

San José State University
College of Engineering, Biomedical Engineering Department
BME 198A, Senior Design Project I, Fall, 2022

Course and Contact Information

Instructors:	Melinda Simon/ Kevin Maguire
Office Location:	Eng 233M
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Office Hours:	Simon: T 11am-12pm (E 233M), F 12:30-1:30pm (Zoom)
Class Days/Time:	Lecture Friday 8:30 am – 9:20 am Lab: 9:30 am to 12:15 pm
Classroom:	Eng 329
Prerequisites:	ENGR 100W (with grade of 'C' or better), BME 117, BME 177 Corequisites: ENGR 195A and CHE 162 (or ISE 130).
GE/SJSU Studies Category:	To receive credit for GE Areas S and V, students must complete both Engr 195A and Engr 195B, each with a grade of C or better. In addition, they must complete their senior project course sequence and earn a grade of C or better in each course (BME 198A and BME 198B).

Course Format

Technology Intensive, Hybrid, and Online Courses

This course uses Canvas as a learning management system.

The class will take place IN PERSON. Class sessions will generally be recorded. The recordings may not be posted on Canvas. Please rely on learning from the synchronous session.

You must obtain permission in advance to record any course materials. The recording can be used for your private study purposes only. The recordings are protected by the instructor's copyright.

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on the Canvas Learning Management System course login website at <http://sjsu.instructure.com>. You

are responsible for regularly checking with the messaging system through Canvas. Please check your notification settings to ensure you are aware of new assignments, announcements, and files posted.

Course Description

Apply bioengineering principles to the design and implementation of an approved project, from problem definition to analysis, design and validation, and experimentation, including possible construction and testing. First semester of a two-semester project. Team projects are encouraged. Integrate global and social issues in engineering.

Course Description: The senior design project is a critical component of the BME student experience. It is a capstone or culminating experience for the program and serves as a synthesis point for concepts presented across the BME curriculum. Students will be asked to integrate knowledge from their broad educational experience and condense this into a cohesive research or design project. Because of the broadly interdisciplinary nature of the biomedical engineering field, students are encouraged to form groups and design teams with senior design students in other departments.

This two-semester sequence (BME 198A and BME 198B) is centered on a design experience wherein students – either individually or in teams – identify a problem or need within the field of biomedical engineering, propose a solution, execute their proposal, and report their results in a professional and scientific manner.

Workshops and in-class activities will train students in engineering design practice; project identification and scheduling, evaluation and identification of design constraints including economic, environmental, ethical, safety, social, and political considerations; design of experiments; critical review of relevant literature; project/time management; and communication skills.

At the end of the semester, students are expected to have completed a project proposal and feasibility study. This will include providing evidence of feasibility in the form of theoretical analysis, calculations, and preliminary data demonstrating the potential for experimental success, as well as an experimental plan with clearly defined milestones and deliverables.

Meeting regularly with your advisor is mandatory to receive a passing grade in this course.

GE Learning Outcomes (GELO)

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

1. 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 (S-LO1);
 - BME 198A Essay 1: Based upon your response to Engr 195A Reflection Paper 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? Also, consider how your role as a biomedical engineer might be viewed by other cultures or social groups (300 words minimum)

2. Describe historical, social, political, and economic processes producing diversity, equality, and structured inequalities in the U.S. (S-LO2);
 - BME 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. Specifically, relate your work to historical inequalities in the availability and quality of healthcare attainable by various ethnic and cultural groups. (500 words minimum)
3. 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) (S-LO3).
 - BME 198A Essay 3: An important consideration in BME is access and beneficence; what groups will have access to the treatment/device you are developing? Which will not? What groups are likely to benefit most from the result of your work? (250 words minimum)
4. Recognize and appreciate constructive interactions between people from different cultural, racial, and ethnic groups within the U.S. (S-LO4)
 - BME 198A Essay 4: The Santa Clara Valley has a unique distribution of wealth, including a large homeless and underprivileged population. Identify organizations addressing the healthcare needs of these populations and describe the interaction between cultures and classes inherent in the work of these organizations. (minimum 500 words)

Course Learning Outcomes (CLO)

- **Apply** conservation laws to biological and medical systems to solve biomedical engineering problems
- **Apply** engineering fundamentals and scientific reasoning to model and predict responses at biological interfaces
- **Design** and analyze appropriate experiments to measure or optimize specific engineering properties, incorporating statistical procedures
- **Analyze** and interpret results of specific and mandatory FDA testing
- **Solve** open-ended biomedical engineering problems using experimental methodologies
- **Function** effectively as both team leader and team member in accomplishing engineering team projects
- **Evaluate** the constraints in a biomedical engineering problem
- **Troubleshoot** a biomedical system by dividing the system into subcomponents and narrow the failure to single subsystem or an interaction
- **Simulate** the problem by using mathematical modeling tools
- **Communicate** effectively in informal team settings and through formal and informal presentations, in written and oral formats
- **Understand** global/societal impact of bioengineering issues and policies.
- **Conduct** a thorough information search, be resourceful in uncovering information, and critically evaluate information.
- **Apply** appropriate software, modern tools, and techniques for design and analysis of biomedical systems

Required Texts/Readings

Textbook

The Grant Application Writers Workbook, National Science Foundation Version
Available for purchase (\$90) at:
<https://www.grantcentral.com/workbooks/national-science-foundation/>

Other Readings

Materials related to the course will be posted online.

Library Liaison

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Grading Information

Grading Information

Expectations, details, and grading rubrics for each assignment will be provided in class or on Canvas.

Determination of Grades

Participation assignments	10%
Presentations	10%
Draft sections of the final report and lab activities	20%
Reflection papers (5% each)	20% (Students that receive less than a 15 out of 20% for the reflection papers will receive an incomplete.)
Final Report and Presentation Assessment by your SJSU technical advisor	40%
Total	100%

Grade distribution. The final grade distribution will be as follows: above 97 A+; 93-97 A; 90-92 A-; 88-89 B+; 83-87 B; 80-82 B-; 78-79 C+; 74-77 C; 71-73 C-; 60-70 D; below 60 F

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](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

GE Area S and V: Area S and V content will be covered and discussed in class and ALL students will be required to complete the assignments, even if you have other class credit for area S and V and are not enrolled in ENGR 195A. Keep in mind that these are part of the writing requirement for Upper Division GE, so you will be required to write proper English.

A paper that contains significant spelling and/or grammar errors will be returned to you and not graded. See the resources section below for help with writing.

Correct use of English is a fundamental requirement for your papers to be graded. If errors in English make it difficult for a grader to understand your sentences, or excessively slow down the grader to mark your technical errors, your paper will be returned to you for further work on its English, and your grade for the paper will be deferred until it is resubmitted with corrected English. If your assignment is returned for an excessive number of grammatical errors, you will be allowed to rewrite and resubmit it within two weeks of the original return date. If not resubmitted by the end of two weeks, you will receive a zero (0) for the writing assignment.

Class policies: I expect and require that students be respectful of their peers. This translates to:

- Computer use during class is restricted to course-related activities
- No cell phone use during class
- Students will respect a diversity of opinions, ethnicities, cultures, and religious backgrounds
- Students will treat online discussions with their peers as if they were in-class, face-to-face interactions

Learning resources: If you are having difficulty in the class, I want to encourage you first to seek help from your peers; through discussion on Canvas or in person.

Please also visit me during office hours (or schedule an appointment if you prefer a one-to-one conversation). In addition, there are a number of campus resources available to you to help ensure your success:

- **Peer Connections:** <http://peerconnections.sjsu.edu> is a campus resource for mentoring, tutoring, and workshops.
- **Writing Center:** <http://www.sjsu.edu/writingcenter> is a valuable resource if you are interested in improving your writing skills.
 - **Grammarly:** Grammarly is a free resource to identify mistakes in your writing and offer suggestions in real-time: <https://www.grammarly.com/>
- **Accessible Education Center:** <http://www.sjsu.edu/aec> is available to help if you need course adaptations or accommodations because of a disability, or if you need special arrangements. Please make an appointment with me as soon as possible, or see me during office hours if you would like more information.

The schedule for the class can be found [here](#)

Recording Zoom Classes

This course or portions of this course (i.e., lectures, discussions, student presentations) will be recorded for instructional or educational purposes. The recordings will only be

shared with students enrolled in the class through Canvas. The recordings will be deleted at the end of the semester. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording).

Students are not allowed to record without instructor permission

Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12--7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.