

Senior Project Guidelines

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Senior projects vary widely from department to department and from faculty member to faculty member. This document should only be considered a guide for doing senior projects with me.

These guidelines are not intended to be exhaustive. If you have a project in mind which doesn't seem to fit the guidelines below, but which you think is a suitable project, by all means talk to me about it.

1 Overview

The senior project is an independent project selected and completed under the supervision of a Cal Poly faculty advisor. The student earns 5 academic credits (cpe461/462 or csc491/492) for the project. The rule of thumb for ordinary coursework is that there is usually one in-class hour per week per unit, plus another 2–3 hours outside of class per unit. That means one would expect a five unit course to occupy 15–20 hours/wk, or 150–200 hours over a ten week quarter. In terms of productivity, that is approximate equivalent to a half-time job for two and a half months. Spread over two quarters, that turns into about one full (8–10 hour) work day per week. In addition to being a substantial amount of work, a senior project should represent a significant educational experience.

2 Description

There are several factors that make something suitable for a senior project:

Independence A senior project should be a discrete unit. There should be a well-defined beginning and end of the project as well as clearly-defined criteria for success or failure.

Ownership The student needs to be the one primarily responsible for the project. This means that the student is directly responsible for the projects' success or failure. (As with most projects, failure is mitigated by additional work: e.g., an analysis of the unforeseen circumstances that caused the failure, etc.)

Research The project should require the student to do some investigation before implementation. Things to consider: How have others approached this problem? What new technologies will be involved? What new techniques or technologies must the student learn (or invent) to successfully complete this work?

Creativity The project should require creativity on the part of the student. The solution should not be obvious.

3 Components

The following are required senior project components:

Proposal The student must generate a written proposal for the project prior to beginning the work. This proposal, described in more detail in Section 5.1, describes the general scope of the work including specific milestones and deliverables.

The proposal requires approval from the faculty advisor **before registering for the first quarter** of senior project.

Implementation There should be a technical implementation component of the project. This can be hardware and/or software. The exact implementation required will depend on the specific nature of the project.

Report There will be a substantial final project report required. This report should describe problems encountered, solutions developed, dragons slain, etc. The report will ultimately be filed with the library, so it must be publishable.

Demonstration Finally, if the project includes an implementation component of the project, some sort of demonstration of the final system must be performed for the faculty advisor.

4 Process

The general senior project process looks something like this:

1. Student writes a proposal on the project and has it approved by the faculty advisor.
2. Periodically during the term of the project, the student and faculty advisor will meet to discuss progress.
3. At the end of the first quarter, the student will submit a specific proposal for finishing the project along with a timeline outlining how it will be accomplished.
4. Upon completion of the project, the student will demonstrate the completed work.
5. Upon completion of the project, the student will write up the final project report according to the *Computer Science Department Guidelines for Senior Project*.

5 Deliverables

Over the two quarters there are a number of deliverables. Deadlines for all deliverables over the two quarters are shown in Table 1 on page 3. What each one comprises is described below.

5.1 Initial Proposal

Before beginning work on a project, the student must produce a written proposal including:

- a statement of the problem the project is intended to solve,
- an outline of the general scope of the work, including specific milestones and deliverables, and a tentative schedule, and

Week ^a	Initial Proposal	Weekly Meeting	Weekly Report	Spec. & Schedule	Final Report	Project Demo.
First Quarter						
1	●	●	●			
2		●	●			
3		○	●			
4		○	●			
5		○	●			
6		○	●			
7		○	●			
8		○	●	● (draft)		
9		○	●	○ (draft)		
10		●	●	● (final)		
Finals	<i>—No work will be accepted during finals week—</i>					
Second Quarter						
1		●	●			
2		○	●			
3		○	●			
4		○	●			
5		○	●			
6		○	●			
7		○	●			
8		○	●		● (draft)	
9		●	○		○ (draft)	
10		●	○		● (final)	●
Finals	<i>—No work will be accepted during finals week—</i>					

- Mandatory due date applies at the end of the week.
- Recommended, but can be as arranged with advisor.

^aSome Fall quarters have 11 weeks. In this case Week 10 deadlines apply to Week 11.

Table 1: Senior project deadline structure.

- a description of how the proposed project satisfies each of the criteria outlined in Section 2.

If this is to be a group project, the proposal should also address the expected division of responsibilities among the partners.

This proposal will usually be about a page in length, although it could be longer depending on the project.

5.2 Weekly Meetings

A meeting is not exactly a deliverable in the traditional sense, but I expect each student to keep me informed of progress. The first and last weeks of the each quarter are mandatory, as are the second week of the first quarter and the second to last week of the second quarter. These meetings should be brief and can usually be accomplished during ordinary office hours. Longer meetings to discuss particular problems can, of course, be arranged.

5.3 Weekly Reports

I ask that student send me a short written update every week describing progress for the past week and plans for the next week. This is not intended to be a substitute for meeting, but it does form a more permanent record of progress.

These updates will usually be brief, certainly less than a page, and simple but they should:

1. Clearly describe what has been done since the last update,
2. Specifically address the status of the goals stated in the previous week's report, and,
3. State specific goals for the coming week.

For students working with partners: I want a progress report from each student addressing his or her own contributions to the project as well as how that work interacts with the partner's part and the overall progress of the project.

This effort is not wasted: Aside from keeping me updated on the project's progress, these notes will form a valuable resource for when writing quarter-end reports.

5.4 Specification and Schedule

The final product of the first quarter of work will be a final project specification and completion schedule. At a minimum, this report will have the following components:

- An annotated bibliography suitable to form the foundation for the background chapter of the final report. The exact content of this will vary by project, but sources must be of good quality.
- A complete specification of deliverables and evaluation metrics for the following quarter's implementation.
- An outline of the final report at the section heading level.
- A timeline for completion of the implementation and final report with a complete draft submission date of not later than the eighth week of instruction.

5.5 Final Report

The only permanent record of a senior project is the final report. This document will generally consist of the following five chapters, although it may vary according to project:

Introduction This chapter includes including a statement of the problem the project is intended to solve, an outline of the general scope of the work, and a description of how the proposed project will solve the problem. This is not unlike the initial proposal.

Background This chapter provides all of the technical background necessary for understanding both the problem and the solution proposed by the project. It should include appropriate references. The goal of this chapter is to provide all of the background information needed for a reader who is technically literate but not an expert in this particular field.

Description This chapter (or chapters, as necessary) describes the technical details of the project.

Evaluation This chapter evaluates the performance of the project implementation. It should outline proper metrics and experiments and evaluate the results of those experiments in terms of the metrics. If the project was a success, how well did it succeed? If it failed, why did it fail?

Conclusions This chapter should summarize the overall experience of the project and potentially suggest possible directions for future work.

I tell my students, “The final report should be the document you wish you had had in your hands when you began this project.”

5.6 Project Demonstration

For any project that includes an an implementation component of the project, there must be some sort of demonstration of the final system for for the faculty advisor. The exact nature of the demonstration will, of course, vary depending on the project.

5.7 Paperwork

No project is complete without the appropriate paperwork. It is the student’s responsibility to ensure that these requirements are met. The requirements are outlined in either:

- the *Computer Science Senior Project Checklist*, or
- the *Computer Engineering Senior Project Handbook*.

6 Group Projects

The senior project is intended to be a demonstration of a student’s accomplishment during his/her time at Cal Poly. For that reason, I do not usually advise group projects. Proposals that propose group projects must be careful to address both:

- the division of labor among partners, and
- a means for evaluating the individual contributions of each partner.

7 CPE Projects

Computer Engineering senior projects require the project to have both hardware and software components.

8 Deadlines and Grading

8.1 Deadlines

While deadlines and deliverables in an advisory course are always considered negotiable, the ones put forth in Table 1 are to be considered the minimum to be making acceptable progress towards completion of the project. Failure to meet these deadlines will be reflected in the course grade (below).

Because the final exam period is a period for evaluation of the quarter's work, all work must be submitted on or before the last day of classes for the quarter.

8.2 Grading

Except in extraordinary circumstances, the student will receive a letter grade at the end of each quarter reflecting the quality of work performed during that that quarter. A “placeholder” grade such as an *RP* or *I* will only be considered if

1. the student was doing passing work at the time of the request, and
2. some external circumstance prevented the student's completing the coursework.