Syllabus for CSCI 310: SOFTWARE ENGINEERING

Spring 2025, v1.0

Course Catalog Description

This course provides an introduction to the software engineering process and software lifecycle. The topics covered include project management, requirements, architecture, design, implementation, testing, and maintenance phase activities.

Basic Course Information

Lecture time: Mondays and Wednesdays, 10:00am-11:50am
Lecture location: SAL 101
Lecture slides, online questions, course policies: https://piazza.com/usc/spring2025/csci310
Final exam: Monday, May 12th, 8am-10am in SAL 101.
Prerequisite course: CSCI 201: Principles of Software Development

Readings and Textbook

Each lecture will have corresponding assigned readings. Most of the readings will come from the below listed publications. Additional handouts for topics not covered in these publications will be made available via Piazza as PDFs or links to the relevant materials online will be specified in the lecture on a slide titled “Lecture Reading Materials.”

Software Engineering, 10th Edition.
By Ian Sommerville
Publisher: Pearson
ISBN 10: 0-13-394303-8

Guide to the Software Engineering Body of Knowledge (SWEBOK Guide) v3.0
By The IEEE Computer Society
Free download via: www.swebok.org

Course Staff

Instructor

Staff: William G.J. Halfond, Ph.D. <halfond@usc.edu>
Role: Please contact the Instructor with any questions either via email (for private issues) or Piazza (for general class issues).
Office Hours Location: GCS lower level study room and online via the Zoom link posted on the “Office and Help Hours Piazza” post.

Teaching Assistants (TAs)

Staff: TBD
Role: The TAs are responsible for maintaining all grade records, overseeing the regrade processes, peer evaluation, and returning grades. Contact them for any questions about missing or incorrect grades. They can be contacted via email.

Course Producers (CPs)

Staff: TBD
Role: The CPs are responsible for answering questions about the homeworks during help hours and online via Piazza. They also provide feedback and mentoring to the student teams during the group projects.
Help Hours: listed on Piazza via the calendar in the “Office and Help Hours” post.

Course Graders

Staff: TBD
Role: The graders are responsible for grading project processes. They can be contacted via the Github Classroom as part of the regrade process.

Office and help hours: Office hours and help hours for the Instructor and CPs will be set during the first two weeks of class and shown via a calendar in a pinned Piazza post titled “Office and Help Hours.” Any last minute changes to office and help hours will be reflected on the “Office and Help Hours” Piazza post calendar.

Course Overview

The topics covered in this class will cover the key concepts and best practices of the software engineering discipline. Students will learn about the different phases of the classic software engineering lifecycle and the activities that software engineers perform during each of these phases. This will include project management, software requirements specification, architecture, design, implementation best practices, software testing, and maintenance activities.

To reinforce learning, students will complete a set of homework covering basic software engineering skills. Students will also participate in a team-based software engineering project. In this project students will utilize agile-based software development techniques and go through multiple iterations of the agile software lifecycle.

Topics Covered in This Course

Topics covered in this course are listed below. When applicable, the specific tools, processes, or frameworks used in the homeworks and projects are listed in parentheses.

- Variations and applicability of common software engineering processes (Waterfall, Cleanroom, Scrum, and other Agile processes)
- Ability to identify and define software lifecycle activities and the role of each lifecycle activity in ensuring quality software
- Familiarity with the tools, mechanisms, and processes used to achieve each lifecycle activity's goals
- Project planning, cost estimation, and scheduling (COCOMO)
- Requirements elicitation and specification techniques (Use cases/Gherkin)
- Architecture and design notations (UML)
- Design methodologies (Object-oriented)
- Automated build systems (Maven)
- Implementation best practices (Gitflow and Test-Driven Development)
- Configuration management (GitHub)
- Unit testing (JUnit, Jest, and Mockito)
- Structural coverage oriented test requirements (Jacoco)
- Continuous integration testing (via GitHub Actions)
- Specification/behavioral-based testing (Cucumber)
- Full-stack web development (React and Spring Boot)

Coursework and Grading

The overall course grade for this class will consist of one team-based project, multiple homeworks, two exams, and one quiz. The breakdown for the overall course grade is listed below.

- Homeworks: 17%
- Midterm Exam: 15%
- Project: 50%
- Final Exam: 15%
- Project Quiz: 3%

The letter grade assigned to each student will be based on a scale with at least the following grades for a given percentage x. If the overall class average is lower than 80% at the end of the semester, the average will be scaled up to a B-.

A: x >= 93	C: 73 <= x < 77
A-: 90 <= x < 93	C-: 70 <= x < 73
B+: 87 <= x < 90	D+: 67 <= x < 70
B: 83 <= x < 87	D: 63 <= x < 67
B-: 80 <= x < 83	D-: 60 <= x < 63
C+: 77 <= x < 80	F: x < 60

Homeworks

Students will complete a series of individual homeworks that focus on the development and refinement of important software engineering skills. Homeworks will be discussed and explained in class when they are assigned. The topics include: the use of git and GitHub, writing use cases in Gherkin, writing JUnit tests, using Gitflow, writing unit tests to achieve various levels of code coverage, and writing acceptance tests using Cucumber.

Class Project

The class project will be team-based and focus on the development of a small client-server web application. Throughout the project, students will use an Agile based software development

process. The project will be completed over the course of several iterations, with each team receiving a score for the iteration based on the quality and completeness of their implementation, and the degree of conformance to the software development processes.

Peer Grading for Project: After each iteration of the project, students will submit an evaluation of their teammates. The average score assigned by the team to the student will be used to weight the grade awarded to each student for the deliverable. A student's failure to submit a team evaluation by the deadline will result in an individual penalty to that student.

Exams and Quizzes

There will be a midterm exam, final exam, and a project quiz. The midterm will cover all material and homework topics presented to date in the class. The final exam will be cumulative over the entire semester. The quiz will focus on the Agile Project Manual presented in class in preparation for the class project.

After the midterm exam, students may submit regrade requests up to the date specified by the instructor. No exam regrade requests will be considered after that time.

Regrade Policy for Homeworks and Project

Regrades are available for each iteration of the project and homeworks. The policy and process for regrade requests will be posted on Piazza. Failure to follow this policy or submit a regrade on time will result in the request being denied.

Policy for Late Submissions

A "late deadline" will be set for each homework. Any deliverable may be completed up to the late deadline and will be assessed a 20% penalty on the score for that deliverable. Students must notify the instructor via the provided late homework form of their intention to submit late *before the late deadline has passed*. No credit will be awarded for any deliverable submitted after the late deadline or for which a notification has not been sent to the instructor prior to the late deadline. There is no late submission for any project deliverable and project demos must be done at the assigned time.

Academic Conduct

USC Statement on Academic Integrity

The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

Class Specific Examples of Academic Dishonesty include, but are not limited to, (1) falsification of any data or information submitted as part of a deliverable, (2) misrepresentation of the functionality of the code or systems created as part of a deliverable, or (3) receiving unauthorized aid.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the internet, or via any other media. (Living our Unifying Values: The USC Student Handbook, page 13).

Support Systems:

Disability Accommodations: USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible, but no later than two weeks before any exam or activity for which an accommodation is requested. Accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - 988 for both calls and text messages – 24/7 on call

The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL) – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

USC Campus Support and Intervention - (213) 740-0411

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-2850 or otfp@med.usc.edu

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.