CSC223: Software Engineering

Smith College [Spring 2022]

Instructor

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Teaching Assistants

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Place & Time

Seelye 301

Tuesdays
Usually 1:20-4:00pm
Occasionally 7:00-9:30pm

Course Overview

All software that is used in the real world was created under real constraints. In this course you will learn how to engage in the messy-guessy process of specing, planning, designing, and building a software product that you intend to deploy "in the wild". In CSC223 you will:

- Compare engineering methodologies
- Practice rapid prototyping & agile development
- Model complex system architectures
- Design software that satisfies needs & constraints
- Build & maintain a real system using Ruby on Rails

Prerequisites: CSC212, confidence in coding ability and willingness to learn new languages

Format & Workload

Class meets weekly on Tuesday afternoons, except once a month when it will be held in the evening. Those evening meetings will be marked on Moodle and announced the week prior with a reminder sent the day before. Classes will follow a **workshop format**. We will begin with a short lecture to unpack the readings, then switch to hands-on activities and group project work. You should expect to devote **9 hours per week outside of class** to complete your readings and assignments.

Reading Materials

Readings for this course will draw from three books, all of which are recommended, none of which are required. You will be expected to read and reflect on **~2 chapters each week**. These readings will all be **provided via Moodle** and thus you are not obliged to obtain them yourself. However, the books listed below are certainly worth reading in their entirety.

Ian Sommerville
Engineering Software Products: An Introduction to Modern Software Engineering

Don Norman
The Design of Everyday Things

Frederick P. Brooks, Jr.
The Mythical Man-Month: Essays on Software Engineering

Assignments

The majority of your work will be devoted to a three phase **group project** during which you specify, plan, and **build a software system** using the Ruby on Rails web framework. You will submit documentation, code, and reports jointly, and you will demo your product at the end of the semester as a team. Before the project begins you will set up your development environment and complete a ~12 hour **series of trainings**. Additionally, every week before class you will each write **brief reflections** (200-300 words) on the readings and you'll also compose a succinct (500-700 words) **research report**.

Weekly Schedule

Week	Date	Topic	Major Assignments
1	Jan. 25	*What is Software Engineering?*	
2	Feb. 1	*Why is Software Engineering Challenging?* Product Management & Communication	Hello Stack App
3	Feb. 8	*How Do Modern Software Engineering Teams Operate?* Agile Methods & Feature Driven Development	Group Prefs. Survey
4	Feb. 15	*How Do We Model Complex Systems?* Architecture & Abstraction	Training A
5	Feb. 22	*How Do We Decide What to Build?* User-Centered Design	Training B Group Contract
6	Mar. 1	*How Do We Build Elegantly for Complexity?* Patterns & Services	Training C
7	Mar. 8	*How Do We Engineer Robust Systems?* Risk Mitigation	Project Plan Midway Self Review
8	Mar. 15	[Spring Recess]	
9	Mar. 22	*How Do We Engineer Just Systems?* Programming Ethics	
10	Mar. 29	*How Do We Collaborate On Code?* Tools & Techniques	
11	Apr. 5	*Why Does This Feel So Hard?* (Re)Assessing Challenges	Project Prototype
12	Apr. 12	*When Do We Launch? What Do We Do After?* Deployment & Evaluation	Research Report
13	Apr. 19	*What Do We Want to Learn More About?* Student-Led Topic	
14	Apr. 26	Demo Day Presentations	Final Project Self-Team-Peer Reviews

Communication

All online communication for this course will take place **via Discord** (a text, voice, and video chat service popular with gamers, live streamers, and programmers). If you do not already have an account, please create one. **Join our server** using the invitation, then follow the instructions in the pinned message in #welcome to set your nickname and pronouns.

CSC223-S22 Discord Server Invitation
https://discord.gg/j3nzxEc5Fq

- #announcements: Important notices about assignments, class times, deadlines, etc.
- #general: Discussion about course material, engineering problems, off-topic ideas, etc.
- #questions: If you are wondering something, chances are someone else is puzzled too. Post any non-personal questions you have here. Please utilize threads when responding.
- DMs: Message me directly for matters that require individual communication.

I will try to answer time-sensitive questions within one workday, but please turn to your peers and TAs for help first. Chances are they will assist you more quickly. Sometimes I miss DMs, so don't be shy about pinging me again if you're waiting on a reply. Lastly, please note that I'm terrible at responding to email. I'll read it, but you'll either get a reply right away, or between two days and two years later.

Office Hours

Office hours are a time when you can **ask me questions about... anything!** Weekly hours are for any student who would like to chat with me and I hold them on a rotating schedule. To see upcoming office hours and ensure you get a slot, please **book a time via Calendly**. If you need a different time you are welcome to DM me. You can visit my office/lab in person or **remotely on Gather** depending on the operating mode of the college. Please specify your preference when reserving a meeting spot.

Reserve Time via Calendly
https://calendly.com/johannabrewer

Virtual Meetings on Gather
https://gather.town/app/NfY57eEoJJb22wzP/InclusiveDesignLab

Grading

In keeping with how software is evaluated, most submissions are graded on a **simple scale**: needs improvement (C); meets expectations (B); exceeds expectations. (B+/A-); distinguished (A/A+). You will have two opportunities to **review your own performance** (mid-semester and after demo day) and to weigh in on your final letter grade. Assessments in this course are weighted to reflect the overall workload.

- 50% Major project assignments
- 25% Reading reflections & research report
- 25% Class participation & presentations

Your success in this class will depend on your **active engagement** with both the material and your classmates because software engineering is not a solo endeavor. To do well, you must demonstrate that you are working to master both **coding and communication**.

Academic Integrity

Much of the work for this class will be done in groups, but every student will complete significant pieces individually. As software engineers, we all build on the code of those who came before us, and as honorable scholars, we credit their contributions. Whenever you collaborate with others, whether in designated groups or informally as study partners, you must **acknowledge your collaborators**. Likewise, I expect you to always **cite all sources** used when preparing your assignments. This includes not only books, papers, and articles but also websites, StackOverflow pages, social media posts, etc.

Participation & Absences

Though formal attendance will not be taken, you won't be able to participate in class if you are not there. We only meet thirteen times so **your presence in each class matters**. If you know you will have a planned absence, please let me know two days in advance; and if you have an emergency, please inform me after you are safe.

Extensions & Lateness

It is important you complete your **work in a timely fashion**. Programming assignments are due by midnight on Mondays and written assignments are required to be submitted an hour before class begins. If you require additional time to complete your individual assignments, DM me to request it, **late is better than never**. Extensions on group assignments will only be given in exceptional cases where a team member's Dean provides a written request.

Comfy Class Policies

Laptops and phones can be distracting, but they are important tools for us. Please avoid using your devices in class for purposes other than coursework. Hydration is essential so you are welcome to bring beverages, but you must use **closed containers** to avoid spills. We will have two breaks during which you can have a snack, but while we are still masking let's **refrain from eating** during class.

Fostering Respect & Inclusion

During this course we will engage in a variety of discussions, activities, and projects that rely on your ability to work together. So that we can build our sense of community, please, make sure you change your Discord nickname to your preferred first name and set your pronouns in our channel. When communicating with one another, whether in class or online, I expect you to practice **active listening**. When someone is talking, you should be focused on understanding what they are expressing rather than thinking of how you will respond. Additionally, I ask you to remember that we all come from different backgrounds that shape our unique perspectives, and so we ought to **respect one another** when we have sincere differences of opinion.

Diversity Statement & Equity Commitment

As a mixed-race, Native, non-binary, neurodivergent person who was the first in their family to earn a doctoral degree, I have stake in bettering, and a first-hand knowledge regarding, the experience of marginalized folks in our society. I know that a welcoming learning environment can have a real impact, and so I am committed to making this **classroom a comfortable place** for all my students. Please let me know if you ever have thoughts, questions, or concerns about ensuring that we **treat one another equitably**.

Accessibility & Accommodations

Learning and teaching with masks on is a challenge for all. You are welcome to use a live captioning app on your mobile device if it increases your ability to understand when others speak. Course materials including readings, slides, and lecture notes will be provided as PDFs that are screen reader compatible. If you have any issues accessing the materials, let me know as soon as possible and I will work to find a solution. Should you encounter barriers to participation in this or any other course, please reach out to Laura Rauscher, **Director of Disability Services, by calling (413) 585-2071** to make an appointment to discuss support and accommodations.

Health Resources

College can be stressful, even more so in the midst of a pandemic, but you are not alone. Please reach out for help if you are feeling unwell or overwhelmed. The Schacht Center on campus provides a variety of **free & confidential** health and counseling services. You can email healthservices@smith.edu or call (413) 585-2250 for any medical concerns. To set up an appointment for mental health support you can email counselingservices@smith.edu or **call (413) 585-2840 if you are in crisis**.

Acknowledgments

Some of the materials used in this course are derived from previous classes at Smith, as well as similar courses taught at other institutions. Thanks to my academic colleagues, especially Alicia M. Grubb, for sharing their syllabi.