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 361 - Algorithms and Data Structures

Textbook

None. All reading materials will be provided 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>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Assignments &amp; Participation</td>
<td>15</td>
</tr>
<tr>
<td>Leading Paper Discussion (minutes)</td>
<td>10</td>
</tr>
<tr>
<td>Progress Meetings</td>
<td>25</td>
</tr>
<tr>
<td>Project Deliverables</td>
<td>30</td>
</tr>
<tr>
<td>Final Presentation</td>
<td>5</td>
</tr>
<tr>
<td>Final Report</td>
<td>15</td>
</tr>
</tbody>
</table>

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. One or two papers are assigned for reading on most weeks, and are preceded by a submission of Depending on who you are, you may have a varying set of responsibilities.

- **Discussion Leaders** I assign to each reading a set of Discussion Leaders. You are responsible for reading the assigned papers, then meeting outside the classroom to formulate a discussion plan that you will carry out with the rest of your classmates. You will submit this plan to me on the Friday before the class discussion occurs for any feedback I might have. On the day of discussion, every Discussion Leader will break out into small groups of 3-5 students and convene/moderate discussion of the readings. Each Discussion Leader will then grade the participants in their breakout group on a scale of 0-3. (I will provide you with a rubric). You will lead twice.

- **Discussion Participants** If you are not a Discussion Leader, you must read the papers, print them out, and be ready for thoughtful discussion of the work. Discussion Leaders will be grading you on the quality and quantity of contribution to the conversation.

- **Everyone** must submit on Canvas answers to questions on the reading by the day before the discussion.

3.2 Progress Reports

To receive a passing grade, you must demonstrate that you are making constant progress both individually and as an integral part of your team. If you are in a team, individual contributions done without communication with the rest of your group will still result in deductions to your grade. To check progress, we will run Scrum in two ways:

- **Daily Scrum:** The project manager of your group will store a daily log of progress reports from each team member, including herself each morning, she will pose three questions: (1) What have you done since the last report, (2) What do you plan to get done today, and (3) What are the impediments, if any? She will record your answers daily.
- **Bi-Weekly Scrum Reports:** Every two weeks, the team and I will meet for a larger Scrum in class. Before the meeting, the project manager must send me their daily log, and they must rate their group members’ performance (confidentially) on a scale of 0 to 3 (again, a rubric will be provided to you). The project manager must also rate herself. **No two students shall receive the same rating.** During our meeting, I will ask you the same three questions, but at a larger scale.

- **Project Manager Election:** At the end of the two-weeks, your team will elect the next project manager. No project manager can be re-elected before everyone has served.

- **In the Case that You’re Working Alone:** You are your own project manager, and you **still** need to record daily Scrum reports. You also need to rate yourself in the Bi-Weekly Scrum Report.

- **Instructor Withdrawal:** If you receive consecutive “deficient” ratings from your project manager, and are unresponsive to me, I will take steps to withdraw you from the course.

### 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 you are required to demo your project during lunch hour. Your final presentation should include:

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

- **Overview of the Deliverable** – Outline the significant use-cases of your project, showing UML diagrams and their evolution, if appropriate.

- **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?

- **Optional Demo** – If you have time during the presentation, do a live demo of your project, showing off the most important functionalities. You might use this to draw interest to your full demo.

Every team member must be equally 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. You will report on 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 write-up 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 dozens.
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 Community Statement

The goals of this course can only be accomplished in a setting of mutual respect, where ideas, questions, and misconceptions can be discussed with civility. As your instructor, I am committed to creating a classroom environment that welcomes all students, regardless of their identities (e.g., race, class, gender, sexual orientation, religious beliefs). I firmly believe that everyone in the class is fully capable of engaging and grasping the material, and that the world of computing is stronger when it includes the broadest possible set of perspectives. We all have unconscious biases, and I will try to continually examine my judgments, words, and actions to keep my biases in check and treat everyone fairly. I hope that you will do the same. If you feel comfortable, please let me know if there is anything I can do to make sure everyone is encouraged to succeed in this class.

5 Policies

Laptops and Phones

Laptops: Due to the work-based nature of this class, please bring your laptops and notes to every class.
Phones: Please put your phones on silent and stay off of them during class.

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. There-
fore, 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.

### 6 Course Schedule

The following course schedule is tentative and subject to change.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System requirements</td>
<td>Notes provided</td>
</tr>
<tr>
<td>2</td>
<td>Use-cases, class diagrams, UM</td>
<td>Notes provided</td>
</tr>
<tr>
<td>3</td>
<td>Discussion; scrum</td>
<td>Papers provided</td>
</tr>
<tr>
<td>4</td>
<td>Discussion; scrum</td>
<td>Papers provided</td>
</tr>
<tr>
<td>5</td>
<td>Discussion; scrum</td>
<td>Papers provided</td>
</tr>
<tr>
<td>6</td>
<td>Discussion; scrum</td>
<td>Papers provided</td>
</tr>
<tr>
<td>7</td>
<td>Discussion; scrum</td>
<td>Papers provided</td>
</tr>
<tr>
<td>8</td>
<td><strong>Spring Break</strong></td>
<td>–</td>
</tr>
<tr>
<td>9</td>
<td>Progress report</td>
<td>–</td>
</tr>
<tr>
<td>10</td>
<td>Discussion; scrum</td>
<td>Papers provided</td>
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<tr>
<td>11</td>
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</tr>
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<td>12</td>
<td>Discussion; scrum</td>
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<tr>
<td>13</td>
<td>Discussion; scrum</td>
<td>Papers provided</td>
</tr>
<tr>
<td>14</td>
<td>Discussion; scrum; Final Presentation</td>
<td>Papers provided</td>
</tr>
<tr>
<td>15</td>
<td><strong>Final scrum and reading period</strong></td>
<td>–</td>
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