Web Application Programming
Unity and Diversity

CS472
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Web Application Programming: Unity and Diversity

Course Overview

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Theme I: HTML, CSS, and JavaScript – Life is Structured in Layers						
Week 1	HTML	CSS	Intro to JavaScript	Execution Context & Closure	Call Context	Class & Constructor Function
Theme II: Server-Side Programming with Node.js & Express.js - Every Action has a Reaction						
Week 2	Asynchronous programming	Node.js	Modules	Review	Self-Study	Midterm Exam
Theme III: Client-Side Programming – Faster Reaction Time						
Week 3	Express.js	REST	React Intro	Communication	TypeScript	Review
Theme IV: Integrating all parts together - The Whole is Greater than the Sum of the Parts						
Week 4	Final Exam	Project	Project	Project Presentation		

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A dominant feature of the World Wide Web that has made it the most successful computing platform on the planet is that there is a single unifying protocol that underlies and connects all applications running on the WWW throughout the entire world. The Hypertext Transfer Protocol (HTTP) is used by all servers and browsers on the WWW. HTTP is a simple set of rules that allows every one of the billions of hosts running on the WWW to have access to every other host. It is this simple underlying unification mechanism that has made web applications the predominant form of delivery for modern software applications.

Web applications are an example of a system of almost infinite diversity and complexity that has arisen based on an underlying unifying mechanism. This is a concrete computing example of a similar law of nature from the science of physics and Maharishi's Science of Consciousness. In physics all the diversity of the physical world arises from the underlying *unified field* of physics. In the 1970's and 1980's physicists traced all forces in the universe back to four fundamental forces or fields of nature (gravity, electromagnetic, weak and strong nuclear forces). Now these four fields are integrated into a single field known as the unified field. According to Maharishi's science of consciousness this unified field is the same as the field of pure consciousness or pure awareness that we experience in our daily practice of the Transcendental Meditation Program.

When our thoughts and actions are connected to this level of pure consciousness, they are naturally in accord with the laws of nature guiding the entire universe. They will tend to be successful like the WWW's success in becoming the predominant computing platform in the world.

Course Goals

This course provides a systematic introduction to programming interactive and dynamic web applications for individuals with little or no prior web application programming experience. At the completion of the course, you will be proficient in designing and writing the following:
- HTML to specify webpage content.
- CSS to specify website styling and layout.
- JavaScript as a functional language for making web pages responsive.
- Node.js and Express.js for creating dynamism in websites.
- React is the library for the user interfaces.
- TypeScript extends JavaScript by adding Types to the language.

Client-Side Course Objectives

- Design and write web pages including proper separation of content in HTML, styling in CSS, and processing in JavaScript.
- Write CSS selection rules with understanding of CSS cascade, inheritance, and specificity rules.
- Create sophisticated responsive layouts using box-model, flexbox, and grid.
- write JavaScript using functional programming techniques, closures, and inheritance via prototypes and function constructors.
- Understand JavaScript scope, execution context, scope chain, and event loop.
- Use the Fetch API to implement responsive web applications.
- Create the User Interface using the basics of the React

Server-Side Course Objectives

- Design and develop web applications with a deep understanding of concurrency.
- Clearly understand the different purposes of browser versus server-side code.
- Design and develop web applications with a deep understanding of runtime environments, containers, and concurrency.
- Use Node.JS and Express.JS to implement full-stack, TypeScript-based, server-executable webapps.
- Use Fetch API to interact with and send/receive data to/from a Server-side component (Node.js or some other back end), especially as part of a single page web application (SPA). Clearly understand the different purposes of browser versus server- side code.

How You Will Accomplish the Objectives
Preview the slides and reading, attend lectures, complete readings and answer quiz questions.

How You Will Demonstrate You Have Accomplished the Objectives
Complete homework labs and write small applications on exams.

Resources - Official Documentations

- https://www.w3schools.com
- https://developer.mozilla.org
- https://javascript.info   The Modern JavaScript Tutorial, 2007 - 2024 by Ilya Kantor.
- https://www.typescriptlang.org
- https://nodejs.org
- https://expressjs.com
- https://react.dev

Class Attendance

Attendance at all classes is required, because all elements of class — lectures, questions and answers, discussions, laboratory work — contribute to the learning process. Absences are usually excused only if you are sick in bed or have a family emergency.

If you must miss a class, please let your instructor know ahead of time. Call, send an email, or send me a note with your friend. There is no such thing as a personal day. If you have personal business to take care of, please schedule it for after class or during the days between blocks. At the same time, it may occasionally be necessary for you to miss a class (or part of a class) for some reason other than illness or family emergency. Please speak with the instructor beforehand, who will be open to considering your needs.

The first lesson of each course is the most important. Students are expected to be present from the first lesson onward. Any student does not present on the first morning (except for such compelling reasons as illness or family emergency) may be asked to withdraw from the course. Unexcused absences may result in the student receiving a grade of NC (No Credit) for the whole course.

Students in job-search are expected to hold high standards of attending each session and not leaving during class time to answer recruiter phone calls or to take interviews.

Punctuality

Punctuality is expected and required in the professional world. People commonly lose their jobs for being late — especially new college graduates unfamiliar with professional expectations. Colleges and universities have come under criticism for not properly preparing students for these values.

Therefore, we place a similarly high value on arriving on time for every class session. If students are late, they disrupt the learning environment and may miss the wholeness of the lesson. Coming late is unprofessional and shows a lack of courtesy to the instructor and fellow students and will affect the attendance grade. The faculty requests that students arrive a couple of minutes early, so everyone is seated and settled when the class begins. The policy also applies to attending online sessions.

Punctuality also extends to returning from the 10-minute class break (usually around 11:00 AM) in a timely fashion (as announced by the professor at the beginning of the break). The instructor should not need to go out and round up students.

If you need to be late to class for some reason beyond your control (a dentist appointment, for example), please arrange that with me ahead of time. Failing to comply with the policy will affect your Attendance and Etiquette grade.

Contact Info

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Evaluation Criteria

Your class grade represents your performance on the course objectives as measured by your score in the lab/homework assignments, project, Midterm Exam and Final Exam, as well as your daily professional etiquette (including participation and attendance).

Midterm Exam (1 - 7)	40%
Final Exam (8 - 14)	40%
Labs	10%
Project	10%
TM and Attendance	0 - 5%

We will use the following grading scale:

Range	Letter Grade
93-100	A
90 – 92	A-
87 – 89	B+
83 – 86	B
80 – 82	B-
77 – 79	C+
73 – 76	C
70 – 72	C-
0 – 69	NC