

# EECS C106A/206A / BIOE C106A

## Final Project Guidelines

Fall 2020

## Overview & Requirements

Your final projects must include **sensing**, **planning**, and **actuation**. Beyond requiring these three elements, the project is completely open-ended. We have provided some sample project ideas [at this link](#). Because this semester's remote delivery prevents us from letting you work with robots in the lab to complete final projects, we've split the options up into three tracks: Simulation Projects, Hardware Projects, and Design Sprints.

Simulation Projects will be projects built in simulation environments, like Gazebo. Because you're not limited by hardware, you can think up some truly crazy ideas to try! Please note that as you consider these projects, you should consider what simulation environments you will need to explore as well as what you might need to build.

Hardware Projects will be projects that have a strong mechanical component involved. We'd love folks to be able to work with hardware if they want, so we've outlined a few options below that are budget-friendly projects and still very fun!

Design Sprint Projects will be fairly different from Simulation and Hardware Projects. In this style of project, you'll identify a problem, engage with the community who faces this problem, prototype a solution, iterate on this solution, and then provide a report on what your suggested next steps are. Do not be fooled into thinking that this might be an easier project, especially in terms of time commitment! Good design requires rigorous testing and community engagement.

To spice things up and keep you engaged, we will be recognizing Showcase Winners and Honorable Mentions for each track. You'll be recognized on the course website and will win prizes! ~~Did someone say C106A swag? Or Menchie's gift cards?~~

## Dates, Deadlines, & Grading Breakdown

Mini-Proposal	10/09	5%
Final Proposal & Parts List	10/30	10%
Final Products		
Presentation	12/10, 12/11	20%
Demo	12/10, 12/11	20%
Report (website)	12/18	25%
Video	12/18	20%

## Grading Scheme

Overall, we will be evaluating your project on its complexity, polish, the participation of all team members, and on the following characteristics:

- **Design:** How original or ingenious is your design?
- **Implementation:** Does your implementation work? How reliable is it?
- **Scope:** Does your project contain sensing, planning, and actuation?
- **Rigor:** Do you properly test/evaluate your project? Are your assumptions reasonable?

These characteristics will be evaluated on the following scale:

Mark	Description	Equiv. Score (undergraduate)	Equiv. Score (graduate)
5	Exceeds expectations	95-100%	90-100%
4	Fully meets expectations	90-95%	80-90%
3	Adequately meets expectations	80-90%	70-80%
2	Barely meets expectations	70-80%	60-70%
1	Does not meet expectations	0-70%	0-60%

We expect most projects to score around 3-4 in each category, but we are not opposed to giving everyone a 5 if all projects are great. **Note that you do not need all 5s to make an A on the project.**

Projects will vary in complexity, and in general, the more complex or risky the project, the less polished we expect it to be. In other words, if your project is very complex, then we don't expect it to work perfectly or reliably. If your project is relatively simple, however, we'll expect it to work reliably and consistently, as you'll have more time to devote to getting it working well. A project that is simple but well done (i.e., very reliable) may receive the same grade as a high-risk project that is functional.

## Late Work Policy

In general, **no late project work will be accepted**. If you feel that you will be unable to make any of the deadlines listed above, let us know **before** the deadline explaining your situation and we will revisit this policy at our discretion.

## Groups

Project groups should consist of **3-5 people**. If you would like to form a group that is larger or smaller, please talk to us **before** submitting your mini-proposal. Note that expectations will scale with the number of project group members: we will expect more polish, complexity, and reliability from larger teams. We will also of course expect that all members equally contribute to each team.

If you're having trouble finding a team even after the team-building mixer, feel free to start a thread on Piazza!

## Multi-Class Projects

If you are in another project course, you are welcome to complete a single project for both classes, provided the scope of the project is extended appropriately (i.e., you should not simply turn in the same project for both classes — the portion of the project that you turn in for EE106A should stand on its own). You may work with team members who are only enrolled in the other class, as long as you complete all the project requirements of EE106A as listed here. We may ask to see the report you submit to any other class to ensure that the amount of work completed is sufficient to cover both assignments.

## Mini-Proposal (due 10/09)

A preliminary mini-proposal is due **10/09 at 11:59p** and should be submitted to Gradescope. This document should be about one page and contain the following:

- name and contact information of each team member (full name, SID, email address);
- (brief) qualifications of each group member (department, previous experience, etc.); and
- project idea(s) and a brief description thereof.

In the subsequent week, we will read over your mini-proposals, and the week of 10/19, we will meet with each group individually to discuss your ideas in lieu of regular lab section (information forthcoming).

## Final Proposal & Parts List (due 10/30)

Incorporating your project meeting feedback, you will complete a finalized proposal, due **10/30 at 11:59p** to Gradescope. A L<sup>A</sup>T<sub>E</sub>X template for this proposal has been provided on the website; you are not obligated to use the template, but all listed components should be present and complete.

An important part of this final proposal is the **parts list**, or **bill of materials**. Each group will be allocated approximately \$50 to spend on parts for their project. You are not obligated to use these funds (especially if you are working on a simulation project), and all purchased components must be returned to the lab on completion of the project. **If you plan on requesting materials, it's critical that they appear clearly and completely in your final project proposal, as that gives us plenty of time to order them for you in time for subsequent project deadlines.**

## Showcase: Final Demo / Presentation (12/10, 12/11)

For our end-of-year Showcase, final project demonstrations will occur over Zoom on **12/10** and **12/11** (the Thursday and Friday of RRR week), time TBD. We expect that **all team members are present** for the demos. Additionally, final project demonstrations will occur in blocks with multiple groups, and we expect you to be present for the full block to see what others have been up to and give feedback. If you have a conflict, let us know ASAP and we will do our best to accommodate you as we develop the final schedule. Exact expectations will be posted to the website.

Though exact details have yet to be finalized, you can expect to have a 15 minute slot. 10 of those minutes will be used to present your project, and the remaining 5 minutes will be used for QA. We highly encourage you to watch as many groups as possible!

## Final Project Report (due 12/18)

Final project reports are due **12/18 at 11:59p**, and will take the form of a website. It will also include link(s) to the video(s) of your functional system that make up 20% of your final grade. Exact expectations will be posted to bCourses.

Additionally, 5% of your grade will be dedicated towards your analysis of where your project fits into the larger picture. What potential social, political, and economic impacts could your project make? Who benefits? Who loses out? These are all important questions to ask yourself whenever you work in design and engineering. Nothing exists in a bubble!

## Teamwork / Peer Grading

To help ensure fair project grades, final scores will be modified based on peer evaluation. Each student will fill out a form evaluating both their own and teammates' performances. Exact instructions will be posted to bCourses.

## Example Projects & Ideas

A list of past projects has been posted to the website. The teaching staff has collated a number of research projects for groups to attempt. If you're interested in getting involved in undergrad robotics research or start involvement with another lab, this is a great way to get your foot in the door. We've also provided a couple more general ideas.

## Research and Sponsor Projects

If you're interested in a research/sponsor project, express interest to Stella, Amay, and Tiffany and state your interest in your mini-proposal. However, please also provide a backup project, since most of these

projects can only support one group, and we want to ensure a good fit between you and your sponsor. This is particularly relevant for groups who want to work for Rob and Permobil.