CS 471: Software Engineering
Boise State University
Spring 2018

Lecture Time:	Monday/Wednesday 12:00pm – 1:15pm
Lecture Location:	CCP 260

Instructor:	Bogdan Dit
Office Hours:	Monday/Wednesday: 1:15 pm – 3:15 pm or by appointment (https://bdit.youcanbook.me)
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TA:	Josh Chamberlain
Office Hours:	TBD
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Course URL: All course materials will be posted on Piazza (http://piazza.com/boisestate/spring2018/cs471/)

Prerequisites:
- CS 230 and CS 321
- Strong individual programming skills are expected

Textbook:
- **Required:** Sims, Chris and Johnson, Hillary Louise, *The Elements of Scrum*, 2011. ISBN 0982866917 (Also available for Kindle) http://www.agilelearninglabs.com/resources/the-elements-of-scrum/
- **Optional:** Somerville, Ian, *Software Engineering*, Tenth Edition. Pearson Higher Education, 2015, ISBN 0133943038 http://iansommerville.com/software-engineering-book/

Course Objectives.
Successful students will be expected to:
- Understand the need for a rigorous approach to software development
- Understand software build-management and source code management techniques and tools
- Know widely used methods of documenting the requirements and design of a software system
- Understand defect removal activities including pair programming, test-driven development, unit-level testing, code reviews, static analysis, integration and regression testing, acceptance testing, non-functional testing, and beta testing
- Choose appropriate quality goals, construct a quality plan, and instrument the development process to assess whether a project is meeting is meeting its goals
- Understand scrum roles and work as a member of an agile development team
- Demonstrate use of current software development tools individually and on a team

Course Catalog Description:
A formal study of the software development process. Topics include: life cycle models, requirements definition, specification, design, implementation, validation, verification, maintenance, and reuse. Students work in small teams on significant projects. Creation of teams and specifications to be realized in CS 481.

Topics Covered:

- The Elements of the Scrum Development Process
- Waterfall Life Cycle
- Software Quality Goals, Definition of Done and Defect Removal Models
- Requirements Analysis with User Stories and Use Cases
- Controlling Software Projects
- Pre-Integration Software Engineering Practices: Pair Programming, Unit-Level Testing, Test-Driven Development, Static Analysis, Code Reviews
- Downstream Software Engineering Practices: Integration Testing, Acceptance Testing and Beta Testing
- Quality Planning, Test Coverage, Equivalence Partitioning, Boundary Value Analysis
- Development Workflows for Source Code Management Systems, Build Automation Systems, Build Tools, Continuous Integration and Regression Testing
- Non-Functional Testing
- Principles of Object-Oriented Analysis and Design, UML Class, Statechart and Sequence Diagrams
- Selected Topics from Software Engineering Research

A two-course sequence: CS471 and CS481.
CS471 emphasizes the use of an agile software engineering approach to analyze a customer's needs, capture requirements, navigate the inevitable conflict between **features**, **schedule** and **quality**, communicate design choices, and apply modern software engineering tools to implement and test a software product. In addition, CS471 introduces the software engineering process, activities and artifacts. Students begin their **Senior Design project** and, by the end of CS471, demonstrate an executable (though functionally incomplete) release of their product. CS471 students will invest a minimum of about **6 hours/week** outside of the classroom lecture on their project.
CS481 revisits quality planning and the use of software metrics for controlling the project to achieve a compromise between the project's competing demands for features, quality and effort. Project team membership ideally remains unchanged from CS471 although minor changes are necessary to accommodate real-world challenges (students repeating CS471, transfer students, etc.). 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 students present their completed projects at the engineering college's Senior Design Showcase (http://coen.boisestate.edu/seniordesign/). CS481 students will invest a minimum of **6-9 hours/week** outside of the classroom lecture as less new material is introduced compared to CS471. You can learn more about CS481 at http://coen.boisestate.edu/jconrad/cs481.

Grading Criteria:

- 5%: Scrum Quiz and Pop Quizzes
- 15%: Two Midterms
- 20%: Final Exam
- 30%: Homework Assignments
- 25%: Project
- 5%: Project Peer Assessment
- *Extra credit opportunities*

- *Class participation (e.g., participating in class discussions, answering questions on Piazza) counts as extra credit towards the final grade (e.g., bump an A- to an A).*

Scrum Quiz, Pop Quizzes, Midterms and Final Exam:

- The Scrum quiz will be a Blackboard take-home quiz that will test your knowledge of Scrum.
- The pop quizzes will be unannounced and must be taken in class on the day they are given.
  - Make-up pop quizzes will not be granted other than for exceptional reasons
  - Credit for group portions of the quizzes will only be given to group members who participate in the quiz
- The two midterms and final exam:
  - will be either in class exams or will be taken on-line via Blackboard in the Testing Center
  - will have their dates confirmed at least one week in advance
  - will be comprehensive

Project and Peer Assessment:

- All CS471 students begin a significant group project that, in most cases, concludes in CS481 (Senior Design). Teams will be assigned different projects from a pool of Senior Design Proposals submitted by industry sponsors. Unlike many CS courses, the CS471 project assignment does not describe what to build. Instead, each team will elicit the project requirements in the form of a scrum Product Backlog from their sponsors.
- Students have an opportunity to express their preferences for a team and a project assignment. Project assignments take into consideration the size of the proposed projects, the required skills, and the skill set of the potential team members as evidenced by their CS electives.
- At the end of the semester, each team member will have the opportunity to evaluate the contributions of the other team members in the Peer Assessment. This document will be used to evaluate (in part) your contribution to the project.
- Students are required to use GitHub (https://github.com/) and ZenHub (https://www.zenhub.com/) to manage their group project

Grading scale:

- $90 \leq A- < 93 \leq A < 97 \leq A+$
- $80 \leq B- < 83 \leq B < 87 \leq B+$
- $70 \leq C- < 73 \leq C < 77 \leq C+$
- $60 \leq D- < 63 \leq D < 67 \leq D+$
- $F < 60$

Late Policy:

All work must be completed before the due date. If you have a compelling and documented reason for not being able to meet the deadline, you must make the alternative arrangements *before* the due date. Late submissions will not be graded.

Other Notes:

- This term we will be using Piazza for class discussion as well as questions and answers that we do not have time to discuss in class. The system is highly catered to getting you help fast and efficiently from classmates, and myself. I encourage you to post your questions on Piazza.
- A separate schedule of classes will be posted on Piazza and will be updated throughout the semester. The schedule will contain information on the topics, assignments and due dates.

- All students are requested to access their Boise State e-mail account regularly. You may be contacted when important matters arise.
- You can check your grades via Blackboard (https://blackboard.boisestate.edu/).
- Copying or plagiarism of any type will not be tolerated and will be dealt with in accordance to the College's policy on cheating and plagiarism described in Boise State University's Policy on Academic Honesty (https://deanofstudents.boisestate.edu/academic-integrity/) and the Student Code Of Conduct (https://deanofstudents.boisestate.edu/student-code-of-conduct/)
- Any modifications to the syllabus will be reflected on Piazza and announcements will be posted.
- Safety information can be found: http://coen.boisestate.edu/cs/safetydocument/
- Special accommodations for students with disabilities: in accordance with the University policy, if you have a documented disability and require accommodations to obtain equal access in this course, please contact the instructor at the beginning of the semester or when given an assignment for which an accommodation is required.