CIS 658 Web Architectures

Syllabus

Lecturer: Dr. Yong Zhuang

About this course

CIS 658 focuses on the design and implementation of modern web applications with an emphasis on software engineering practices, scalable client-side architectures, and cloud-backed data services. Students will build a complete web application using a contemporary front-end framework and integrate it with a cloud database and authentication. The course covers front-end structure and state management, asynchronous data access, API usage, security basics for web apps, and testing and deployment practices. The work in this course is project-driven, with weekly milestones that lead to a final project presentation.

Course Objectives:

After completing this course, students should be able to:

- Design and implement a maintainable front-end architecture using Vue.js components and modern TypeScript practices.
- Manage application state using a store-based approach and reason about data flow across components.
- Integrate a web application with cloud services for data storage and user authentication.
- Use asynchronous programming patterns to build reliable data access layers and user experiences.
- Apply basic web security practices.
- Develop and evaluate a complete web application through iterative milestones, testing, and deployment-ready packaging.

Contact Information

Instructor:	Dr. Yong Zhuang
E-mail:	yong.zhuang@gvsu.edu
Office:	MAK D-2-234
Office Hours:	MW, 12:00 pm–1:00 pm, in-person (MAK D-2-234) and remote (Zoom)
Course Page:	Blackboard and Course Website
Zoom:	Meeting ID: 396 668 6420, Password: 587684
Section 01:	**Class time:** Monday, 6:00 pm–8:50 pm (in-person / synchronous) + asynchronous
	Room: DeVos Cntr Interprofess Health, Room 507 / Zoom
	Final presentation: Monday, April 27, 6:00 pm–7:50 pm

Course Logistics & Prerequisites

- No assigned textbook
  - most materials about web development is available online
- Check **Blackboard** on a regular basis for
  - announcements,
  - course material,
  - assignments
- Check **Course Website** regularly
- Zoom session
  - https://gvsu-edu.zoom.us/j/3966686420?pwd=WGxpc0N4YWcvOU9aWGxWZGYxbXZUdz09

Grading

Course Component	Overall Weight
In-class activities	5%
Quizzes (short concept checks)	20%
Milestones / Assignments	35%
Final Project (implementation + presentation)	40%
Total	**100%**

The instructor reserves the right to make minor adjustments to the point distribution.

Grading

Grade A	Grade B	Grade C	Grades D & F
$A \geq 93\%$	$B+ \geq 87\%$	$C+ \geq 77\%$	$D+ \geq 67\%$
$A- \geq 90\%$	$B \geq 83\%$	$C \geq 73\%$	$D \geq 60\%$
	$B- \geq 80\%$	$C- \geq 70\%$	$F < 60\%$

Assignments, Due Dates

- **Due dates:** All assignments will be due at 11:59pm Michigan time on the due date.
- **Late policy:** Each student is required to complete all learning activities by the due date deadline. No learning activities or assignments are accepted late. All assignments, graded discussions, quizzes, exams, etc., are submitted electronically. No assignments are accepted via email, printed, or any other method.

Attendance

- **Attendance and participation:** This course uses a Multiple Delivery format. Students may participate in person, online synchronously, or asynchronously. Attendance and participation expectations apply to all students and may include in-class activities, Zoom participation, or completion of assigned online activities, depending on the week.
- **Asynchronous participation:** Students who do not attend a live session are responsible for reviewing posted materials and recordings and completing any required asynchronous activities by the specified deadlines.
- **Accommodations:** Students who require accommodations should inform the instructor as early as possible to ensure appropriate support across all delivery formats.
- The instructor reserves the right to modify course policies, schedules, and due dates when necessary.
- This course follows GVSU policies available at www.gvsu.edu/coursepolicies/.

Academic Honesty

- Document Collaborations: Clearly note any collaborations on individual assignments.
- No Code Sharing: Direct electronic transfer of code between students is not allowed.
- Cite Internet Sources: If you use code from the internet, provide an active link and ensure it doesn't constitute the entire solution.
- Engage Online Respectfully: Participate in forums for discussion, not for sharing solutions or soliciting complete answers.
- Discuss Conceptually: Talk about problems using non-technical, conceptual language rather than sharing specific code.
- Ultimately, you are responsible for all aspects of your submissions. You should be able to explain and defend your submission if the work is entirely your own.

Prerequisites

- Formal Prerequisites: CIS 500.
- Fluent in Java (or other object-oriented(OO) Languages)
  - You should be able to solve most problems at codingbat.com in a couple of minutes. If you struggle in solving these problems, then ***you are not ready*** to take this course
- Self Learner
  - Skilled in high-level programming **concepts**, and able to teach yourself the basics of other C-like languages (Java|Type)Script
- Good understanding of OO techniques: inheritance, methods, interface, ...

Expected Java Fluency

- Accessing object properties (without using a “getter” functions)
- Using loops on arrays of objects
- Writing own functions/methods
- Passing arguments into functions
- Function return value
  - Returning “result” from a function
  - Using a function “result”

Course Delivery – Multiple Delivery

Technology Requirements: Students attending remotely must have reliable internet access and a device with a webcam, microphone, and speakers. All students should log in to Zoom using their official GVSU account when joining live sessions.

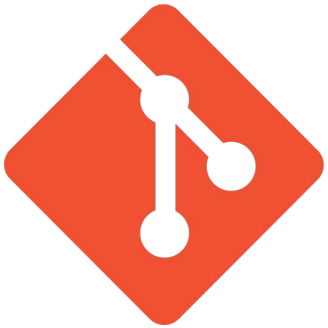
Blackboard and Course Communication: All announcements, assignments, submissions, grades, and recordings will be managed through Blackboard. Course materials and additional resources will be provided at Course Website. Students are expected to check Blackboard and Course Website regularly.

Attendance and Participation: Attendance and participation requirements apply to both in-person and online students. Participation may include in-class activities, Zoom engagement, or completion of assigned online activities, depending on the week.

Recording Notice: Live class sessions may be recorded for instructional purposes and made available to enrolled students. If you have concerns related to accessibility or privacy, please contact the instructor early in the semester.

Technical Support: For technical issues related to Zoom, Blackboard, or login problems, contact GVSU IT Services at it@gvsu.edu or (616) 331–2101.

Programming Tools



git

Debugger (in browser)

docker

Recommended

Programming Tools

Visual Studio

Visual Studio Code

Academic Resources

- **The writing center:** The Fred Meijer Center for Writing, with locations at the Allendale and Pew/Downtown Grand Rapids campuses, is available to assist you with writing for any of your classes. For more information about these services and locations, please visit their website: http://www.gvsu.edu/wc/
- **Speech lab:** The Grand Valley Speech Lab is a peer-to-peer communication center that helps students with all elements of oral presentations. For more information about this service, please visit their website: https://www.gvsu.edu/speechlab/

Academic Resources

- **Research consultants:** The Center for Scholarly and Creative Excellence (CSCE) promotes a culture of active, engaged, ethical scholarship. It supports innovative faculty and student research and collaborative partnerships in the broader community. For more information, please visit their website: https://www.gvsu.edu/csce/
- **Library:** GVSU's library offers a vast collection of online resources available for students. Visit their website for more details: https://www.gvsu.edu/library/
- **Disability support resources:** If any student in this class has special needs because of a disability, please contact Disability Support Resources at http://www.gvsu.edu/dsr/ (DSR) at 616-331-2490.

Tentative Course Content

☞ **January 19, 2026 Martin Luther King, Jr. Day Recess:** No class!

☞ **March 8–14, 2026 Spring Break:** No class!

Week	Topics Covered
1	Syllabus, course overview, development environment setup (Docker), HTML, Quiz 1
2	**Martin Luther King, Jr. Recess (No Class)**
3	CSS fundamentals, CSS Grid and Flexbox, Assignment 1, Quiz 2
4	TypeScript fundamentals, Quiz 3
5	Term project introduction, TypeScript (advanced topics)
6	TypeScript (continued), Quiz 4
7	HTTP fundamentals, JavaScript modules, Vue.js fundamentals, Assignment 2
8	Vue.js (continued), Promises and asynchronous programming, Quiz 5
9	**Spring Break (No Class)**
10	State management with Pinia, Assignment 3
11	Vuetify (UI components and layout), Quiz 6
12	Vue Router, Assignment 4, Quiz 7
13	Cloud database integration with Firestore, Firebase Authentication
14	Fetch and Axios, ExpressJS overview, Assignment 5
15	Project studio: milestone integration, performance checks, deployment preparation, presentation preparation
16	**Final Project Presentation (Week of April 27)**

Course Website

***subject to change throughout the semester**

Warming Up

- Individual introduction
  - Name and what do you want to be called
  - Describe your background and experience in web development.
  - Specific topics you seek to learn from this class

About Me

- You can call me Dr. Zhuang (draw on), or Yong (you own)
- Education:
  - Ph.D., M.S. in Computer Science from the University of Massachusetts
- Experience/Interests:
  - My research interests include web application design, machine learning, and data mining.
- Personal Interests:
  - I enjoy spending time in city parks, hiking, and playing board games with friends and family.