SSW 322-Syllabus

SSW 322 Engineering Design VI

School of Systems and Enterprises

2024 Spring

Meeting Times: Monday 10:00 to 10:50 am and Wednesday 10:00 to 10:50 am

Meeting Location: McLean 211

Instructor: Jacqueline Libby, jlibby@stevens.edu, Office: Babbio 517

Grader: Zuting Chen, zchen125@stevens.edu, Office hours 2nd Floor Babbio (by the circular tables), Wednesdays, 2-3pm.

Course Web Address: https://sit.instructure.com/courses/70892

Prerequisite(s): Programming experience in an object-oriented language, preferably Java or Python
Corequisite(s): SSW 315 Object Oriented Software Engineering (or equivalent)

COURSE DESCRIPTION

This course provides software engineering students with experience for software design and evolution in the context of engineering design. Students will explore the software design process covering domain knowledge identification, design modeling and communication, design validation, design risk assessment, and strategic design in software evolution. Students will acquire essential skills for improving "a design that solves a current problem" to "a good design that fits into a domain's context and eases future code maintenance while providing excellent user experience". Students will practice skills in the roles of software "manager", "designer", "architect" and "developer" in a real-software-project-like setting. Students will employ user centered design, design, implement, maintain, and deliver more than one release of a project during the semester drawing on principles of Engineering Design. Tools that have been introduced in earlier software engineering courses will be brought together as part of this pre-senior design experience, as will new tools in User Centered Design, Engineering Design and testing.

LEARNING OBJECTIVES

After successful completion of this course, students will be able to:

- Demonstrate how Engineering Design, User-Centered Design, and general design can be applied to the problem you are trying to solve.
- Technical Design: Develop and apply domain-centric design solutions for problem specifications at hand.
- Engineering Foundation: Implement designs following the well-accepted SOLID object-oriented design principles for complex and practical problems.
- Design Assessment: Assess, criticize and improve the design of a software system so as to improve the ease of code maintenance in its evolution.
- Communication: Present and communicate design decisions.

FORMAT AND STRUCTURE

- 2 contact hour meetings per week, consisting of lectures, technical tutorials, and group presentations.
- In addition, there will be group check-ins with the grader after each of the four project milestones. It is assumed that the groups will come during the grader's office hours, unless group members are unavailable. If unavailable, please email grader to schedule a time to meet in person or virtually.

Weekly meetings and a team project form the core of the course. Students will be expected to participate in-person for weekly meetings, attend group check-ins, and complete a semester-long group development project.

COURSE MATERIALS

Optional Textbook(s):

- User-Centered Design by Travis Lowdermilk, 2013 (L) ISBN 978-1449359805
- Domain-Driven Design by Eric Evans; 4th Edition, 2004 (E) ISBN 0321125215
- Engineering Design: A Systematic Approach by Pahl, Beltz, Feldhusen and Grote, 2007 (P) ISBN 978-1-84628-319-2

Optional Other Readings:

- An Introduction to Software Architecture, David Garlan and Mary Shaw, January 1994 Link
- Software Engineering Design: Theory and Practice by Carlos Otero, ISBN-13: 978-1439851685, ISBN-10: 1439851689

COURSE REQUIREMENTS

Team projects: students will work in groups of five on a semester-long software project. to gain practical experience in software design, implementation, and maintenance. There will be four project milestones split up over the course of the semester. Each group will give an in-class presentation for each milestone.

GRADING PROCEDURES

Grades will be based on:

- Milestone Presentations: 60% (Four milestones throughout the semester, 15% each). The entire group of five people will receive the same score.
- Peer ratings after each milestone: 20% (Ratings are given just by the other members of your group, not the entire class. This helps with determining individual contributions made by each member of the group.)
- Github activity: 15% (All group members are expected to contribute to software development, and this will be tracked by the grader based on repository contributions. This also includes use of issues, especially for members that are in more managerial roles.
- Participation in group check-ins with grader: 5%

Final grades will be determined by the following scale:

A	100%	to	93%
A-	< 93%	to	90%
B+	< 90%	to	87%
B	< 87%	to	83%
B-	< 83%	to	80%
C+	< 80%	to	77%
C	< 77%	to	73%
C-	< 73%	to	70%
D+	< 70%	to	67%
D	< 67%	to	60%
F	< 60%	to	0%

LATE POLICY

With regards to the 60% of the grade for milestones: If milestones are late, **5% will be deducted each 24 hours, for the entire group. Exceptions will not be made**. The reasoning for this strict policy is so that group members can rely on each other for timely collaboration, and so that we can stay on schedule with presentations in the syllabus.

TENTATIVE COURSE SCHEDULE (subject to change)

Weds Jan 17	Lecture: Course Logistics, Project Introduction
Mon Jan 22	Tutorial: GitHub Basics
Weds Jan 24	Lecture: Intro to Software Design
Mon Jan 29	Lecture: User-Centered Design
Weds Jan 31	Milestone 1 (Groups 1, 2, 3)
Mon Feb 5	Milestone 1 (Groups 4, 5, 6)
Weds Feb 7	Milestone 1 (Groups 7, 8)
Mon Feb 12	Lecture: UML (Guest Lecture)
Weds Feb 14	Tutorial: Front-end (tools for user interfaces)
Mon Feb 19	**President's Day, No Class**
Weds Feb 21	Lecture: Domain-Driven Design
Mon Feb 26	Tutorial: API's for activity tracking
Weds Feb 28	Milestone 2 (Groups 4, 5, 6)
Mon Mar 4	Milestone 2 (Groups 7, 8)
Weds Mar 6	Milestone 2 (Groups 1, 2, 3)
Mon Mar 11	**Spring Break**
Weds Mar 13	**Spring Break**
Mon Mar 18	Lecture: Security Intro
Weds Mar 20	Lecture: User Authentication, part 1
Mon Mar 25	Tutorial: Back-end (tools for databases)
Weds Mar 27	Lecture: User Authentication, part 2
Mon April 1	Milestone 3 (Groups 7, 8)
Weds April 3	Milestone 3 (Groups 1, 2, 3)
Mon April 8	Milestone 3 (Groups 4, 5, 6)
Weds April 10	Lecture: Access Control
Mon April 15	Lecture: Clean Code
Weds April 17	Lecture: SOLID
Mon April 22	Lecture: Code Smell
Weds April 24	Milestone 4 (Groups 1, 2, 3)
Mon April 29	Milestone 4 (Groups 4, 5, 6)
Weds May 1	Milestone 4 (Groups 7, 8)

ACADEMIC INTEGRITY

Undergraduate Honor System

Enrollment into the undergraduate class of Stevens Institute of Technology signifies a student's commitment to the Honor System. Accordingly, the provisions of the Stevens Honor System apply to all undergraduate students in coursework and Honor Board

proceedings. It is the responsibility of each student to become acquainted with and to uphold the ideals set forth in the Honor System Constitution. More information about the Honor System including the constitution, bylaws, investigative procedures, and the penalty matrix can be found online at http://web.stevens.edu/honor/.

The following pledge shall be written in full and signed by every student on all submitted work (including, but not limited to, homework, projects, lab reports, code, quizzes and exams) that is assigned by the course instructor. No work shall be graded unless the pledge is written in full and signed.

"I pledge my honor that I have abided by the Stevens Honor System."

Reporting Honor System Violations

Students who believe a violation of the Honor System has been committed should report it within ten business days of the suspected violation. Students have the option to remain anonymous and can report violations online at www.stevens.edu/honor.

LEARNING ACCOMODATIONS

Stevens Institute of Technology is dedicated to providing appropriate accommodations to students with documented disabilities. The Office of Disability Services (ODS) works with undergraduate and graduate students with learning disabilities, attention deficit-hyperactivity disorders, physical disabilities, sensory impairments, psychiatric disorders, and other such disabilities in order to help students achieve their academic and personal potential. They facilitate equal access to the educational programs and opportunities offered at Stevens and coordinate reasonable accommodations for eligible students. These services are designed to encourage independence and self-advocacy with support from the ODS staff. The ODS staff will facilitate the provision of accommodations on a case-by-case basis.

Disability Services Confidentiality Policy

Student Disability Files are kept separate from academic files and are stored in a secure location within the Office of Disability Services. The Family Educational Rights Privacy Act (FERPA, 20 U.S.C. 1232g; 34CFR, Part 99) regulates disclosure of disability documentation and records maintained by Stevens Disability Services. According to this act, prior written consent by the student is required before our Disability Services office may release disability documentation or records to anyone. An exception is made in unusual circumstances, such as the case of health and safety emergencies.

For more information about Disability Services and the process to receive accommodations, visit https://www.stevens.edu/office-disability-services. If you have any

questions please contact: Phillip Gehman, the Director of Disability Services Coordinator at Stevens Institute of Technology at pgehman@stevens.edu or by phone (201) 216-3748.

INCLUSIVITY

Name and Pronoun Usage

As this course includes group work and in-class discussion, it is vitally important for us to create an educational environment of inclusion and mutual respect. This includes the ability for all students to have their chosen gender pronoun(s) and chosen name affirmed. If the class roster does not align with your name and/or pronouns, please inform the instructor of the necessary changes.

Inclusion Statement

Stevens Institute of Technology believes that diversity and inclusiveness are essential to excellence in academic discourse and innovation. In this class, the perspective of people of all races, ethnicities, gender expressions and gender identities, religions, sexual orientations, disabilities, socioeconomic backgrounds, and nationalities will be respected and viewed as a resource and benefit throughout the semester. Suggestions to further diversify class materials and assignments are encouraged. If any course meetings conflict with your religious events, please do not hesitate to reach out to your instructor to make alternative arrangements.

You are expected to treat your instructor and all other participants in the course with courtesy and respect. Disrespectful conduct and harassing statements will not be tolerated and may result in disciplinary actions.