

Developing Advanced Web Apps

CSCI 4208 | Section 001 | Fall 2025

Instructor:



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Online Delivery (Weekly):

Lectures (*Theory-based*) | Live Lecture | Math 322

- CSCI concepts explained with example code w.r.t. web applications
- Students are expected to participate in live lectures.

Lectures (*Application-based*) | Live Lecture | Math 322

- Monday, Wednesday 5:00 pm - 6:15 pm
- Mandatory participation, Live coding demo sessions

Student Hours & Discussions | Real-time Chat | Discord

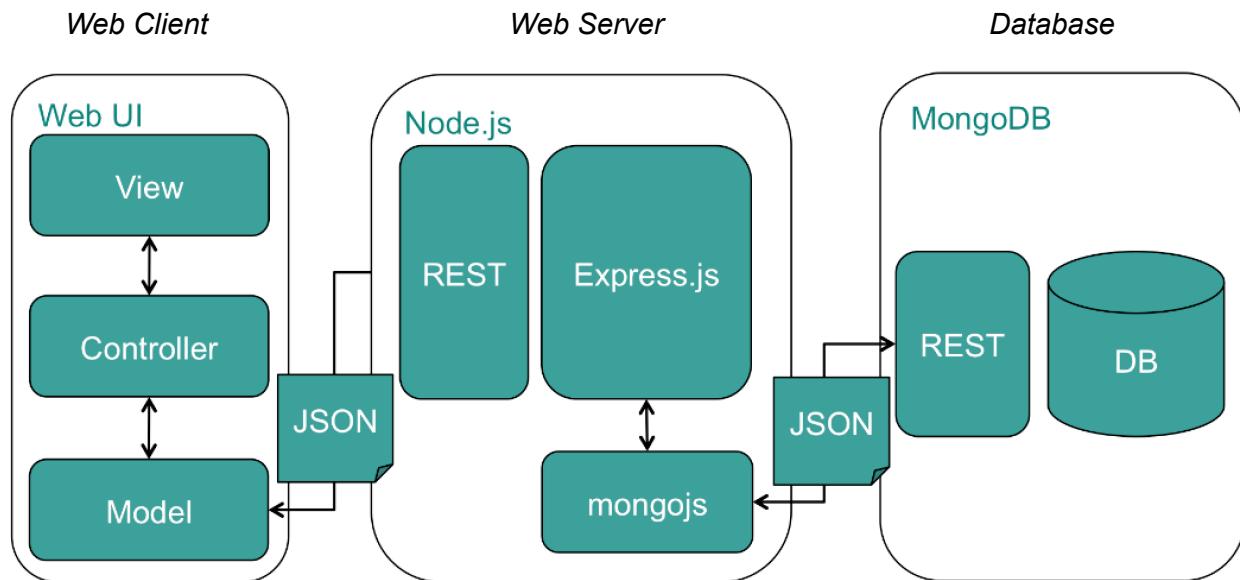
- Persistent Communications (Text, Voice, Video)
- Mandatory participation
- Anytime (24/7)

Prerequisite:

- CSCI 2125 (*Data Structures*) or CSCI 2467 (*Systems Programming*)

Course Description

The design and implementation of advanced web-based applications. Topics covered typically include: HTTP protocol, multi-tier architectures, technologies for server-side and client-side implementation, database connectivity, JSON, session handling, web services, scalability, and security in the web context. Substantial programming project involving the development of a database-backed web application.



Resources:

The course content is derived from the following textbook and supplemental online instructional resources:

Textbook	No required textbook. All reading material will be posted to Moodle.
Frontend Docs	Mozilla Developer Network (https://developer.mozilla.org/en-US/), W3Schools (https://www.w3schools.com/),
Backend Docs	Node (https://nodejs.org/en/docs/) Express (http://expressjs.com/) React (https://reactjs.org/) Mongo (https://docs.mongodb.com/guides/)

Learning Objectives

The course material may be broken down into three different conceptual units

Unit 1: Frontend Web Apps

HTML	Elements, Attributes, Inputs, Forms, Classes, IDs, Markup
CSS	Selectors, Properties, Declarations, Grid & Flexbox, Bootstrap
JavaScript	Variables, Data types, Expressions, Operators, Conditionals, Iteration, Functions, Data Structures, Prototypes, Inheritance and Object-Oriented, ES6 syntax, Modular JS, Events, Event Handling, Event Loop, Functional programming
Browser API	DOM, Local Storage, Sessions, Cookies
REST	asynchronous programming, request data from web server, promises, async, await, http
React	Virtual DOM, Components, State, Renderer, Props, JSX, Keys, Redux
Testing	Browser console debugging

Unit 2: Backend Web Apps

NPM	Node Package Manager, App configuration with package.json
Node	OS-level JavaScript Runtime Environment
Express	Handling HTTP Requests, Responses, Web server & routing, Data validation
Passport	User authorization and authentication, Password Management & Salting
REST	Microservice Architecture, Representational State Transfer, JSON, URL Encoding
Testing	Unit testing, integration testing using Postman and curl

Unit 3: Database Integration

MongoDB	Data persistence, Document-based Storage
CRUD	Create, Read, Update, Delete Operations for database fields

Course Grading

Grading Rubric

Type	Description	%
Standup Talks	Peer-led open discussion of students' work on the underlying conceptual ideas for their implementations.	20
Practical Labs	Weekly projects where students follow step-by-step instructions to implement web-based technologies.	25
Coding Homework	Larger-scale software design & development challenges where students must utilize their skills to implement unique web applications.	25
Final Project	Final capstone of the course. It will be a full-stack application of your design	30

Final Letter Grades

A: >= 90, B: 80 - 89, C: 70 - 79, D: 50 - 69, F: < 50. The "I" grade (for Incomplete) is given only in exceptional circumstances.

Academic Dishonesty

The University's policy regarding academic dishonesty (<https://www.uno.edu/media/15321>). Academic dishonesty includes cheating, plagiarism, and collusion. In the event of academic dishonesty, the student will be assigned a grade of 0 on the exam or exercise, the student will be informed in writing of the action taken, and a copy of this letter will be sent to the Assistant Dean for Special Student Services.