CS 481 - Senior Design Project

Department of Computer Science - Boise State University

Catalog Description - CS 481

CS 481 SENIOR DESIGN PROJECT (0-6-3)(F,S)(FF). Capstone experience designing, implementing, and testing an assigned software artifact. Students report progress via documentation, meetings and demos. Class concludes with a presentation and demonstration of the completed product to students, faculty and project sponsors. Topics include teamwork, communication, ethics, project management, tools, design, verification and validation. PREREQ: CS 471.

Course logistics

- Instructor: Shane K. Panter
    - **Office:** CCP 246
    - **Phone:** 426-3317
    - **Email:** shanepanter@boisestate.edu
    - **Office hours: Listed in blackboard**
- Classroom: CCP 259
- Meeting times: We/Fr 9:00AM - 10:15AM

Textbooks

There is no required textbook for this class.

Finishing Foundations

Senior Design serves as a capstone course applying all that has been learned during the student's undergraduate curriculum, as well as newly acquired skills, to complete a significant real-world project. CS481 is a Finishing foundations course therefore, this course supports university Learning Outcomes (ULO) 2, 3 and 4 as specified by the Foundational Studies program. Each ULO is assessed in this course as detailed in the sections below.

Oral communication (ULO 2)

Communicate effectively in speech, both as a speaker and listener.

Students teams are responsible for constructing a poster and presentation for the Senior Design Showcase and demonstrating their project throughout the semester with oral presentations.

Critical inquiry (ULO 3)

Engage in effective critical inquiry by defining problems, gathering and evaluating evidence, and determining the adequacy of argumentative discourse.

CS481 applies scrum, quality planning and software metrics to control the project through visible, conscious, agile choices in the inevitable conflict between delivered features, schedule and quality. These decisions are driven by project artifacts (the scrum Product Backlog and a Quality Plan), software metrics instrumenting the current state of the most recent sprint, and forecasts of what the project will deliver if it holds its current course.

Students will author user stories and tasks in the product backlog and quality plan during each sprint. Students will also write clean and clear documentation for the software artifacts they are producing.

Teamwork/innovation (ULO 4)

Think creatively about complex problems to produce, evaluate, and implement innovative possible solutions, often as one member of a team.

CS481 students collaborate in teams to complete a significant faculty-guided project. Students will work with a mentor to capture the product's requirements and balance the competing agendas (features, quality and schedule). Sprints will ordinarily be two or three weeks in duration, subject to coaching by the faculty. All team members are expected to attend all team meetings. Attendance is taken, and members will lose points for tardiness.

ABET assessment

CS481 - Senior Design is part of the departments assessment plan. CS481 measures outcomes B, H, and K (defined below)

Outcome B

An assignment in CS 481 (Senior Design Project) asks the students to submit their final scrum Product Backlog documents containing their project's requirements expressed as prioritized and estimated User Stories with their Acceptance Criteria. The outcome's requirements-analysis component is measured by the student teams' ability to capture their sponsors' requirements with a reasonably complete and consistent set of requirements expressed as User Stories in the role-goal benefit template and their Acceptance Criteria in the given-when-then template.

Outcome H

CS481 (Senior Design) students practice professional development in their projects. Students are assigned to project teams by the instructor taking into account their project preferences and their formal preparation as evidenced by their 400-level electives (not unlike real-world project assignments). While the instructor attempts to ensure each team is staffed with a variety of skills, not all students are well-prepared for all Tasks. Some Tasks require students to learn new technologies (e.g. programming languages, frameworks, etc) and tools (e.g. development environments), and the scrum process (e.g. Sprint Planning Meeting) requires students to volunteer to complete Tasks using skills they acquire during the course of the project.

Outcome K

CS 481 (Senior Design Project) student teams apply agile software engineering skills learned in CS 471 to complete a significant project for their sponsors delivered as an artifact of an assignment. The instrument assesses multiple artifacts of each team's development process and the resulting product including use of the Sprint Backlog for documenting how User Stories, written in the customer's business language, were decomposed into engineering Tasks, the Definition of Done containing an appropriate quality goal and defect removal activities, a Defect Removal Model asserting the chosen activities should achieve the quality goal, productivity and quality metrics, screenshots of the completed product, evidence of its handoff to the sponsor along with instructions for building the product

Workload Policy

Policy #4080 section 2 (reproduced below) defines the number of hours of work per credit hour that is expected by students.

II. Credit Hour Requirements

- A. For each Credit Hour granted, students must have successfully met the academic requirements with an amount of work represented in intended learning outcomes and verified by evidence of student achievement that reasonably approximates not less than:
    - 1. 15 Clock Hours of classroom or direct faculty instruction and a minimum of 30 Clock Hours of out-of-class student work; or
    - 2. At least an equivalent amount of work as required in paragraph (1) of this definition for other academic activities as established by the institution including laboratory work, internships, practica, studio work, workshops, independent study, hybrid, online, and other academic work leading to the award of Credit Hours.
    - For example, for a fifteen week semester, one Clock Hour of classroom or direct faculty instruction and two hours of out-of-class student work each week would be granted one credit.

With guidance from policy #4080 we can calculate the total number of hours that CS481 will require over a 15 week semester. 45 hours per 1 credit gives us 135 hours for 3 credits (45x3) spread over 15 weeks (week 16 is dead week as specified by policy #3080 and is reserved for senior showcase). Thus, the expected workload per student will be **9 hours/week for each student.** The student is responsible for negotiating with the project sponsor an appropriate balance between the planned deliverables, available effort, and an appropriate quality goal.

The time available from each member of your team will vary. Some may wish to invest an amazing effort in their project. Other members may have family and job responsibilities that limit them to no more than the expected 9 hours/week.

Academic Honesty

Academic dishonesty is grounds for immediate failure of the course. CS481 is a team based class where students are expected to work together. Thus, for this class, academic dishonesty consists of forging false progress reports, exaggerating or falsifying the amount of time spent working on classroom deliverables or plagiarizing another student's work. As a student you are responsible for knowing the academic integrity policy at Boise State University.

Institutional policies and Accessibility

The Department of Computer Science is committed to providing and maintaining a supportive educational environment for all. We strive to be welcoming and inclusive, respect privacy and confidentiality, behave respectfully and courteously, and practice intellectual honesty. Disruptive behaviors (such as physical or emotional harassment, dismissive attitudes, and abuse of department resources) will not be tolerated. The complete Code of Conduct is available on the University's website.

Important Links

- As a student you are responsible for knowing the policies that have been set at Boise State. Please review them at: http://registrar.boisestate.edu/general-information-and-policies/
- If you need help with accessibility you can visit the educational access center at: https://eac.boisestate.edu/
- Please review the safety document located at: http://coen.boisestate.edu/cs/safetydocument
- Please review the student code of conduct at: https://deanofstudents.boisestate.edu/student-code-of-conduct/

Grading Policy

CS481 grading will be aligned with the finishing foundations ULO's.

- 50% Sprint artifacts - ULO 3 Critical inquiry and ULO 4 Teamwork
    - 25% Sprint planning
    - 25% Sprint retrospective
- 40% Project demo - ULO 2 Oral communication
- 10% Senior showcase - ULO 4 Innovation

Schedule

After the first week of the semester, your team's faculty member will set-up meeting times with your team. These times will be with in the normal class time due to eliminate scheduling conflicts.

W	Day	Activity	Artifact due
1	8/22	Introduction and project presentations (class)	Team and project Preferences
	8/24	Project assignments (class)	
2	8/29	Sprint 1 planning (team)	Sprint 1 planning
	8/31	Standup meeting (team)	
3	9/5	Standup meeting (team)	
	9/7	Standup meeting (team)	
4	9/12	Sprint 1 demo and review (class)	Sprint 1 retrospective
	9/14	Sprint 2 planning (team)	Sprint 2 planning
5	9/19	Standup meeting (team)	
	9/21	Stand-up meeting (team)	
6	9/26	Stand-up meeting (team)	
	9/28	Sprint 2 demo and review (class)	Sprint 2 retrospective
7	10/3	Sprint 3 planning (team)	Sprint 3 planning
	10/5	Stand-up meeting (team)	
8	10/10	Stand-up meeting (team)	

	10/12	Stand-up meeting (team)	
9	10/17	Sprint 3 demo and review (class)	Sprint 3 retrospective
	10/19	Sprint 4 planning (team)	Sprint 4 planning
10	10/24	Standup meeting (team)	
	10/26	Stand-up meeting (team)	
11	10/31	Stand-up meeting (team)	
	11/2	Sprint 4 demo and review (class)	Sprint 4 retrospective
12	11/7	Sprint 5 planning worksheet (team)	Sprint 5 planning
	11/9	Stand-up meeting (team)	
13	11/14	Preparing for Senior Showcase (class)	
	11/16	Stand-up meeting (team)	Senior showcase
14	11/21	**Thanksgiving**	
	11/23	**Thanksgiving**	
15	11/28	Sprint 5 demo and review (class)	
	11/30	Final wrap up with Sponsor (team)	Project Handoff
16	12/5	Senior Showcase - Micron Engr Bld.	
	12/7	Senior Showcase - Micron Engr Bld.	