

# CSCI 310: SOFTWARE ENGINEERING

SYLLABUS, Fall 2021

## 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:** THH 202

**Lecture slides, online questions, course policies:** <https://piazza.com/usc/fall2021/csci310>

**Final exam:** Monday, December 13, 8am-10am.

**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](http://www.swebok.org)

# Course Staff

## Instructor

**Staff:** William G.J. Halfond, Ph.D. <[halfond@usc.edu](mailto:halfond@usc.edu)>

**Role:** Please contact the Instructor with any questions either via email (for private issues) or Piazza (for general class issues).

## Teaching Assistants (TAs)

**Staff:** Marco De Souza Azevedo <[madesouz@usc.edu](mailto:madesouz@usc.edu)>, Sasha Volokh <[volokh@usc.edu](mailto:volokh@usc.edu)>, Zhaoxu Zhang <[zhaoxuzh@usc.edu](mailto:zhaoxuzh@usc.edu)>

**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 or Piazza.

## Course Producers (CPs)

**Staff:** Catherine Turner, John Meyering, Nandhakumar Saravana, William Borie, Xing Gao, Jane Wang

**Role:** The CPs are responsible for answering questions about the homeworks during help hours and online via Piazza. They will also provide feedback to the student teams during the group projects.

## Course Graders

**Staff:** Akshata Talele, Damini Cousik, Pushkaraj Sarnobat, Shambhavi Srivastava, Swasti Sharma

**Role:** The graders are responsible for grading homeworks and 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 posted online via Piazza under the menu item “Course Information.”

# 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, Scrum, Cleanroom)
- Ability to identify and define software lifecycle activities
- Understanding of the role of each phase's activities in ensuring quality software
- Familiarity with the tools and mechanisms used to achieve each phase'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 framework (JUnit)
- Coverage oriented unit testing (JUnit/Jacoco)
- Continuous integration testing (Travis)
- Specification/behavioral-based testing (Cucumber)

# 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: 13%
- Midterm Exam: 15%
- Project: 55%
- Final Exam: 15%
- Quiz: 2%

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

## Homeworks

Students will complete a series of individual homeworks that focus on the development and refinement of important software engineering skills. These 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, writing acceptance tests using Cucumber. Homeworks will be discussed and explained in class when they are assigned.

## 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 five 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 required 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 quiz. The midterm will cover all material 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 Submission of Homework

A "late deadline" will be set for each homework and announced via the deliverable table on Piazza. 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 email 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 email 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

**Plagiarism** – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” <http://policy.usc.edu/scampus-part-b>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

**Academic Dishonesty** - includes, but is 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 penalties for academic dishonesty will include but are not limited to: the assignment to the involved student(s) of a zero grade for the deliverable, a grade of F for the course, and a referral to SJACS.

**Discrimination, sexual assault, and harassment:** These behaviors are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity or to the Department of Public Safety. This is important for the safety of the whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men provides 24/7 confidential support, and the sexual assault resource center webpage describes reporting options and other resources.

**Distribution of classroom materials:** Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. 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 relation to the class, whether obtained in class, via email, on the Internet, or via any other media. (see Section C.1 Class Notes Policy).

## Support Systems:

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

<http://studenthealth.usc.edu/counseling>

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

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

<http://suicidepreventionlifeline.org>

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call

<http://studenthealth.usc.edu/sexual-assault>

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298

<http://equity.usc.edu>, <http://titleix.usc.edu>

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

[http://usc-advocate.symplicity.com/care\\_report](http://usc-advocate.symplicity.com/care_report)

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

The Office of Disability Services and Programs - (213) 740-0776

<http://dsp.usc.edu>

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710

<http://campussupport.usc.edu>

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

Diversity at USC - (213) 740-2101

<http://diversity.usc.edu>

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

<http://dps.usc.edu>, <http://emergency.usc.edu>

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) 442-120 – 24/7 on call

<http://dps.usc.edu>

Non-emergency assistance or information.