**San José State University**

# Biomedical Engineering Department BME 198B, Senior Design Project II, Spring 2022

## Course and Contact Information

Instructors: Prof. Folarin Erogbogbo (Sec. 01, Sec. 02)

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Office Hours: By Appointment

Class Days/Time: Lecture: Friday 9:30-10:20

Activity: Friday 10:30-1:15

Classroom: ENG 331 (Sec. 01/02)

ENG 329 (Sec. 03/04)

Prerequisites: BME198A with a grade of “C” or better, CHE 162 or ISE 130

GE/SJSU Studies Category: Area V

## Course Description

Continuation of BME 198A. Culmination of project requiring formal oral presentation and report consisting of documentation of project methodology and results. when taken with BME major sequence.

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 second semester, students are expected to have completed development, prototyping, and testing of their designs from BME 198A. Testing should be followed up with redesign, secondary prototyping, and retesting to demonstrate improved performance. Over the course of the semester, progress updates will build presentation skills and ensure continued progress toward meeting project milestones.

## Course Format

This class is held in-person in a traditional classroom setting. As a lecture-lab, students’ time will be split between traditional classroom lecture and workshop time for Senior Design teams to make progress towards completing their projects.

## Course Learning Outcomes (CLO) and GE Learning Outcomes (GELO)

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

1. Compare systematically the ideas, values, images, cultural artifacts, economic structures, technological developments, and/or attitudes of people from more than one culture outside the U.S. (V-LO1):
   * BME 198B Refection paper 1: Medical care is not viewed or treated in the same way in every country. There are wide variations in both the availability and the desired outcome of care. In the U.S., we have the advantage of wealth that drives innovation in medical practice and biomedical technology. This leads to significant cost, but also improvement in treatment outcomes. Consider how two other countries view the priorities of medical treatment and the development of medical technology. Are all medical practices in all countries aimed at extending life, regardless of cost? Consider and provide example ideas, values, images, cultural artifacts, economic structures, or technological developments that illustrate your thesis argument. (500 words minimum)
2. Identify the historical context of ideas and cultural traditions outside the U.S. and how they have influenced American culture (V-LO2):
   * ENGR 195B - Reflection Paper 1 (minimum 750 words): Explain the historical context and cultural traditions which led to the development of the mechanical clock. Do research on how the development and adoption of the mechanical clock in Europe later affected the United States. Be sure to give examples. Then, consider your own experience with a form of artifactual timekeeping. Consider the influence that precision in accurate timekeeping has had upon your own behavior, both in your everyday life and especially as an engineer.
   * BME 198B Essay 2: Consider a technology invented outside of the U.S. in your discipline. (a) Describe the cultural and social factors that led to this technology’s “invention.” (b) Describe how this invention has evolved and influenced the culture of the U.S. (500 words minimum)
3. Explain how a culture outside the U.S. has changed in response to internal and external pressures (V-LO3):
   * ENGR 195B - Reflection Paper 3 (minimum 750 words): Consider a social media platform of your choice that is being used in a country outside the US and Canada. Consider the influence of values (through the concept of values infrastructures) upon the designers and the adopting populations. Explain how the adopting culture has changed in response to internal and external pressures made manifest by the social media platform.
   * BME 198B Case Study 1: Explain how an African community has been affected by the availability of medical care or lack thereof (250 words minimum).
   * BME 198B Essay 3: Assume your project has turned into a successful company in the US, describe how your product will put pressure on a culture outside the US. (You have to choose a specific country.) Use the social and cultural processes introduced in ENGR195A&B to guide your answer. (500 words minimum)

## Required Texts/Readings

### Textbook

No textbook required

### Other Readings

Documents and links posted to Canvas throughout the semester.

### Other technology requirements / equipment / material

Student teams are responsible for making sure they are equipped with access to the materials to make their projects a reality! This includes materials, software, services, etc.

## Course Requirements and Assignments

## Project Supervision

Each student has the course instructor (the project advisor) as well as a technical advisor (SJSU BME Faculty member). Sometimes these two roles are occupied by the same person; sometimes by different people.

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 Spring 2022 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.

## 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.

## Project Notebooks

You should purchase a project (laboratory) notebook immediately, and/or create a shared digital notebook with your team (e.g. OneNote). 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.

## BME198B Interim Written and/or Oral Presentations

Bi-Weekly Technical Memoranda

Various Oral Status Reports with and without Visual Aids

Final Report and Presentation (including BME Showcase presentation)

**Oral Status Reports** should be a five-minute presentation in which you introduce your topic again, and then update the audience on what you have accomplished, and what is to be done. Feel free to use foils from your first semester talks to introduce the topic. What problems have you encountered, and how have you solved them? Presentation templates are provided on Canvas for when visual aids are allowed. See course schedule for more details on the Status Update and Progress Report presentations

**Poster Presentation**: All students are required to prepare a poster of their project and present it at the Bay Area Biomedical Device Conferences. This meeting is tentatively scheduled for **March 29th and 30th, 2022.** This poster session is an excellent opportunity for networking with industry professionals and receiving their comments.

**Friday, May 13th, 2022 (tentative)** is **BME Showcase (room TBA).**  All students must present the results of their Senior Design Project on this day. Industry and alumni reviewers will be present. This is the culmination of the year-long senior design project. Students are expected to have prepared adequately, in close cooperation with their advisors. Your poster will also be presented at this event.

### Final Examination or Evaluation

The **Final Project Report** is a completed project report, which includes the design plan, project proposal, feasibility study, and the well-executed project and results. A total of three copies, one bound and two loose, of the Final Report, each with original graphs, figures, photographs and technical sketches must be submitted. The project technical advisor must have approved this report before it is submitted to the instructor. 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.

## Grading Information

|  |  |
| --- | --- |
| **Status Updates** | **20%** |
| *Oral Presentations*  *Technical Memoranda* | *5%*  *15%* |
| **Reflection Papers** | **20%** |
| *Essay 1*  *Essay 2*  *Essay 3*  *BME 198B Reflection Essay* | *5%*  *5%*  *5%*  *5%* |
| **BME Showcase Assessment by Industry Professionals/Professor** | **25%** |
| **Assessment by Project Advisor** | **30%** |
| *Final Report and Presentation*  *Laboratory Notebook Review and Work Progress* | *30%*  *\** |
| **Bay Area Biomedical Device Conference Poster** | **5%** |

***\*An incomplete laboratory notebook that does not support the data and conclusions drawn in the written reports and oral presentations will not receive credit for the course.***

### Determination of Grades

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.

*A plus = 1000 to 970 points*

*A = 969 to 940 points*

*A minus = 939 to 900 points*

*B plus = 899 to 870 points*

*B = 869 to 840 points*

*B minus = 839 to 800 points*

*C plus = 799 to 770 points*

*C = 769 to 740 points*

*C minus = 739 to 700 points*

*D plus = 699 to 670 points*

*D = 669 to 512 points*

*D minus = 639 to 600 points*

*F = 599 points or lower*

**For upper division GE courses (R, S, V)**

“Passage of the Writing Skills Test (WST) or ENGL/LLD 100A with a C or better (C‐ not accepted), and completion of Core General Education are prerequisite to all SJSU Studies courses. Completion of, or co‐registration in, 100W is strongly recommended. A minimum aggregate GPA of 2.0 in GE Areas R, S, & V shall be required of all students.”

## Classroom Protocol

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 phones
* 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

## University Policies

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) ,relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on [Syllabus Information web page](https://www.sjsu.edu/curriculum/courses/syllabus-info.php) (https://www.sjsu.edu/curriculum/courses/syllabus-info.php). Make sure to visit this page to review and be aware of these university policies and resources.

# BME 198B / Senior Design Project II, Spring 2022, Course Schedule

## Course Schedule

| **Week** | **Date** | **Presentation Schedule**  *Status Updates – use slides template*  *Progress Reports – oral report only. No slides* | **Assignments to be Submitted** |
| --- | --- | --- | --- |
| 1 | 1/28 | Project Reviews |  |
| 2 | 2/4 | Progress Report: Reporting Period 1 | **Essay 1 (due 2/7)** |
| 3 | 2/11 | Status Update: Reporting Period 1 | Technical Memorandum 1  Status Update 1 Slides |
| 4\* | 2/18 | Progress Report: Reporting Period 2 | **Essay 2 (due 2/21)** |
| 5 | 2/25 | Status Update: Reporting Period 2 | Technical Memorandum 2  Status Update 2 Slides |
| 6 | 3/4 | Progress Report: Reporting Period 3 | **Essay 3 (due 3/7)** |
| 7 | 3/11 | Status Update: Reporting Period 3 | Technical Memorandum 3  Status Update 3 Slides |
| 8 | 3/18 | Progress Report: Reporting Period 4 | **Essay 4 (due 3/21)** |
| 9 | 3/25 | Status Update: Reporting Period 4 | Technical Memorandum 4  Status Update 4 Slides |
| 10 | 4/1 | No Class – Spring Recess |  |
| 11 | 4/8 | Progress Report: Reporting Period 5 |  |
| 12 | 4/15 | Status Update: Reporting Period 5 | Technical Memorandum 5  Status Update 5 Slides |
| 13 | 4/22 | Progress Report: Reporting Period 6 |  |
| 14 | 4/29 | Status Update: Reporting Period 6 | Technical Memorandum 6  Status Update 6 Slides |
| 15 | 5/6 | Elevator Pitches (final practice) |  |
| 16 | 5/13 | BME Showcase |  |
| **Final** | **5/24** | **Final Report Due to Canvas** |  |

\* *Tentatively the first in-person meeting of the semester*