San José State University
Biomedical, Chemical and Materials Engineering
MatE 198A Senior Design Project
Fall 2014

Instructor: Dr. Gleixner
Office Location: Engineering 385
Email: Stacy.Gleixner@sjsu.edu
Office Hours: TBA
Class Days/Time: Friday 9:00 –12:45, Room TBA
Prerequisites: To enroll in Senior Design Project, you must be a MatE major in good standing in the department and must have submitted an approved Major Form. You must also be in your final year of study at SJSU. MatE 198A/B must be completed in one year. Prerequisite: 2.0 average and "C-" minimum grade in (MATE 115, MATE 141, MATE 151, MATE 153, MATE 154, MATE 155); ENGR 100W; CHE 162. Corequisite: ENGR 195A, MATE 195 and CHE 161

Course Description
Apply materials engineering principles to the design and implementation of an approved materials engineering project. Integrate global and social issues in engineering.

Course Goals
Senior Project is an important facet of your undergraduate education. It is the culminating experience that provides you with the opportunity to integrate knowledge learned from the various courses into a cohesive research and design project. This course will also focus on how global and social issues are integrated into engineering. This course will provide you with several workshops practicing engineering design experience project management, oral and written communication, literature reviews, safety and ethical considerations, and global and social issues in engineering. It also provides you with the training necessary to plan, execute, evaluate, and implement a project in its entirety based on the proposed design/research objectives. You will be required to identify, evaluate, plan, promote, coordinate, and complete a project of your own, with faculty supervision.

In the College of Engineering at SJSU, we believe that it is critical that engineering students integrate the GE student learning outcomes into their engineering studies. In your senior project course and the Engr 195A course, you will be challenged to understand the relationship of engineering to the broader community both in the U.S. and worldwide. In addition to the assignments in Engr 195A, the engineering faculty have created linked activities in your senior project course that allows you to apply these concepts to your engineering discipline.

GE/SJSU Studies Learning Outcomes (LO)
Upon successful completion of this course, students will be able to:
S-LO1: 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 Testimony 1: Discuss and provide examples of how your identities (i.e., religious, gender, ethnic, racial, class, sexual orientation, disability and/or age, among others) are shaped by cultural and societal influences within contexts of equality and inequality (250-500 words).
- Engr 195A Testimony 2: How does language affect our identities? How do we use language and labels to authenticate our identities to others and ourselves? (250 words)
- MatE 198A Testimony 1: 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? (250-500 words)

S-LO2: Describe historical, social, political, and economic processes producing diversity, equality, and structured inequalities in the U.S.;

- Engr 195A Reflection paper 2: “Secrets of Silicon Valley” reflection paper (250 words)
- MatE 198A Reflection paper 2: Using the case studies provided in ENGR195A/B, describe how your project fits into the historical, social, political, and economic processes producing diversity, equality, and structured inequalities in the U.S. (500-750 words)

S-LO3: 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); and

- Engr 195A Reflection paper 1: Describe social actions within the borders of the United States that have led to greater equality and social justice in your life (i.e., religious, gender, ethnic, racial, class, sexual orientation, disability, and/or age). Discuss how your current or past projects have or will contribute to social justice in the United States (750-1250 words).
- Engr 195A Reflection Paper 2: In his essay, Dyson gives some historical examples of technological innovations that he claims have increased social justice. Considering the technological innovations in your discipline, please describe another example and indicate how it has increased social justice in the U.S. (250-500 words)
- MatE 198A Reflection paper 1: Describe how the push for a lead free standard in electronic products (RoSH) increased social justice in the U.S. (250-500 words)

S-LO4: Recognize and appreciate constructive interactions between people from different cultural, racial, and ethnic groups within the U.S.

- Engr 195A Website Analysis: Organization Website Analysis Environmental and social justice issues are addressed at many different levels and in different ways by groups and organizations. This assignment addresses the broad GE learning objective of “recognizing and appreciating constructive interactions between people from different cultural, racial, and ethnic groups in the U.S.” and the specific course learning objective to “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. (750 words)
- MatE 198A essay: Consider a negative side effect of technology ewaste. Read the following articles and answer the questions in paragraph form. Your essay must cite your sources and be at least 500 words.

Articles:
MatE 198A Course Learning Objectives:

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

- Formulate design objectives
- Plan a project based on the proposed design objectives
- Develop a detailed experimental plan using research in the literature, design of experiments, and project management
- Discuss the safety, environmental, and ethical components of the project
- Design, plan, execute, and evaluate a feasibility study
- Present proposal and results in an oral and written format
- Discuss the social and global issues of engineering and specifically the design project
- Discuss the role of identity, equality, social actions, and culture in solving technical problems

Required Textbooks


Class Canvas Site

This course will conduct all of its communications outside of class using Canvas. All of the online resources including solutions to in class work and assignments will be on Canvas. To get into your account you must be enrolled in the course. Go to the www.sjsu.edu/ecampus/students/ where you will find log-in directions for students and links to Canvas.

Classroom Protocol

Silence all cell phones during the class period. Please arrive on time for class. I will collect assignments at the very start of class. If you are late to class, you will be marked down 10% on the assignment. Please hold all assignments to pass in to the end (it is very disruptive when you walk up and hand it to me during the class).

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current
academic calendar web page located at http://www.sjsu.edu/calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/

**Grading**

Grading for MatE 198A will be based on the following criteria:

<table>
<thead>
<tr>
<th>Grading Category</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Oral Presentations</td>
<td>20%</td>
</tr>
<tr>
<td>Workshop Assignments</td>
<td>20%</td>
</tr>
<tr>
<td>Seminar Reports (4 reports on 4 talks)</td>
<td>5%</td>
</tr>
<tr>
<td>Interim Design Report and Final Presentation</td>
<td>30%</td>
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<tr>
<td>Reflection papers and activities related to global and social issues</td>
<td>30%</td>
</tr>
<tr>
<td>Participation in in-class activities</td>
<td>5%</td>
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<td>B+</td>
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<td>83-86</td>
<td>B</td>
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<td>80-82</td>
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<td>77-79</td>
<td>C+</td>
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<td>73-76</td>
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<td>60-69</td>
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**Project Supervision**

Each student has the course instructor (the project advisor) as well as a technical advisor. Sometimes these two roles are occupied by the same person; sometimes by different people. Identification of the technical advisor will occur during the project identification stage, which occurs during the first few weeks of class.

Students are expected to complete their projects within the allotted two-semester time. It is advised that the student, together with his/her technical advisor, set the scope of the project such that it can be successfully completed, including writing the final report. "Incomplete" grades will not be assigned at the end of the second semester. Only a serious and compelling reason, consistent with the criteria established for a late drop from a course in the College of Engineering,
shall be the basis for an incomplete grade in the Senior Design Project, at the end of two semesters.

For full credit, this summary must be submitted to the instructor within **ONE WEEK** of attendance at the seminar.

**Important Senior Project Requirements**

Each of the written and oral reports and other requirements are discussed individually below. Be sure to refer to this document each week as deadlines approach.

**Seminar Attendance (Submit 4 seminar reports this semester)**

You must attend at least 4 seminars over the course of the semester. These can be on campus or technical talks off-campus. The Silicon Valley Leaders Symposium which is on Thursday 12-1 pm in Eng 189: [http://engineering.sjsu.edu/news-and-events/svls](http://engineering.sjsu.edu/news-and-events/svls). Another option is the Green Talks, Wednesdays from 12-1:15 in Eng 189: [http://engineering.sjsu.edu/news-and-events/greentalk](http://engineering.sjsu.edu/news-and-events/greentalk). You could also attend the local ASM talks (emails of these come out to the student email list).

You must turn in a one-page essay on the topic. Your one-page essay must summarize the talk as well as reflect on how it relates to your project or career. It will also be graded based on organization and writing quality. Even if the talk is completely outside the scope of your major, you can observe and record thoughts about the speaker’s presentation style or the speaker’s personal history and career.

**Project Notebooks**

You should purchase a project (laboratory) notebook immediately. In the notebook you should document each phase of your work. At first, this notebook will serve as a journal as you collect information about the project. Take notes on papers you read, and keep notes of conversations with your customer and technical advisor. Date every page as you begin writing. Jot down ideas as you think of them. Use a chronological entry system. When you begin doing experiments, write down the objective of the experiment, sketch the experimental apparatus, and make an appropriate table for your results. When you analyze your data, record the analysis method. Paste in computer-produced graphs and charts and tables if necessary, so that all your work is in one place.

You also need a system to organize all your literature review papers. If you prefer to read them online, this can be done with a folder system on your computer. If you prefer to read them on paper, you should get a binder to collect them in. Index the articles so that you can find them later when you write your report. Take notes in your lab notebook but refer to the article by page or author, or number the articles in some way.

**Workshop Reports**

There will be a variety of workshops conducted in the classroom for this semester. The topics include design constraints, project management, library/Internet search training, communication and presentation skills, safety and ethics considerations, design of experiments, and global and social issues in engineering. The deliverables are all listed on the Canvas assignment site (with due dates and descriptions of the assignments).

**Design Project Proposal**

Your project proposal will include the following items:
Name of the project; technical advisor and site (if off-campus); overall goal of the project; motivation of the project; design objectives; major design constraints; major resources needed and available; technical background needed to succeed in the project; major milestones (including completion of the Feasibility Plan).

The proposal must be approved by your technical advisor before turning it in or making your presentation. The written proposal should be 4-5 pages in length, double-spaced, and word-processed.

The oral report is a 15-minute presentation including a minimum of 5 transparencies or PowerPoint slides. You should plan to speak for 12 minutes and allow 3 minutes for questions. Describe your topic and tell us what the primary goal of the research is, including all of the items mentioned above. Try to include answers to some of these questions: What is the motivation for this work? Why is this project important? What is the technological relevance of the project? What will your approach to the problem be? What is the primary technical difficulty associated with the project?

**Feasibility Study Plan**

The goal of the first semester in Senior Design is to complete a Feasibility Study. This study is a major milestone in the Design Project and will demonstrate that you will have the necessary background knowledge and skills to succeed at the Design Project. It will demonstrate that the resources needed for the project are available at the site chosen, and that your project is on time and on target for completion in the second semester.

The Feasibility Study Plan must be a well-defined experiment or design plan that comprises a critical path step in the project. This report presentation should include a description and plan for determining the feasibility of the project, a milestone schedule for the entire year, and a preliminary review of the available literature. This report gives the student an opportunity to ask critical questions and identify problems with the design, aids in determining possible courses of action, and initiates corrective actions before production. What will it take to succeed? How can I demonstrate that this project is feasible? What work has been done on this problem to date? Where does that work leave off, and yours begin? What is the purpose of final design review? What are the steps to accomplishing it? After it is complete, what will happen next?

Your plan should include a preliminary Milestone Schedule, indicating the important tasks to be accomplished both semesters, and when you plan to finish each one. Work backwards from the due date of the Project Final Report Draft, due on the 12th week of the second semester. The Milestone schedule is a set of stepping-stones to get you from start to finish. The Milestones will change later as you approach the end of the first semester and know what obstacles you will encounter.

**Interim Design Report**

The Interim Design Report is your final end of semester report for MatE 198A. Included within this report will be most of the other reports you have prepared this semester such as the design proposal and the feasibility study plan. This will include, but is not limited to: an overview of the industry and a problem statement, a detailed discussion of the literature, the project objective, the functional requirements, the design specs, a detailed experimental plan for the complete proposal, discussion of the safety, ethical, environmental, global and societal issues involved with the project, the feasibility plan and the results of the feasibility study and updated milestone schedule.

**Friday, December 6, is Interim Design Report Presentation Day.** Department Faculty, your technical advisor, and other industry representatives will be present at this presentation. Students are expected to have prepared adequately.
This report is usually about 25 pages long, double-spaced. Reports must be submitted to turnitin.com for plagiarism check. No grades will be assigned to a report if it is not checked by turnitin.com. When you receive your reviewed copy back from your instructor at the end of the semester, be sure to keep it handy. You will need to re-submit it the following semester when you write your final report.

University Policies and Resources

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 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 www.sjsu.edu/studentconduct 

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 Americans with 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 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Student Technology Resources

Computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and on the 2nd floor of the Student Union. Additional computer labs may be available in your department/college. Computers are also available in the Martin Luther King Library.

Engineering Student Success Center

Davidson College of Engineering Student Success Center (ESSC) assists undergraduate students in increasing their level of academic success and knowledge. In part, this is accomplished by helping students understand university requirements, policies, and procedures as well as by fostering a community of support. For more info, drop by E344 or see www.engr.sjsu.edu/students/essc

SJSU Writing Center

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. They offer free drop-in and by appointment writing sessions as well as workshops and online tutorials. www.sjsu.edu/writingcenter
King Library

Most all of you know of the library, but do you know of all it’s hidden resources? You can reserve the small study rooms (great for group study work): library.sjsu.edu/reserver-studymeting-room

There are a lot of tutorials online that are helpful on things like citing & writing, evaluating information, and search tips. library.sjsu.edu/tutorials-tools

Also, you can make an appointment with the engineering librarian to get help on searching and referencing. http://library.sjsu.edu/ask-librarian/ask-librarian

Career Center

Be sure to register for the Career Center. They have free workshops on resumes, interviewing, etc. You can make an appointment for a specialist to work on your resume with you. They have large internship and full time job fairs and an online job database. careercenter.sjsu.edu

Peer Connections

The Learning Assistance Resource Center (LARC) and the Peer Mentor Program have merged to become Peer Connections. Peer Connections is the new campus-wide resource for mentoring and tutoring. Our staff is here to inspire students to develop their potential as independent learners while they learn to successfully navigate through their university experience. Students are encouraged to take advantage of our services which include course-content based tutoring, enhanced study and time management skills, more effective critical thinking strategies, decision making and problem-solving abilities, and campus resource referrals.

In addition to offering small group, individual, and drop-in tutoring for a number of undergraduate courses, consultation with mentors is available on a drop-in or by appointment basis. Workshops are offered on a wide variety of topics including preparing for the Writing Skills Test (WST), improving your learning and memory, alleviating procrastination, surviving your first semester at SJSU, and other related topics. A computer lab and study space are also available for student use in Room 600 of Student Services Center (SSC).

Peer Connections is located in three locations: SSC, Room 600 (10th Street Garage on the corner of 10th and San Fernando Street), at the 1st floor entrance of Clark Hall, and in the Living Learning Center (LLC) in Campus Village Housing Building B. Visit Peer Connections website at http://peerconnections.sjsu.edu for more information.

Student Health Center

The health center is free to all students for drop in or by appointment care. You can have a regular check-up or go with a specific question. (They do not handle emergencies. For emergencies, call 911 or campus police). They also have a number of health and wellness workshops. www.sjsu.edu/studenthealth

Counseling Services

There is a free counseling service for students that takes both drop in and appointments. They handle the spectrum from depression, homesickness, stress, and academic study skills. www.sjsu.edu/counseling

Associated Students Site

The Associated students site hosts a range of resources including child care, recreation facilities, print shop, and transportation passes. as.sjsu.edu
Student Clubs

SJSU has over 300 recognized student clubs. [www.sjsu.edu/getinvolved](www.sjsu.edu/getinvolved) Also, the College of Engineering lists all their student clubs here [www.engr.sjsu.edu/students/organizations](www.engr.sjsu.edu/students/organizations)
# Course Schedule

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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Student Activity</th>
<th>Notes</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>8/23</td>
<td>Organizational session, course outline, engineering design principles and project topics</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8/30</td>
<td>Workshop: Communication Skills, Project Identification</td>
<td>Due: MatE 198A Testimony</td>
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<tr>
<td>3</td>
<td>9/6</td>
<td>Oral Presentations: Project Identification</td>
<td>Due: Topic Statement, Project Identification Presentation</td>
</tr>
<tr>
<td>4</td>
<td>9/13</td>
<td>Workshop: Library/Internet Search Training, Literature Search Strategies, Workshop: Design Constraints</td>
<td>Due: MatE 198A Reflection paper 1</td>
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<td>9/20</td>
<td>Workshop: Project scheduling, time management, project management</td>
<td>Due: Literature review results</td>
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<tr>
<td>6</td>
<td>9/27</td>
<td>Presentation: Project Proposals</td>
<td>Due: Project Milestones, Project Proposal Report and Presentation</td>
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<td>7</td>
<td>10/4</td>
<td>Workshop: Broader Considerations</td>
<td>Due: Design Constraints worksheet, Feasibility Study Plan</td>
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<td>8</td>
<td>10/11</td>
<td>Workshop: Engineering Ethics</td>
<td>Due: Broader Considerations Worksheet</td>
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<td>9</td>
<td>10/18</td>
<td>No Class</td>
<td>Due: MatE 198A Reflection paper 2</td>
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<td>10/25</td>
<td>Oral Presentations: Ethics Project Presentation</td>
<td>Due: Ethics Project Presentation</td>
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<td>Oral Presentations: Feasibility Study Status Update 1</td>
<td>Due: Feasibility Update Presentation</td>
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<td>12</td>
<td>11/8</td>
<td>Workshop: DOE, Statistical Analysis</td>
<td>Due: MatE 198A Essay</td>
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<td>13</td>
<td>11/15</td>
<td>Discussion of Interim Design Report</td>
<td>Due: DOE Worksheet</td>
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<td>11/22</td>
<td>Oral Presentations: Feasibility Study Status Update 2</td>
<td>Due: Interim Design Report Outline</td>
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<td>Thanksgiving Break – No Class</td>
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<td>16</td>
<td>12/6</td>
<td><strong>Interim Design Report Presentation</strong></td>
<td>Due in class: Oral report Due to technical advisor and instructor: Written report</td>
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