ECE 452/567 Software Engineering

COURSE INSTRUCTOR AND CONTACT INFORMATION

- **Name**: Hang Liu
- **Email**: Hang.Liu@rutgers.edu
- **Phone**: (848) 445-0876
- **Office**: CoRE 509
- **Website**: https://www.ece.rutgers.edu/hang-liu

COURSE TEACHING ASSISTANT AND CONTACT INFORMATION

- **Name**: Mengyu Zhao
- **Email**: mz524@scarletmail.rutgers.edu
- **Office**: EE building (will request a room & announce)

- **Name**: Lang Zhu
- **Email**: lz529@scarletmail.rutgers.edu
- **Office**: EE building (will request a room & announce)

COURSE MEETING DAYS, TIMES, LOCATION, MODALITY

Course time: 2:00 PM – 3:20 PM, Tuesday/Thursday
Course location: SEC 111 (click here [hyperlink] to see the location) of Busch campus
Canvas sites:https://rutgers.instructure.com/courses/295216
Course format: In-person class. See attendance and participation for more policies.

OFFICE HOURS / STUDENT SUPPORT HOURS

Professor Office hours: 11 AM – 12 PM Tuesday/Thursday, or by appointment via email.
Location (either one below would work):

- Virtual office hour on Zoom: https://rutgers.zoom.us/my/hl1097?pwd=RVNmY0ZxVXRmWjd6QzREaGZoZkVqdz09, passcode: hl1097
- In-person: CoRE 509, Busch campus

Teaching Assistant Office hours:

- Mengyu Zhao:
  - Wednesday 2-3 pm
  - Location: In person: EE building (will request a room & announce)
- Lang Zhu:

- Monday 4-5 pm
- Location: In person: EE building (will request a room & announce)

COURSE DESCRIPTION

The Software Engineering course is essential for computer and electrical engineering students. It provides a comprehensive introduction to JavaScript programming, software architecture, database systems and software testing. The course is project-oriented, focusing on hands-on experience and the practical application of these concepts. By the end of the course, students will be equipped to develop a fully functioning web application.

REQUIRED TEXTS AND COURSE MATERIALS

JavaScript Programming (JSP). Ivan Marsic. Location:
https://rutgers.instructure.com/courses/295216/files/42225973?module_item_id=10745678

Software Engineering. Ivan Marsic (SE). Location:
https://rutgers.instructure.com/courses/295216/files/42225975?module_item_id=10745680

LEARNING GOALS

This course provides a comprehensive overview of fundamental software engineering concepts

- **Use Cases**: Understanding and defining the functional requirements of software systems.
- **Software Architecture:** Emphasis on RESTful services and microservices architecture, which are essential for building scalable and maintainable applications.
- **Domain Modeling and Domain-Specific Languages (DSLs):** Techniques for representing and managing the complex relationships within a software system's domain.
- **Testing Methods:** Best practices for ensuring software reliability and quality through various testing strategies.
- **Software Security:** Principles and practices for protecting software from vulnerabilities and threats.
- **Advanced JavaScript Programming:** Exploration of advanced concepts such as asynchronous programming and functional programming, crucial for developing robust and efficient applications.

Students are expected to have a solid understanding of JavaScript basics, as this course will not cover introductory JavaScript topics.

GRADING SCALE

We will follow the default grading scale from Canvas (https://rutgers.instructure.com/courses/295216)

ASSESSMENT / GRADING COMPONENTS

Weighting of Assessments

Homework 35%
We will have up to 5 separate homework during this course. The homework will be posted and submitted through CANVAS. Please start your homework early to avoid delays in submission.

This is a *software engineering* course, so program code quality is critical. It is critical that the code gives a correct solution, but it is also critical that it is well designed. Design includes proper formatting for readability; favoring shorter code that provides equivalent functionality; favoring code that addresses boundary cases; favoring extensively tested code; favoring code that is easier to understand and extend; etc.2 All of these aspects will be considered in grading the homework assignments.

Homework generally requires JavaScript code with test cases. Some homework solutions require a narrative explaining the result you will observe when running your code.

Homework submission format — **only PDF or plain text** are acceptable. When submitting program code, if multiple code files are submitted then include everything in a **ZIP folder**. Your programming solutions must include test cases that are carefully selected with a good reason that is explained, instead of being purely randomly selected. Note that student programs may be tested with other cases in addition to those provided by the student.

It is acceptable to collaborate on solving a problem, but it is not acceptable to copy each other's solutions. In case homework solutions from different students raise suspicion of copying, the corresponding students will be notified that we suspect copying. For the first offense, each involved student will receive at most 40% of the maximum grade assigned to that homework. For the subsequent offenses, each student will receive zero credit and may be subject to administrative measures.

Project written part: 45%
The project report will be separated into multiple submissions. Overall, the requirements for the project are:

- Develop the server and client-side (focus on the server!) preferably using only JavaScript, HTML, and CSS
- The projects will consist of "modules" that are the same for all teams
- Each module will cover one or more past lectures and follow the guidelines about the goal and the technologies to be used
- The students have the freedom to choose their specific business application and implement it by following the provided guidelines

Each report submission will cover the following items:

- Report 1:
  - Part 1: Project Proposal

    - Part 2: Requirements
  - Report 2:
    - Part 1: Use Cases
    - Part 2: Database Schema
    - Part 3: API Specification
  - Report 3
    - API Implementation
    - All previous reports and updated

Project demo video part: 20%
The project demo video will be recorded as a YouTube video, requirements are thoroughly listed in a separate file **Demo.pdf**

Late submission policy: All assignments are due on Canvas by class 2:00 PM Monday/Thursday. Each delayed day of the submission will introduce a 20 %-point penalty. That said, after 5 days of delays, there is no need for submissions.

TENTATIVE SCHEDULE OF TOPICS

Week	Time	Subject	Section	Note
1	Sep 3	Syllabus & Introduction	SE Ch1	
	Sep 5	JavaScript Functions	JSP 2.2	Assignment 1 Open
2	Sep 10	JavaScript Objects	JSP 2.3	
	Sep 12	TA coding mentoring session: Demonstrate how to install & use NodeJS and Jasmine	JSP Ch1	Assignment 1 Due
3	Sep 17	Requirements Engineering	SE 2.1.1 – 2.1.2	
	Sep 19	Use cases	SE 2.1.3	Assignment 2 Open
4	Sep 24	Architecture	SE 2.2 (Excluding 2.2.4)	
	Sep 26	TA coding mentoring session Demonstrate how to use GitHub	SE 1.3.4	Assignment 2 Due
5	Oct 1	REST	SE 2.2.4 & JSP 5 (Excluding 5.4)	
	Oct 3	REST server example	JSP 5.4	Report 1 Due, Assignment 3 Open
6	Oct 8	TA Hands-on JS Backend Development	JSP 5.4	
	Oct 10	Database-SQL	JSP 7	Assignment 3 Due
7	Oct 15	Domain model	SE 2.3	

	Oct 17	TA Hands-on MySQL and Firebase	[Will provide later]	
8	Oct 22	Asynchronous JavaScript - Intro	JSP 2.3	
	Oct 24	Asynchronous JS - Promises	JSP 2.3	Assignment 4 Open
9	Oct 29	TA coding mentoring session		
	Oct 31	Program Design 1	JSP 3.1 – 3.2	Assignment 4 Due
10	Nov 5	Program Design 2	JSP 3.3	
	Nov 7	TA coding mentoring session		Report 2 Due
11	Nov 12	JS Functional Programming 1	JSP 4.1 – 4.2	
	Nov 14	REST Backend Functional Programming	[Will provide later]	Assignment 5 Open
12	Nov 19	TA coding mentoring session	[Will provide later]	
	Nov 21	JS Functional Programming 2	[Will provide later]	Assignment 5 Due
13	Nov 26	JS Functional Programming 3	[Will provide later]	
	Nov 28	Thanksgiving Recess (No Class, Have a good rest)		
14	Dec 3	Work on the final report & demo (No Class)		
	Dec 5	**Report 3 (final): All previous reports combined and updated**		Report 3 Due
15	Dec 10	**Demo (final): YouTube video**		Demo Due

POLICIES

Attendance and Participation

Per GRADING COMPONENTS, attendance and participation will be 10% of your total grade. While we encourage our students to attend the class and or participate in the discussion, the student should not risk his/her health to fulfill this goal. More information about attendance and participation can be found https://sasundergrad.rutgers.edu/degree-requirements/policies/attendance-and-cancellation-of-classes.

Disability Accommodations

In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation." Please see https://ods.rutgers.edu/ or reach out to the instructor for more information.

CIVILITY / COMMUNICATION / CLASSROOM COMMUNITY / SENSITIVE TOPICS

This course is purely based on presentation and discussion. So, **the instructor would like to encourage a respectful communication and a supportive classroom community that celebrates diversity.** For the presentation, we want the presenters and participants to be aware of sensitive and uncomfortable topics, language, or images.

ACADEMIC INTEGRITY POLICY

Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy. As per the policy, all suspected violations will be reported to the Office of Student Conduct. Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly
- Fabrication
- Using another person's ideas or words without attribution, including re-using a previous assignment Unauthorized collaboration
- Sabotaging another student's work

If you are ever in doubt, consult your instructor.

If you have any questions, please visit the Rutgers University website on Academic Integrity: http://nbacademicintegrity.rutgers.edu/

STUDENT SUPPORT AND MENTAL WELLNESS

Rutgers University provides the following resources to support students in their academic success and mental wellness.

- Student Success Essentials: https://success.rutgers.edu
- Student Support Services: https://www.rutgers.edu/academics/student-support
- The Learning Centers: https://rlc.rutgers.edu/
- Rutgers Libraries: https://www.libraries.rutgers.edu/
- Bias Incident Reporting: https://studentaffairs.rutgers.edu/bias-incident-reporting
- Office of Veteran and Military Programs and Services: https://veterans.rutgers.edu
- Student Health Services: http://health.rutgers.edu/
- Counseling, Alcohol and Other Drug Assistance Program & Psychiatric Services (CAPS): http://health.rutgers.edu/medical-counseling-services/counseling/
- Office for Violence Prevention and Victim Assistance: www.vpva.rutgers.edu/