



Course Syllabus - INST377 - Spring 2020

Dynamic Web Applications

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INST377
Spring 2020

Catalog Description

This course will be an exploration of the methods, tools, and processes for developing dynamic, database-driven user interfaces and websites, which will cover an end-to-end process to build a web application. This includes acquiring, installing, and running web servers, database servers, and web applications.

Extended Course Description

This course will introduce methods and tools for developing application layers that include both front-end and back-end of a web-based system. This course will cover acquiring, installing and running web servers, database servers, and web applications. This course will also cover methods, skills, and processes for developing and maintaining application layers that allow end-users to interact with underlying databases through dynamic web interfaces.

Learning Outcomes

Upon completion of the course, students will be able to:

1. Build dynamic web interfaces that allow a wide range of users to interact with underlying databases.
2. Articulate the basic approaches and key development elements for building databases and dynamic user interfaces.
3. Acquire, install and maintain a web server as a stand-alone component or as part of a bundled software distribution.
4. Acquire, install and maintain applications that facilitate interactions between different layers of the application or site architecture.
5. Articulate the relationships between server and client-side technologies including web servers, API layers, JavaScript, CSS, and HTML.
6. Identify security issues in dynamic web applications and develop approaches to address them.
7. Maintain code versions and update servers using Git version control.
8. Understand universal usability and how it applies to web applications
9. Explain how programming is situated in and reflects social issues (e.g. racism or sexism) and describe actions that individuals or organizations are taking to counteract inequities in software and programming/technical organizations.

Class Meets

Section 0102
T/H 9:30am – 10:45am
HBK #0302J

Section 0101
T/H 5:00pm – 6:15pm
HBK #0302J

Office Hours

T/H, 11am-Noon,
HBK 4111G
& by appointment calendar

Teaching Assistants

Malcolm Moore
mvmoore@umd.edu

AMPs

Francis Ogbennah - 101
Nathan Kwon - 101
Joshua May - 102

Prerequisites

INST 327

Antirequisite

INST 407
CMCS 122

Course Communication

Announcements relating to this course will be made in the courses ELMS page and in-class.

Messages should be via ELMS

Required Resources

Course website: elms.umd.edu

Textbook/Readings

- [Mozilla Developer's Network - Learn Web Development](#)

Hardware

- A paper book to write notes in
- Pencil or pen, bring to every class
- A charged laptop computer capable of running Minecraft at 60fps with medium settings
 - ([Link to check your benchmark](#))

Software

1. Node.js and NPM installed
2. A Github account at github.com
3. Github Desktop or the Git CLI
4. VSCode
 - a. <https://code.visualstudio.com/>
 - b. The Rainbow Brackets extension for VS Code
 - c. Live Server extension by Ritwick Dey
 - d. Prettier plugin by Esben Petersen
5. ESLint installed globally and the ESLint plugin for VSCode
6. A shell client, such as bash, Windows PowerShell, or OSX Terminal

Other Resources

- Mozilla Developer's Network: <https://developer.mozilla.org/en-US/docs/Web>
- Code Academy: Getting Started With Javascript: <https://www.codecademy.com/learn/introduction-to-javascript>
- CSS Zen Garden: <http://www.csszengarden.com>
- Oh Shit, Git: <https://ohshitgit.com/>
- Github guides: <https://guides.github.com/>
- Wizard Zines: <https://wizardzines.com/>

Course Activities and Assessments

This course is assembled around an active learning model, where you will have a lecture and then some time to work on lab activities in-class. If you choose not to attend class, it may be challenging to complete lab assignments, as there are details covered in lecture which cannot be effectively reproduced with slides - or web documentation - alone.

You will be expected to do research outside of class, using the class readings and lectures as a jumping-off point for your explorations within the supplemental resources listed for the class. Web development is an evolving practice, and things which may be true one month may be completely changed by the time term has completed: your best skill is your ability to look it up.

Labs

Each lab in the term builds on the last. Our understanding in the class is that while you will work in collaboration with others to understand the code, you will submit and be graded on your own individual work. Labs lose two points or between ten and twenty percent for late submission.

Labs cannot be submitted without an exemption once they lock.

Lectures

The early part of our class is lecture dependent. Please arrive in class on time and prepared to participate. Your laptop is expected to be closed during lecture until such time as we are walking through the labs. You may use your laptop in the latter part of class for class activities such as note-taking, referencing an e-copy of the book, or running class exercises.

Messaging Services

Don't use messaging services during lecture. Taken alongside other elements of class accomplishment, it may impact your grade.

Rather than using messaging services during class, please take advantage of the **required** paper and notebook, and practice drawing wireframes, long spirals where no line touches itself, and small cartoons. In addition to bringing your mind back to the lecture at hand, this will increase your ability to control a pen, and from there your ability to render a web interface clearly for prototyping.

You are requested to place your phone within your bag on arrival to class.

Quizzes

There will be quizzes throughout term to test your comprehension of reading assignments and lecture. Quizzes are individual work designed to cover material from class. All quizzes are due by the date indicated on ELMS, and some quizzes may have a completion time limit.

Assignment Submission

You will be expected to submit working links to your complete labs, using your Github or Github Pages account. You will then be marked both on your code and whether your code works as expected within a browser environment. Please submit your work by the due date listed on the assignment - as covered in our grading policy, work that is more than ten days late will receive a zero. If an assignment due date is a religious holiday for you, please let the instructor know as soon as the assignment is announced so that an alternate due date can be set for you.

Group Project

Students will work in 3-to-5 person teams and build a non-trivial web-enabled application over the semester. The final project will involve identifying an end-user need for interacting with a remote API, determining the requirements for the application that will facilitate the interaction, developing a deadline-oriented plan for building the application, and coding and documenting the application. Groups will be asked to find and articulate their own project topics, but they may seek the instructor's input whilst identifying possible topics and choosing which topic to be used.

Students can show preferences for group mates, but the instructor may finalize project groups based on diversity in skill sets and career goals. The instructor will provide more details on the project in the class.

Grading

- All grades are earned based on a rubric, which establishes *minimum* project requirements. Maximum grades are achieved by not only accomplishing the minimum, but accomplishing the designated tasks to a high level.
- Your grades assessed based on class assignments, which are attached to a grading rubric.
- All assessment scores will be posted on the course ELMS page.
- You are graded in this class by TAs and GAs. You should consult with your section's TA before consulting the instructor about any questions to do with grading.
- If you would like to review any of your grades, or have questions about how something was scored, please email me to schedule a time for us to meet in my office.
- I am happy to discuss any of your grades with you, and if there is a mistake, I will immediately correct it.
- Any formal grade disputes must be submitted in writing and within one week of receiving the grade.
- Final letter grades are assigned based on the percentage of total assessment points earned.

Learning Assessments	Weight
Participation	5%
Exams	10%
Quizzes	10%
Independent Assignments	20%
Labs	25%
Group Project	30%

Late Submission Policy

If an assignment due date is a religious holiday for you or you have any serious issues that prevent you from meeting the due date, please let the instructor know as soon as the assignment is announced, so an alternate due date can be set. This notification should be made within 24 hours after the assignment is announced. Otherwise, there will be no adjustment in the due date.

If a lab or quiz has been locked, it cannot be submitted without an exemption.

Basic Needs Security

If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live and believe this may affect your performance in this course, please visit go.umd.edu/basic-needs for information about resources the campus offers you and let me know if I can help in any way.

Syllabus Change Policy

This syllabus is a guide for the course and is subject to change with advance notice.

CourseEvalUM

Course evaluations are a part of the process by which the University of Maryland seeks to improve teaching and learning. The University Senate approved the implementation of a standard, online, University-wide course evaluation instrument. Each course evaluation contains a set of universal questions, and some are supplemented by questions from specific colleges. Across the University, course evaluations are being administered through a web-based system dubbed CourseEvalUM. Students who leave no "Pending" evaluations in their Evaluation Dashboard each semester can view the aggregate results of a subset of universal items online.

Across the University, course evaluations are being administered through a web-based system dubbed CourseEvalUM. All information submitted to the Evaluation System is confidential. Instructors and academic administrators can only view summarized evaluation results after final grades have been submitted. Instructors and academic administrators cannot identify which submissions belong to which students. This standardized set of evaluation results provides the University with useful information on teaching and student learning across the campus.

For additional info see Student Fast Facts at:

https://www.irpa.umd.edu/Assessment/CourseEval/stdt_faq.shtml

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Professional Conduct

This course has a zero-tolerance policy for unprofessional behaviour. Severe violations of professional decorum or professional behaviour will be referred to the office for Student Conduct at my discretion, and may result in consequences ranging from a reduction in marks to a course failure.

Unprofessional conduct includes but is not limited to:

- Use of cellphones in class for purposes other than two-factor authentication
- Harassment or mistreatment of peers during group work
- Any type of plagiarism or lack of citation for shared work

Names/Pronouns and Self Identifications

The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.). The pronouns someone indicates are not necessarily indicative of their gender identity. Visit trans.umd.edu to learn more.

Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all your fellow Terps.

Tentative Course Schedule

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This is a tentative schedule, and subject to change as necessary – monitor the course ELMS page for current deadlines. In the unlikely event of a prolonged university closing, or an extended absence from the university, adjustments to the course schedule, deadlines, and assignments will be made based on the duration of the closing and the specific dates missed.

	DATE	THEME	Topics	Readings	Assignments
1	Jan 27-31	GETTING SET UP: Installing software to succeed as a developer HTML 1: Publishing On The Web	<ul style="list-style-type: none"> ➤ Introduction & Overview ➤ Setting Up Your Local Dev Environment: Source control & Git. ➤ What is a server? What is HTML? 	<ul style="list-style-type: none"> ➤ Getting Started With The Web at MDN, from Installing Software through to CSS Basics. 	<ul style="list-style-type: none"> ➤ Plan and write your first HTML/CSS page using MDN ➤ Get that page into your new Github Pages account.
2	Feb 3 -7	HTML 2: What is a markup language? HTML page structure HTML 3: Accessibility and semantic tagging vs class naming	<ul style="list-style-type: none"> ➤ What Is HTML? ➤ Introduction to the DOM 	<ul style="list-style-type: none"> ➤ Introduction to HTML at MDN 	<ul style="list-style-type: none"> ➤ HTML Layout Lab 1: Letter Markup
3	Feb 10 - 14	CSS 1: Selectors and styles CSS 2: Flexbox and Responsive Websites	<ul style="list-style-type: none"> ➤ Cascading Style Sheets: Styling ➤ Introduction to CSS selectors and the DOM 	<ul style="list-style-type: none"> ➤ CSS First Steps at MDN ➤ Flexbox at MDN ➤ Introduction to the Document Object Model at MDN 	<ul style="list-style-type: none"> ➤ Complete Flexbox Froggy ➤ HTML Layout Lab 2: Structure Page Content
4	Feb 17 - 21	Javascript 1 Javascript 2	<ul style="list-style-type: none"> ➤ Selectors in Javascript ➤ Variables, Data Types, Operators ➤ Introduction to Group Project 	<ul style="list-style-type: none"> ➤ Getting Started With The Web: JavaScript ➤ MDN - Javascript - First Steps 	<ul style="list-style-type: none"> ➤ Lab 4 - Selectors and Strings ➤ DUE: HTML/CSS Assignment 1: Your Resume, In Flexbox ➤ Group Project: Pick Your Teams

5	Feb 24 -28	Javascript 3 Javascript 4	<ul style="list-style-type: none"> ➤ Functions, Conditionals, Loops, Functional Programming Basics ➤ Introduction to Events ➤ ES6: Fat Arrow/Lambda Functions 	<ul style="list-style-type: none"> ➤ MDN - Javascript - Building Blocks ➤ MDN - Manipulating Documents in the Browser ➤ Map, Filter, and Find at MDN 	<ul style="list-style-type: none"> ➤ Lab 5: Loops And Functions ➤ Group Project: Team Contracts Due
6	Mar 2 - 6	HTML 4 - Forms And Interactivity	<ul style="list-style-type: none"> ➤ HTTP methods ➤ HTML Forms 	<ul style="list-style-type: none"> ➤ MDN Your First Form ➤ Group Project Topic Discussions 	<ul style="list-style-type: none"> ➤ Lab 6: HTML Forms - Sending A Post Request ➤ Mini Groups: Assignment #2 - Image Gallery due
7	Mar 9-13	Javascript 5 Javascript 6	<ul style="list-style-type: none"> ➤ Javascript 5 - Objects & JSON ➤ AJAX and Web APIs 	<ul style="list-style-type: none"> ➤ MDN - Object Basics ➤ Working With JSON at MDN 	<ul style="list-style-type: none"> ● Lab 7 - JSON & Session Storage
	Mar 16-20	SPRING BREAK	SPRING BREAK	SPRING BREAK	SPRING BREAK
8	Mar 23-27	Basic Data Visualization in Web Applications (Loading data across platforms)	<ul style="list-style-type: none"> ➤ MIDTERM EXAM ➤ Front End Web Libraries ➤ Leaflet.io 	<ul style="list-style-type: none"> ➤ MDN - Client-side Web APIs - Fetching Data ➤ UMD.io docs 	<ul style="list-style-type: none"> ➤ Group Project: Midterm Project Proposals Due ➤ Lab 8 - Client-Side Libraries - Maps and Plugins
9	Mar 30 - Apr 3	Hosting A Web Application Package Managers and Modules	<ul style="list-style-type: none"> ➤ Fetch API 	<ul style="list-style-type: none"> ➤ MDN - Server Side Website Programming ➤ MDN - The Express Framework - Routes 	<ul style="list-style-type: none"> ➤ Basic Final Project Wireframe Walkthrough Due ➤ Group Wireframe/ Feedback Replies ➤ Lab 9 - Fetch Requests (HTTP methods in JS)
10	Apr 6-10	Integrating SQL and External Data Sources Last Week For A "W" Withdrawal	<ul style="list-style-type: none"> ➤ Building An API on a server using Express 		<ul style="list-style-type: none"> ➤ GROUP PROJECT PITCH PRESENTATION ➤ Lab 10 - Building An Express Server (Server-side dependencies and Package.json)

11	Apr 13-17	Advanced Topics - Systems Administration Online	➤ Heroku Integration- Hosting an app using web CI		➤ Lab 11 - Deploying To Heroku
12	Apr 20-24	Advanced Topics - Single-Page Web Apps	● Group project meetings w professor		
14	Apr 27-1	Advanced Topics -	● Group project meetings with professor		
15	May 4-8	Final Presentations	➤ FINAL EXAM ➤ Final Presentations	➤ FINAL EXAM ➤ Final Presentations	➤ FINAL EXAM ➤ Final Presentations