1 Course Information

The senior capstone course provides computer science majors the opportunity to integrate the knowledge that they have gained from across the curriculum. Students are encouraged to work in teams, and can pursue either an applied or theory project. Students choosing applied projects participate in the identification of a problem, develop a project proposal outlining an approach to the problem’s solution, implement the proposed solution, and test or evaluate the result. Students choosing a theory project conduct original research (e.g., develop a new algorithm) and evaluate its strengths and limitations. Regardless of the choice of project, students document their work in the form of written reports and oral presentations.

Prerequisites

Students registering must be of senior class standing, or have permission of the instructor. All prerequisite courses must have been completed with a grade of C- or higher:

- CS 240 - Software Engineering
- CS 361 - Algorithms and Data Structures

Textbook

None. Papers for the weekly readings will be distributed on the course web page.

2 Learning Outcomes

The specific goals for this course include:

- To explore in depth an advanced topic in computer science.
- To formally present work in both oral presentations and written reports.
- To constructively critique and discuss the work of others.
- To trace the historical development of computer science through readings and discussions.
- To learn \LaTeX{} and other presentation tools.
3 Grading

The following grade cutoffs are upper bounds - they might come down, but will not be set higher: A = 95, A- = 90, B+ = 87, B = 83, B- = 80, C+ = 77, C = 73, C- = 70, D+ = 67, D = 64, D- = 60, F = < 60. Your overall grade will be composed as follows:

<table>
<thead>
<tr>
<th></th>
<th>% Weight</th>
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<tbody>
<tr>
<td>Readings (Quizzes)</td>
<td>15</td>
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<tr>
<td>Check-ins</td>
<td>20</td>
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<tr>
<td>Final Presentation</td>
<td>10</td>
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<tr>
<td>Final Report &amp; Deliverables</td>
<td>50</td>
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<tr>
<td>Attendance and Participation</td>
<td>5</td>
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</tbody>
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Table 1: Breakdown of Grades

3.1 Reading & Discussion

Computer science is a field of intellectual inquiry, and it’s advancing at a staggering rate. Many great works have been seminal to our beloved field of study, and great works continue to be produced, opening new avenues for computer research. I will hand-select papers that have, through the years, shaped the landscape of computer systems & architecture, database systems, and the web & cloud.

One paper is assigned for reading on most weeks. We will always hold the discussion in class on Monday, which may spill over to Wednesday. Here are your responsibilities:

- Bring yourself. **Attendance is mandatory on all days**, and it does factor into your grade.
- Bring a copy of the paper, and any comments and questions you may have for discussion.
- A short quiz will be held in the beginning of class. You may use the paper and your notes to take this quiz.
- You are required to participate in the discussion.

3.2 Project Check-ins

Your team is required to prepare and orally deliver a short presentation on your progress, detailing to the class (and to me) the current status of your project, road-blocks, contingency plans, and whether your milestones are on-track. There will be three check-ins (four-week interval in between).

Your check-in presentation must include the following information:

- **Background** – A very quick reminder to the class what your project is about. This should be longer for your first check-in.
- **Gantt Chart** – Show your timeline, and where you are, currently. Defend any edits you had to make to your Gantt chart.
- **Previous Work** – (When it applies) present where you left off in the previous check-in, and what problems you were working towards solving.
- **Progress** – Detail all progress you’ve made since the previous check-in. When appropriate, demo any relevant deliverable you’ve produced.
- **Next Steps** – What are your objectives for the next check-in?
Your “check-in” presentations will be graded on the following items:

- **Adherence to Your Timeline** – Large group projects are often hard to scope out very far, so some wiggle room and remediation is to be expected. But an utter lack of progress, with no obvious explanation, is unacceptable. You will be penalized harshly if the Δ between check-ins is small.

- **Team Work** – Every member of the team is to contribute equal amounts of work. I will direct detailed questions to each member responsible for a certain system component.

- **Question/Answer** – Set aside some time for me and your peer to ask questions, or to give constructive feedback, about your project. Your response to our questions should be coherent and appropriate.

### 3.3 Final Presentation

Your final “check-in” presentation is the most important. All Puget Sound faculty and your mentors will be invited to join us for **Math/CS Day**. Each team will be given ample time to present their project and demo: 25min presentation + 5min Q&A. Your final presentation should include:

- **Detailed Background** – What your project is about, why is it interesting, and who does it help?

- **Overview of the Deliverable** – Outline the functionalities of your major components in your project.

- **Demo** – Do a live demo of your project, showing off the important and interesting algorithms/functionalities.

- **Challenges** – What were some road-blocks you ran into, and describe any difficult design-decisions you had to make over the course of your capstone.

- **Reflection** – What are some things you would do differently in hindsight? What were your favorite and least favorite things about this project?

Like check-ins, every team member must be involved in the presentation.

### 3.4 Final Report

At the end of the course you will be required to submit a written report describing your project or research, using a format typical for publications in computer science. This report will detail your accomplishments this semester, but will also be an opportunity to reflect on your experience and to get some practice with more formal writing. Your final report should conform to the 2-column ACM format, no less than 8 pages, including figures and references.

If you completed an implementation project, your writeup should include a detailed description of your implemented system, including what it does, how it works, and how it is used. You might also include details about false starts or discoveries you made of what didn’t work, or how your project integrates with a larger system. If you completed a research project, this document should include the details of that research, including what you discovered and the significance of that discovery. Be sure to detail the background for your research, the method of your research, the results of your research, the analysis of your results, and the implications of that analysis.

In either case, you will want to include the background and motivation of your project (which you can borrow from your proposal), as well as a brief overview of related and similar work. Implementation projects should have at least five references, while research projects might have as much as 10 or 20 or more.

### 3.5 Attendance

It is worth repeating that, due to the discussion-based and teamwork-based nature of this class, attendance is mandatory. It will factor into your final grade.
4 Policies

Class Disruptions
I understand the student’s need to have their phone on them to answer the occasional important call. I do ask that you please have your phones on vibrate and take the call outside the classroom out of respect for your fellow students.

Academic Integrity
You should be aware of the Student Integrity Code at the university. Any suspected cheating (e.g., plagiarizing code, copying homework solutions, etc.) will be reported to the Registrar, which may result in possible suspension/expulsion. See this link for more info:

Student Accessibility and Accommodation
If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Peggy Perno, Director of the Office of Accessibility and Accommodation, 105 Howarth, 253.879.3395. She will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Classroom Emergency Response Guidance
Please review university emergency preparedness and response procedures posted at . There is a link on the university home page. Familiarize yourself with hall exit doors and the designated gathering area for your class and laboratory buildings.

If building evacuation becomes necessary (e.g. earthquake), meet your instructor at the designated gathering area so she/he can account for your presence. Then wait for further instructions. Do not return to the building or classroom until advised by a university emergency response representative.

If confronted by an act of violence, be prepared to make quick decisions to protect your safety. Flee the area by running away from the source of danger if you can safely do so. If this is not possible, shelter in place by securing classroom or lab doors and windows, closing blinds, and turning off room lights. Lie on the floor out of sight and away from windows and doors. Place cell phones or pagers on vibrate so that you can receive messages quietly. Wait for further instructions.

Student Bereavement Policy
The University of Puget Sound recognizes that a time of bereavement can be difficult for a student. Therefore, the university provides a Student Bereavement Policy for students facing the loss of a family member. Students are normally eligible for, and faculty members are expected to grant, three consecutive weekdays of excused absences, without penalty, for the death of a family member, including parent, grandparent, sibling, or persons living in the same household. Should the student feel that additional days are necessary, the student must request additional bereavement leave from the Dean of Students or the Dean’s designee. In the event of the death of another family member or friend not explicitly included within this policy, a bereaved student may petition for grief absence through the Dean of Students office for approval.