



CSCI 310: Software Engineering

Units: 4

Fall 2022 – Monday, Wednesday—10:00am-11:50am

Location: THH 301

Instructor:

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Course Description

Introduction to the software engineering process and software lifecycle. Covers project management, requirements, architecture, design, implementation, testing, and maintenance phase activities in individual and team based projects.

Learning Objectives

Students will gain a basic understanding of the foundational methods and techniques of professional software development, and learn how to leverage these methods and techniques in practical settings. Major learning objectives are:

1. Understand the importance of requirements: make sure your software does what the customer wants it to do
2. Understand the basic object-oriented (OO) design principles: make sure your software has flexibility
3. Understand the basic design patterns: make sure your software is maintainable and reusable
4. Understand the software processes: make sure you work efficiently and communicate well with others

Prerequisites

CSCI 201 (Principles of Software Development)

CSCI 104 (Data Structures and Object Oriented Design)

CSCI 103 (Introduction to Programming)

Textbook and Supplementary Readings

Textbook:

- Software Engineering (10th Edition), Ian Sommerville, Pearson, 2015 (required)

Supplementary Reading:

- Head First Software Development, Pilone and Miles, O'Reilly, 2008 (optional)
- Head First Design Patterns, Freeman and Robson, O'Reilly, 2014 (optional)

Assignments and Examinations

The grades will be based on the completion of quizzes, two examinations, an individual coding assignment, and a team-based software development project.

- **Quizzes:** Unannounced quizzes will assess the student's understanding of the materials covered in the lectures.
- **Examination #1:** This exam will cover materials taught in the first half of the semester.
- **Examination #2:** This exam will cover materials taught in the second half of the semester, although students are still expected to show in-depth understanding of the topics covered by the first exam.
- **Project #1:** This individual coding assignment will be a warming-up exercise for every student to get familiar with Android Studio, which is needed to complete the team-based coding tasks in Project 2. It will also develop the student's ability to use professional software development tools and adopt test-driven development (TDD).
- **Project #2:** This team-based project will develop the student's ability to collaborate with others and adopt the iterative (agile) development process. The project will have 5 exercises, thus resulting in 5 deliverables. The last exercise, in particular, will be "sprint" intended to refine the software implemented in the first four exercises.

Grading Breakdown

| Assignment | % of Grade |
|--|-------------|
| Quizzes | 5% |
| Examination #1 | 20% |
| Examination #2 | 20% |
| Individual Coding Assignment #1 | 10% |
| Team Project | 45% |
| <ul style="list-style-type: none">• <i>Deliverable #1 - 5% (requirements)</i>• <i>Deliverable #2 - 5% (design)</i>• <i>Deliverable #3 - 20% (implementation)</i>• <i>Deliverable #4 - 10% (testing)</i>• <i>Deliverable #5 - 5% (sprint)</i> | |
| TOTAL | 100% |

While the team project is a collaborative exercise, each student will receive an individual grade, based on not only the team's overall performance but also the student's individual contribution; thus, an individual's grade may deviate from the team's grade although (in the ideal case) all team members are expected to contribute equally.

No students are allowed to miss either examinations. Failure to take an exam during its scheduled time will result in a grade of zero on that exam.

Students are allowed to miss up to three (3) quizzes during the entire semester without a penalty. That is, for all students, three of the lowest-graded quizzes will be dropped when computing the final grade.

Additional Policies

Late homework submissions will still be accepted within 24 hours after the announced deadline, but with a penalty of 20%. Assignments received more than 24 hours late will receive a grade of 0.

If you feel that an error has been made in grading, please notify the TAs within one week. After one week (7 calendar days), regrading requests will no longer be allowed.

Course Schedule (tentative)

| Week | Date | Topic | Textbook (Sommerville) | Supplement (Head First) | Homework |
|------|-------|---|---------------------------|----------------------------|-----------------------------|
| 1 | 08/22 | Introduction | Ch.1-2 | | |
| | 08/24 | Android I | | | |
| 2 | 08/29 | Android II | | | Project 1 |
| | 08/31 | Tools: configuration management | Ch. 25 | Ch.6-8 | |
| 3 | 09/05 | NO CLASS – Labor Day Holiday | | | |
| | 09/07 | Tools: build and unit testing | | | |
| 4 | 09/12 | TDD: test-driven development | | | |
| | 09/14 | Iterative development I | Ch. 3-5 | Ch. 1-5 | |
| 5 | 09/19 | Iterative development II & Requirements | | | Project 2.1 |
| | 09/21 | Iterative development III | | Ch. 9-11 | |
| 6 | 09/26 | Architectural design | Ch. 6 | | |
| | 09/28 | Detailed design | Ch. 7 | | Project 2.2 |
| 7 | 10/03 | OO Design Principles | | | |
| | 10/05 | OO Design Patterns I | | | |
| 8 | 10/10 | Review for Exam 1 | | | Project 2.3 |
| | 10/12 | Exam 1 – in the lecture classroom at 10 -11:50AM | | | |
| 9 | 10/17 | Guest Lectures | | | |
| | 10/19 | Short lecture + Team Meeting for Project 2.3 | | | |
| 10 | 10/24 | OO Design Patterns II | | | |
| | 10/26 | Refactoring | | | |
| 11 | 10/31 | Testing I | Ch. 8 | | |
| | 11/02 | Testing II | | | |
| 12 | 11/07 | Testing III | | | Project 2.4 |
| | 11/09 | Automated Testing | | | |
| 13 | 11/14 | NO LECTURE – Team Meeting for Project 2.4 | | | |
| | 11/16 | Program Analysis I | | | |
| 14 | 11/21 | Program Analysis II | | | Project 2.5 |
| | 11/23 | NO LECTURE -- Team Meeting for Project 2.5 | | | |
| 15 | 11/28 | Program Analysis III | | | |
| | 11/30 | Wrap Up – Review for Exam 2 | | | Project 2.5 due on 12/02 |
| 16 | 12/05 | NO CLASS – Study Day | | | |
| | 12/07 | Exam 2 – in the lecture classroom at 11:00AM-1:00PM | | | |

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”

<https://policy.usc.edu/student/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>.

Discrimination, sexual assault, intimate partner violence, stalking, and harassment are prohibited by the university. You are encouraged to report all incidents to the *Office of Equity and Diversity/Title IX Office* <http://equity.usc.edu> and/or to the *Department of Public Safety* <http://dps.usc.edu>. This is important for the health and safety of the whole USC community. Faculty and staff must report any information regarding an incident to the Title IX Coordinator who will provide outreach and information to the affected party. The sexual assault resource center webpage <http://sarc.usc.edu> fully describes reporting options. Relationship and Sexual Violence Services <https://engemannshc.usc.edu/rsvp> provides 24/7 confidential support.

Support Systems

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the *American Language Institute* <http://ali.usc.edu>, which sponsors courses and workshops specifically for international graduate students. *The Office of Disability Services and Programs* <http://dsp.usc.edu> provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, *USC Emergency Information* <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of Blackboard, teleconferencing, and other technology.