Course Syllabus
Introduction to Software Engineering
CSE 115a

Summer 2024

Course Goals

The course aims to introduce students to concepts, practices, and tools widely used in the software industry by small teams in the development of software products (or systems with a significant software component). The course addresses principal project management, product engineering, and collaborative aspects of software development as a team enterprise.

The course emphasizes experiential learning. Students will apply the concepts, practices, and tools introduced in a course-long software project as members of self-organized teams of four to six students.

Course Contents

Lecture Topics

Topics covered by the lectures include the following, roughly in the order stated below. The course does not use a specific textbook. The instructor will post (on Canvas) references to books and articles for specific topics.

Project planning and management

- The Scrum project management framework
  - Roles, practices, and work products
- Scrum best practices
  - Team working agreements, including coding standards and style guides, Definition of Done, and acceptance criteria
- Scrum smells

  [Test 1]

Agile Engineering Practices

- User-value-driven incremental development
- Software repository policies for developer teams
- Clean Code and Simple Design
- Test Driven Development
- Unit test frameworks

System Design Principles

- SOLID Design Principles
- Unit test patterns
- Design patterns

Quality Assurance Concepts

- Testing concepts
- Static analysis
- Review of source code and other design artefacts

[Test 2]

Read and Comment (RAC) Assignments

Students will critically review three scientific publications addressing software engineering topics touched upon in the lectures and write a one-page summary for each. Each student will peer review four submissions (for each article).

The selection of the articles is subject to change.

[Submission and reviews of RACS will be on the Crowdgrader platform.]

Team Status Reports (TSRs)

Students will submit a brief weekly report on their own and their teammates' contributions and activities within their team project to the teaching staff.

[TSR submission will be through the Grepthink platform.]

Reflection Essay

At the end of the course students will submit a reflection essay of about 1500 words discussing their experiences within their project and the course overall.

Team Software Project

Team formation

During the first week of the course, students self-organize in teams of 5+/-1 students. Students may post project ideas on the Grepthink platform and are encouraged to pitch their ideas to their classmates in the classroom.

Project ideas are limited only by legal constraints. The choice of software technologies to be employed is only limited by the students' willingness and capacity to acquire the necessary knowledge and skills.

Project Execution

All software project related work takes place outside class. In addition to the usual workspaces, cse115a students typically have 24/7 access to Baskin Engineering lab spaces for project work.

Each team must carry out its project in accordance with the project management, engineering, and collaboration principles and practices discussed in the lectures.

Each team will meet with a member of the teaching staff at least twice a week at a scheduled time to discuss progress and any issues related to the project.

Project Presentations

Each team will give an initial presentation in class (typically in week 2) describing its project plan and a final presentation discussing the product built and the process used to build it.

Assessment

The final grade is based on equally weighted individual and team project work.

Individual Work

The individual work component includes

- Two tests
    - Scored by teaching assistants or readers
- Three Read-and-Comment assignments
    - Scored by peer reviews and teaching assistants or readers
- Three weekly team status reports
    - Reviewed by teaching staff
- One Reflection essay
    - Reviewed and scored by instructor

Team Project

The team project is assessed throughout the course in weekly meetings and in a final project review, attended by the team, the instructor, and a teaching assistant (usually different from the one that accompanied the team throughout the course).

Elements of the review include a product demonstration, code review, review of testing practices, a review of required work products, a summary of contributions by each team member, and a discussion of the team's overall project experience.

The assessment of each team member is based on the overall quality of the project (i.e., in about equal measure the quality of the product built and the quality of the process used to build it)and the relative contribution of that student.

The team project score for each student takes into account the assessment by the Home TA (who accompanied the team), the Review TA, and the instructor.