Senior Project Guidelines

for
Chris Lupo
Computer Science Department
Computer Engineering Program

Last Updated: December 2009

Some students have mentioned to me that they have heard confusing or evan conflicting things about senior project requirements. Requirements vary according to:

- University

- College

- Department

- Program or major

- Faculty member

This document focuses on the last item in the list, and more specifically, guidelines for doing a project with *me* (Lupo).

This document is not exhaustive, and students working with me or considering working with me should become familiar with all superceding requirements (see above list).

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 approximately equivalent to a half-time job for two and a half months. Spread over two quarters, that turns into about one full (810 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.

1

Ownership The student needs to be the one primarily responsible for the project. This means that the student is directly responsible for the success or failure of the project. (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, 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, beasts exterminated, 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 several deliverables. Deadlines for all deliverables over the two quarters are shown in Table 5.1. Each deliverable is described below.

5.1 Initial Proposal

Before beginning work on a project, the student must write a proposal that includes the following:

- a statement of the problem the project is intended to solve,

- an outline of the general scope of work, including specific milestones and deliverables, and a tentative schedule, and

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

The proposal should be descriptive but concise (usually about a page in length). If this is to be a group project, the proposal should also address the expected division of responsibilities among the partners.

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. These meetings should be brief and can usually be accomplished in a half-hour session. Longer meetings to discuss particular problems can, of course, be arranged.

5.3 Weekly Reports

I ask students to report to me every week describing progress for the past week and plans for the next week. This is not intended to be a substitute for a meeting, but it does form a more permanent record of progress. Reports may be submitted via email. The weekly 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 weeks 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 partners part and the overall progress of the project. This effort is not wasted: Aside from keeping me updated on the projects progress, these notes will form a valuable resource for when writing quarter-end reports.

5.4 Work Plan

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

Week[a]	Initial Proposal	Weekly Meeting	Weekly Report	Work Plan	Final Report	Project Demonstration
First Quarter						
1	✦	✦	✦			
2		✦	✦			
3		✧	✦			
4		✧	✦			
5		✧	✦			
6		✧	✦			
7		✧	✦			
8		✧	✦	✦(draft)		
9		✦	✦	✧(draft)		
10		✦	✦	✦(final)		
Finals	*— No work accepted during Finals Week —*					
Second Quarter						
1		✦	✦			
2		✦	✦			
3		✧	✦			
4		✧	✦			
5		✧	✦			
6		✧	✦			
7		✧	✦			
8		✦	✦		✦(draft)	
9		✦	✦		✧(draft)	
10		✦	✦		✦(final)	👍
Finals	*— No work accepted during Finals Week —*					

✦   **Mandatory** – by end of the week.
✧   **Recommended** – arranged with advisor.

Table 1: Senior Project deliverable structure.

[a]Some quarters have 11 weeks. In this case, deadlines are translated to the final week.

- 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 (Wikipedia is not a high-quality source).

- A complete specification of deliverables and evaluation metrics for the following quarters 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.

Dr. Nico tells his students, "The final report should be the document you wish you had had in your hands when you began this project."

Quality counts more than quantity in this final report. Treat this documemnt as your most prized piece of work you take away from Cal Poly. This is something you should be showing to prospective employers or graduate advisors, so take it seriously and do your best work.

I *strongly* encourage my students to read one or both of the following texts and/or websites on technical writing:

References

[1] Mary-Claire van Leunen. *A Handbook for Scholars: Revised Edition*. Oxford University Press, 1992.

[2] University of Chicago Press. The Chicago Manual of Style Online. `http://www.chicagomanualofstyle.org/home.html`, August 2006.

5.6 Project Demonstration

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

5.7 Paperwork

No project is complete without bureacracy. It is the student's responsibility to ensure that department, college, and university requirements are met. Your major 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 an *individual's* accomplishment during his/her time at Cal Poly. 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 5.1 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 quarters 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 students completing the coursework.