality of life in the Santa Clara Valley” by comparing one element in our current society to Callenbach’s described society.

### Course Content Learning Outcomes

- The students are able to apply knowledge and skills acquired in earlier coursework to identify, formulate, and propose a sound solution to an engineering problem (c,k)
- The students have an understanding of ethics, social implication of engineering, and the need for life-long-learning (i,f)
- The students can function in teams and can communicate effectively. (g)
• The students can describe and use industry standards (c)

**Topics:**

• Engineering ethics.
• Social implications of Engineering.
• Team work and life-long learning
• Communication skills
• Career objectives and interviewing
• Industry standards

**ABET outcomes**

The letters in parentheses in the course learning objectives refer to ABET criterion 3 outcomes satisfied by the course. These are listed below as a reference:

(a) An ability to apply knowledge of mathematics, science, and engineering

(b) An ability to design and conduct experiments, as well as to analyze and interpret data

(c) An ability to design a system, component, or process to meet desired needs

(d) An ability to function on multi-disciplinary teams

(e) An ability to identify, formulate, and solve engineering problems

(f) An understanding of professional and ethical responsibility

(g) An ability to communicate effectively

(h) The broad education necessary to understand the impact of engineering solutions in a global and societal context

(i) A recognition of the need for, and an ability to engage in life-long learning

(j) A knowledge of contemporary issues

(k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

(l) Specialization in one or more technical specialties that meet the needs of companies

(m) Knowledge of probability and statistics, including applications to electrical engineering

(n) Knowledge of advanced mathematics, including differential and integral equations, linear algebra, complex variables, and discrete mathematics

(o) Basic sciences, computer science, and engineering sciences necessary to analyze and design complex electrical and electronic devices, software, and systems containing hardware and software components
Required Texts/Readings

Textbook

NA

Other Readings

Classroom Protocol

Cell Phones:
Students will turn their cell phones off or put them on vibrate mode while in class. They will not answer their phones in class. Students whose phones disrupt the course and do not stop when requested by the instructor will be referred to the Judicial Affairs Officer of the University.

Computer Use:
In the classroom, students are allowed to use computers only for class-related activities. These include activities such as taking notes on the lecture underway, following the lecture on Web-based PowerPoint slides that the instructor has posted, and finding Web sites to which the instructor directs students at the time of the lecture. Students who use their computers for other activities or who abuse the equipment in any way, at a minimum, will be asked to leave the class and will lose participation points for the day, and, at a maximum, will be referred to the Judicial Affairs Officer of the University for disrupting the course. (Such referral can lead to suspension from the University.) Students are urged to report to their instructors computer use that they regard as inappropriate (i.e., used for activities that are not class related).

Expected time commitment

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 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 practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Assignments and Grading Policy

Outcome Assessment (Grading):

- Credit/No Credit Skill-audit exam. There are two exams. One is a practice exam and the other one counts for credit. Both are in canvas. You need to earn an 80% on the exam or you will receive an Incomplete until you pass.

- Area S (20%) Students must pass this part of the course with a 74% to receive Area S GE credit.
  
  \[ \frac{50}{145} \times 100\% \text{, of the Area S } \%	ext{, Where do I want to be in 5 years and how am I going to get there? Consider your identity as a future engineer. How is your identity as an engineer shaped by cultural and societal influences within contexts of equality and inequality? (Individual)} \]
Reflection paper 1: Describe how the push for a lead free standard in electronic products (RoSH) increased social justice in the US. (Individual)

- Articles:

Silicon Valley Leader Symposia

- You must attend one Silicon Valley Leader Symposia in room 189, (every Thursday from 12 to 1pm for details go to http://www.engr.sjsu.edu/speakers/) at each symposium. Write one paragraph discussing how what you heard in the symposium might affect your perception of your identity as a future engineer. If you feel that the symposium content did not make you think about your future identify as an engineer, just write why you feel that way. (Individual)

Adviser Meeting Reflection paper 1: Meet with advisor and go over draft of reflection paper one, and well as S&V aspects of project (Individual)

- 35% Written Final Proposal. Your proposal will be judged by your project advisor and one other EE faculty member. \((\text{Group, 5000 words})^{1}\)
- 10% Business Plan – This Plan must be approved by the Coordinator and outside evaluators before the project may continue (Group, 3000 words)
- 10% Adviser Evaluation (Individual)
  - You must participate in:
    - Each 198A meeting
    - EE198B final project on the last day of class
    - There is a rubric on canvas on how participation is defined.
- 20% Oral presentation (Area S). Your presentation will be judged by your project advisor, one other EE faculty member (Group, 2000 words)
  - Describe how your project address a social issue in the U.S.
- You will receive an incomplete if you do not earn an 80% on the online skill audit exam.

\(1\) Note: You will not receive the group grade, if you have not participated in the group work.
- **Grading Percentage Breakdown**

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
</tr>
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<tbody>
<tr>
<td>94% and above</td>
<td>A</td>
</tr>
<tr>
<td>93% - 90%</td>
<td>A-</td>
</tr>
<tr>
<td>89% - 87%</td>
<td>B+</td>
</tr>
<tr>
<td>86% - 84%</td>
<td>B</td>
</tr>
<tr>
<td>83% - 80%</td>
<td>B-</td>
</tr>
<tr>
<td>79% - 77%</td>
<td>C+</td>
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<tr>
<td>76% - 74%</td>
<td>C</td>
</tr>
<tr>
<td>73% - 70%</td>
<td>C-</td>
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<tr>
<td>69% - 67%</td>
<td>D+</td>
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<tr>
<td>66% - 64%</td>
<td>D</td>
</tr>
<tr>
<td>63% - 60%</td>
<td>D-</td>
</tr>
<tr>
<td>below 60%</td>
<td>F</td>
</tr>
</tbody>
</table>

**University Policies**

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs’ Syllabus Information web page at [http://www.sjsu.edu/gup/syllabusinfo/](http://www.sjsu.edu/gup/syllabusinfo/)
## Course Schedule

### Table 1 Course Schedule (Subject to change with fair notice as announced by instructor in class)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>EE198A</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25-Aug</td>
<td>Introduction, Professor’s Research Areas, System</td>
</tr>
<tr>
<td>2</td>
<td>1-Sep</td>
<td>Group organization, S&amp;V applications for project</td>
</tr>
<tr>
<td>3</td>
<td>8-Sep</td>
<td>References, Continue with S&amp;V project selection</td>
</tr>
<tr>
<td>4</td>
<td>15-Sep</td>
<td>Area S: Identity, Continue with S&amp;V project selection</td>
</tr>
<tr>
<td>5</td>
<td>22-Sep</td>
<td>Meet with advisor, <strong>No formal class.</strong></td>
</tr>
<tr>
<td>6</td>
<td>29-Sep</td>
<td>Presentation by Paul Wesling “Origins of Silicon Valley”. See Mr. Wesling’s bio <a href="http://www.cpmt.org/wesling.html">http://www.cpmt.org/wesling.html</a> Video <a href="https://www.youtube.com/watch?v=lRDB_W6POys">https://www.youtube.com/watch?v=lRDB_W6POys</a> Reflect on point: How or if the development of SV produced diversity, equality, and structured inequalities in the U.S.?</td>
</tr>
<tr>
<td>7</td>
<td>6-Oct</td>
<td>Engineering Standards, Finalize Projects, min-presentations</td>
</tr>
<tr>
<td>8</td>
<td>13-Oct</td>
<td>Creating Effective Proposals</td>
</tr>
<tr>
<td>9</td>
<td>20-Oct</td>
<td>Meet with advisor, No formal class, Open House</td>
</tr>
<tr>
<td>10</td>
<td>27-Oct</td>
<td>Meet with advisor, No formal class</td>
</tr>
<tr>
<td>11</td>
<td>3-Nov</td>
<td>Area S: Formal Meeting with adviser</td>
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<tr>
<td>10-Nov</td>
<td>No Class: Veteran’s Day</td>
<td></td>
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<tr>
<td>12</td>
<td>17-Nov</td>
<td>Oral Proposal Presentations</td>
</tr>
<tr>
<td>12-Nov</td>
<td>No Class: Thanks Giving</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>1-Dec</td>
<td>Oral Proposal Presentations (Area S)</td>
</tr>
<tr>
<td>14</td>
<td>8-Dec</td>
<td>EE198B Presentations (Area V)</td>
</tr>
</tbody>
</table>
Paul Wesling received his BS in electrical engineering and his MS in materials science from Stanford University. Following assignments at GTE/Lenkurt Electric (component engineering), ISS/Sperry Univac (bubble memory development, reliability, manufacturing engineering), Datapoint Peripheral Products (VP - Product Integrity), and Amdahl (design analysis, mainframe testing, console peripherals), he joined Tandem (now HP's NonStop Enterprise Division) in 1985. As a member of the development team for advanced IC packaging, he designed several multi-chip module prototypes, supervised their fabrication, and tested them. In Tandem's Education Group from 1993 to 2001, he developed courses on reliability, managed Tandem's Distinguished Lectures series, and served on education's Technology Initiative team. He organized a number of advanced technology and professional skills development courses for his Division and also for the IEEE. He managed a grant from the National Science Foundation for the development of multimedia educational modules in the field of IC packaging. Paul retired from HP in 2001, and now serves as the CPMT Society's webmaster as well as Communications Director for the S.F. Bay Area's Council.

Mr. Wesling has published a number of technical and education papers and authored a book chapter. As CPMT's vice president of publications from 1985 through January, 2008, he supervised four archival journals and a newsletter, and oversaw authors for IEEE Press books. He is a Fellow of the IEEE, and received the IEEE Centennial Medal, the CPMT Board's Distinguished Service award, the Society Contribution Award, and the IEEE's Third Millennium Medal. He has organized over 300 courses for the local IEEE chapter in the Santa Clara Valley (Silicon Valley), many of them held at Stanford University (and, more recently, at industrial facilities). He served as scoutmaster of his local Boy Scout Troop for 15 years, is currently Advisor of a High-Adventure Crew, and enjoys backpacking, fly fishing, and amateur radio. He was selected as a torchbearer for the Atlanta Olympics Torch Relay in 1996, based on selection by the local United Way.