

Course Syllabus: INFO 6250 - Online - 17695 - 03

Web Development: Tools and Methods

Fall Semester 2025 - Thu

Instructor: Brett Ritter <b.ritter@northeastern.edu>

Course Description

This course covers Web Development, focusing on both the fundamentals and from them modern development practices for the web. The class will use Javascript on both the front- and backends of web application development, but the lessons learned will be applicable to many languages.

Topics Covered

- Basic git use as a version control system for shared applications and development
- Core MVC and state concepts for both server generated HTML and client-side managed HTML
- Core concepts of RESTful Web Service development
- Modern JS development for the frontend (both "vanilla" JS and React-based)
- NodeJS development of a backend end, both server generated content using the express framework (minimal) and RESTful service development
- Basic Debugging Techniques
- Web security fundamental practices, both front- and back-end
- The basics of how many development teams breakdown application needs and complete work

What is NOT covered

- How to program in general
- HTML and CSS details (My INFO6150 course is a great source of info here)
- Languages other than Javascript (focus is on concepts)
- Mobile specific development
- Accessibility (a11y), Internationalization (i18n), or Localization (l10n)
- SQL/NoSQL usage or database architectures/maintenance
- Specific Libraries: Focus is on concepts and not the diverse but temporary library options

Basic Requirements and Expectations:

- Basic exposure to programming concepts (variables, functions, looping) is assumed
- You will have to use git and github.com following the instructions given
- There is no textbook for the class, but a number of online articles will be shared
- Many topics will be introduced in class but require you to perform additional research/experimentation
- Additional software (without cost) is required. Installation and configuration is your responsibility (Mac, Windows, or *nix)
- Students should ask questions where anything is unclear
- A great deal of work will be done online, in and out of class

Expected Class Schedule (subject to change):

Section 1: Web Fundamentals

Section 1 Schedule

- Thu Sep 4
- Thu Sep 11
- Thu Sep 18
- Thu Sep 25
- Thu Oct 2

Section 1 Topics

Class 1: Start of Web Fundamentals (Section 1)

- About the Course
 - Why WebDev is Awesome

- Core Course Concepts
- Github Repos
- Slack Workspace
- Do Not Copy Work Policy
- Introduction to the Web
 - Clients + Servers
 - The roles of HTML/CSS/JS
 - Static vs Dynamic content
 - HTTP Request/Response
- Introduction to Git

Class 2: HTML/CSS

- HTML Syntax and Role
 - Semantic HTML
- CSS Syntax and Role
 - Semantic CSS
- Using HTML
- Using CSS
- Using a Static Server

Class 3: Intro to JS

- Static vs Dynamic Typing
- Strong vs Weak Typing
- JS Syntax

Class 4: Writing an Express web server

- Using Node
- Using NPM
 - JSON (JavaScript Object Notation)
 - package.json
 - semver
 - Dependencies
- Using Express
- Writing a Server Generated Chat App
 - HTML Forms

Class 5: Sessions and Logins

- Sessions
- Debugging
- Server Security
 - Authentication and Authorization
 - Injection Attacks (XSS, SQL)
 - Password Hashing/Salting

At the end of Section 1 you should be able to write a simple multiple page web application (dynamic website) using NodeJS that serves semantic HTML and styles with CSS. You will receive from github repository updates and submit your work via Pull Requests (PRs) in the same fashion that many employers conduct their work.

Server Side Project (project1) Due

Wed Oct 15, 11:59pm

Section 2: Web Frontend

Section 2 Schedule

- Thu Oct 9
- Thu Oct 16
- Thu Oct 23
- Thu Oct 30
- Thu Nov 6

Section 2 Topics

Class 6: Client Side JS and RESTful Services

- The DOM
- Front End Validation with JS
- Front End State
 - Explicit State vs State in DOM
- Front End Tools
 - Linters
 - Prettier
 - Minification
 - Transpilers

- Bundlers

Class 7: Client Side Dynamic Rendering

- "Building"
 - Babel
 - Webpack
- Client Rendering from State

Class 8: Calling Web Services

- Single Page Applications
- Async JS
 - Promises
- Fetch
 - Calling Services
 - Parsing Results
 - Using Results

Class 9: RESTful Services

- Service Basics
 - Endpoints
 - Sending/Receiving Data
 - Conventions (REST, GraphQL, etc)
- Core REST Concepts
 - URL as a Resource
 - HTTP Method as Interaction
 - Status as Result of Interaction
- Writing RESTful Services in Express
- Calling RESTful Services from Client JS

Class 10: Services Review

- Review the core points from Section 2

At the end of Section 2 you should be able to write a simple single page web application (SPA) using "vanilla" JS that can make use external web service endpoints. You should also be able to write RESTful services using NodeJS. Your SPA can call your RESTful service endpoints to create a full stack application.

Vanilla JS Project (project2) Due

Wed Nov 12, 11:59pm

Section 3: The Recent Web (React)

Section 3 Schedule

- Thu Nov 13
- Thu Nov 20
- Thu Nov 27
- Thu Dec 4

Section 3 Topics

Class 11: Start of React (Section 3)

- Using Vite for React
- React Components
- React State
- React MVC
- React State and Pages

Class 12: Making Service Calls with React

- Proxies
- React Service Calls
- React Hook: useEffect
- useEffect and Service Calls?

Class 13: React State Management

- React Hook: useReducer
- React Hook: useContext
- React Deeplinking

Class 14 (if available): After INFO 6250

- Now What?
- Getting Hired
- Your Future Team

- Projects
- Agile SDLC

At the end of Section 3 you should be able to write a simple single page web application (SPA) using React JS and call RESTful webservices you also write. In development you will use a forwarding proxy to manage multiple servers, and in production both your services and your static documents will use the same server.

Final Projects Due

- NO EXTENSIONS FOR FINAL PROJECT!

Final Due: Mon Dec 8, 11:59pm

No class Thu Dec 11 (just Project due Mon Dec 8, 11:59pm)

Grading: I reserve the right to adjust based on your final demonstration of applied knowledge.

15% Assignments (lowest score ignored)
10% Quizzes (lowest score ignored)
25% Server-side Project
25% Vanilla JS Project
25% Final React Project

Grading Scale

The letter grade for course is decided by the percentage of their total score compared to the possible score. This is the grading scale recommended by the department:

- 95-100% A
- 90-94.9% A-
- 87-89.9% B+
- 84-86.9% B (yes, the threshold for an A is different)
- 80-83.9% B-
- 77-79.9% C+
- 74-76.9% C
- 70-73.9% C-
- 69.9% or below F

Attendance Policy

Students are expected to attend the weekly class sessions (in-person in the classroom) and ask questions whenever the lectures are unclear to them. Barring emergencies, any absences must be requested and approved in advance. Students registered in MGEN courses (INFO, CSYE, and DAMG) are allowed a maximum of 2 absences per course, with 3 or more absences resulting in an automatic 'F' for that course. Students are expected to inform their instructors of any absences in advance of the class; if a student is sick long-term or experiences a medical issue that prevents class attendance, it is strongly encouraged that they speak with their Academic Advisor (coe-mgen-gradadvising@northeastern.edu) to learn more about the Medical Leave of Absence. Should a student anticipate being unable to attend 3 or more classes, they should discuss their situation with their Academic Advisor to explore other types of leave in accordance with the University's academic and global entry expectations. International students should review the Office of Global Services webpage to understand their visa compliance requirements.

Teaching Assistants (TAs) will be present at each class to collect student attendance.

Late Work Policy

- Students are expected to complete the weekly assignments between classes and submit to their class Github repositories by the deadline (normally before the day of the next class)
- Students are expected to complete the weekly Canvas-based quizzes between classes and submit online before the deadline (normally before the day of the next class)
- Students are expected to complete the course projects between classes and submit to their class Github repositories by the deadline (normally before the day of the next class)

Students must communicate with the faculty prior to the deadline if they anticipate work will be submitted late. Work submitted late without prior communication with faculty will not be graded. Late work submitted WITH prior communication is either granted an extension (no grade penalty) OR will be graded with a penalty and only graded after on-time assignments are graded, time-permitting. Any submission that was not granted an extension has no guarantee that it will be graded.

End-of-Course Evaluation Surveys

Your feedback regarding your educational experience in this class is particularly important to the College of Professional Studies. Your comments will make a difference in the future planning and presentation of our curriculum.

I, as the instructor, value all feedback and use it to shape further improvements in the course.

At the end of this course, please take the time to complete the evaluation survey at <https://neu.evaluationkit.com>. Your survey responses are completely anonymous and confidential. For courses 6 weeks in length or shorter, surveys will be open one week prior to the end of the courses; for courses greater than 6 weeks in length, surveys will be open for two weeks. An email will be sent to your Husky Mail account notifying you when surveys are available.

Academic Integrity

A commitment to the principles of academic integrity is essential to the mission of Northeastern University. The promotion of independent and original scholarship ensures that students derive the most from their educational experience and their pursuit of knowledge. Academic dishonesty violates the most fundamental values of an intellectual community and undermines the achievements of the entire University.

As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, examinations of whatever kind, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Students are responsible for learning the conventions of documentation and acknowledgment of sources in their fields. Northeastern University expects students to complete all examinations, tests, papers, creative projects, and assignments of any kind according to the highest ethical standards, as set forth either explicitly or implicitly in this Code or by the direction of instructors.

Go to <http://www.northeastern.edu/osccr/academic-integrity-policy/> to access the full academic integrity policy.

MGEN Student Feedback

Students who would like to provide the MGEN unit with anonymous feedback on this particular course, Teaching Assistants, Instructional Assistants, professors, or to provide general feedback regarding their program, may do so using this survey:

https://neu.co1.qualtrics.com/jfe/form/SV_cTIAbH7ZRaaW0Ki

University Health and Counseling Services

As a student enrolled in this course, you are fully responsible for assignments, work, and course materials as outlined in this syllabus and in the classroom. Over the course of the semester if you experience any health issues, please contact UHCS.

For more information, visit <https://www.northeastern.edu/uhrs>.

Student Accommodations

Northeastern University and the Disability Resource Center (DRC) are committed to providing disability services that enable students who qualify under Section 504 of the Rehabilitation Act and the Americans with Disabilities Act Amendments Act (ADAAA) to participate fully in the activities of the university. To receive accommodations through the DRC, students must provide appropriate documentation that demonstrates a current substantially limiting disability.

For more information, visit <https://drc.sites.northeastern.edu>.

Library Services

The Northeastern University Library is at the hub of campus intellectual life. Resources include over 900,000 print volumes, 206,500 e-books, and 70,225 electronic journals.

For more information and for education specific resources, visit <https://library.northeastern.edu>.

24/7 Canvas Technical Help

For immediate technical support for Canvas, call 617-373-4357 or email help@northeastern.edu

Canvas Student Resources: <https://canvas.northeastern.edu/student-resources/>

For assistance with my Northeastern e-mail, and basic technical support:

Visit ITS at <https://its.northeastern.edu>

Email: help@northeastern.edu

ITS Customer Service Desk: 617-373-4357

Outreach, Engagement, Belonging

Northeastern University is committed to fostering a community of belonging, which is essential to the advancement of Northeastern University's mission of teaching and research. Our university is stronger as a result of the varied backgrounds, experiences, and perspectives that all members of our global community bring to the pursuit of knowledge. Embracing this pluralism is not the work of one office, department, or academic unit. It is a shared responsibility that spans disciplines and boundaries. By harnessing the power of our differences, we will continue to light the path to bold new ideas and life-changing discoveries.

It is my intention that students from all backgrounds and perspectives will be well served by this course, and that the diverse experiences that students bring to this class will be viewed as an asset. I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, socioeconomic background, family education level, ability – and other visible and nonvisible differences. All members of this class are expected to contribute to a respectful, welcoming and belonging environment for every other member of the class. Your suggestions are encouraged and appreciated.

Title IX

Title IX of the Education Amendments of 1972 protects individuals from sex or gender-based discrimination, including discrimination based on gender-identity, in educational programs and activities that receive federal financial assistance.

Northeastern's Title IX Policy prohibits Prohibited Offenses, which are defined as sexual harassment, sexual assault, relationship or domestic violence, and stalking. The Title IX Policy applies to the entire community, including male, female, transgender students, faculty, and staff.

In case of an emergency, please call 911.

Please visit <https://www.northeastern.edu/ouec> for a complete list of reporting options and resources both on- and off-campus.