**The City College of New York**

**City University of New York**

**CSC 59939: Topics in Modern Software Engineering**

**Modern tools in Full-Stack web development**

**Course Information**

**Instructor:** Daniel Obeng

**Email:** [daniel.obeng@macaulay.cuny.edu](mailto:daniel.obeng@macaulay.cuny.edu) (try classroom slack first)

**Time:** Mon 6:30 PM – 9:00 PM ET (Zoom Info TBD)

**Office Hours:** Fri 6:00 PM – 6:50 PM ET (Zoom Info TBD)

**Course Description**

This course overviews software engineering practice in industry. Agile methodologies, software quality assurance, backend technologies and development, and cloud computing are covered. Specifically, this course will focus on the design and implementation of web applications using the latest tools in full-stack web development. Students will work in a team setting to build a fully functional web application. Emphasis on testing, following agile methodologies and software development best practices

**Course Objectives & Learning Outcomes**

Upon successful completion of this course, students will be able to

* work effectively as a part of an agile team
* Follow agile methodologies to build a full-stack web application
* Design and build RESTful APIs
* Write unit, integration, and functional tests for web applications
* Deploy web applications to the cloud
* Set-up CI/CD pipelines for web applications
* Use the available debugging tools to debug web applications
* create Progressive Web Applications (PWAs)
* Use WebAssembly to create fast and efficient web applications

**Textbooks/Materials/Resources**

* Reading materials will be sourced from content from published research, software engineering blog posts, etc. available for free on the web
* Lynda.com - get a New York Public Library card for free access at <https://www.nypl.org/collections/articles-databases/lyndacom>
* Additional course materials will be provided on Blackboard
* Slack (communication)
* [Github Classroom](https://classroom.github.com) (for submitting programming assignments)
* [Mimir Classroom](https://www.mimirhq.com/) (for quizzes & midterm)

**Grading Policy**

* Class participation - 5%
* Assignments - 25%
* Quizzes – 10%
* Midterm exam - 20%
* Final project - 40%

**Academic Integrity/Honesty Policy**

All students are expected to maintain the highest standards of academic integrity. Academic

dishonesty is a basis for disciplinary action and will not be tolerated in any guise. Academic

dishonesty includes, but is not limited to: (1) plagiarism: using another’s words, ideas, or

paraphrases without giving credit to the source[s] and implying they are your own; (2) cheating:

examples include using hidden notes or examining another person’s responses in order to answer

questions on a quiz/test/exam; (3) ringers: having another person fulfill your assignment (e.g.,

homework, exercises, laboratory, quiz, paper, or test). The university takes matters of academic

dishonesty very seriously. The CUNY Academic Integrity Policy provides detailed descriptions

of types of academic dishonesty and outlines processes for those that violate the policy.

**Academic sanctions in this class will range from an F on the assignment to an F in this**

**course.** A report of suspected academic dishonesty will be sent to the Office of the Dean

of Students. The full academic honesty policy can be accessed at: [CUNY Academic Integrity Policy](https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/)

**Other Classroom Policies**

Attendance is mandatory. All assignments are due before the start of class 6:30PM. No late assignments will be accepted. No makeups will be given for missed quizzes or exams

**Weekly Schedule of Topics to be Covered (Tentative - Subject to Change)**

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| --- | --- | --- |
| **Week** | **Topics** | **Readings/Assignments/Deliverables** |
| 02/01 | * Course Overview * Introduction to Web Development * HTML5 Overview | * Setup accounts (Github, mimir classroom etc) * Introduce yourself in Blackboard discussion * Complete Git tutorial |
| 02/08 | * CSS 3/SASS Overview * Python (3.9) Overview | * Submit Project Ideas in Discussion, form teams and pick a project idea to pitch to class at next lecture (5 min presentations) * Submit Project 0 on Github (Build a personal website with HTML/CSS) |
| 02/15 | NO CLASS – PRESIDENT’S DAY |  |
| 02/22 | * Team project pitches (5 mins each) * Before Code: Agile Methodologies in software development | * Complete assigned readings on basic http concepts * Complete assigned readings on agile development * As a team, solidify project idea and submit requirements etc. for the MVP of your app |
| 03/01 | * Web Frameworks: Django * Testing Web Applications (TDD) | * Complete assigned reading on Testing * Submit Project 1 on Github (Build a simple Django application with unit, integration and functional tests) |
| 03/08 | * In class python coding challenge (quiz) on mimir (15 mins) * RESTful API Design and Implementation overview * Javascript (including ES6) | * Javascript ES6 training * Take home Javascript coding challenge (quiz) * Submit Project 2 on Github (Build an API in Django and a front-end in HTML/CSS/JS ) |
| 03/15 | * Front-end Development with web Frameworks (React) * Testing Front-end Applications (Jest, Testing Library, Cypress) * Brief introduction to JSS | * Complete React Training * Complete Project 3 on Github (Build a FE Application with React and tested with Jest) |
| 03/22 | * In class JS coding challenge (quiz) on mimir (15 mins) * Introduction to Typescript * Back-end development with Node and Express * Team Coding Standards (Introduction to Coding styles and Linting) | * Complete Typescript Training * Complete Project 4 (Convert Django application from Project 1 to a Node app) * Team project presentations begin next lecture |
| 03/29 | NO CLASS – SPRING RECESS |  |
| 04/05 | MIDTERM |  |
| 04/12 | * 7-minute team project presentations (following the suggested format TBD) * Deployments (AWS/Heroku/Google Cloud) * Monitoring web applications in production | * Deploy team application to the cloud (submit urls) * Setup monitoring for team applications |
| 04/19 | * In class JS coding challenge quiz on mimir (15 mins) * QA and Debugging Techniques in Web Development | * N/A - continue work on team project |
| 04/26 | * 7-minute team project presentations * Releases * CI/CD | * Setup CI/CD Pipelines for team projects |
| 05/03 | * In class Python coding challenge on mimir (15 mins) * Documentation * Scalability and Security in web Development | * Submit Security Audit of applications |
| 05/10 | * Accessibility * PWA (Progressive web apps) * WASM (WebAssembly) * The Future of web development |  |
| 05/17 | FINAL PROJECT PRESENTATIONS |  |