SWE 432 Web App Development
Spring 2024 Syllabus

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Office: ENG 4417
Office Hours: Tuesday and Thursday, 10:30 – 11:30 am or by appointment

UTA: TBA

Class: 12:00-1:15, T/H, Horizon Hall Room 2009

Prerequisites: Grade of C or better in CS 321 AND MATH 125

Required Text

The text is available through Pearson direct as a rental or purchase along with other sources such as Amazon.

- *Fundamentals of Web Development, 3rd edition*, Randy Connolly and Ricardo Hoar, Pearson, January 2021

Catalog Description

A comprehensive introduction to the design and implementation of software applications for the web, including client and server-side development. Exploration of principles for the design of web applications that are robust, scalable, and secure; that enable change and reuse; and that are usable for their intended purposes. Topics include client-server communication, asynchronous programming, persistence, security, web development tools, the document object model, templates and data-binding, interaction techniques, and site design for the web.

Course Objectives

Upon completion of the course, students should have:

1. Knowledge of quantitative engineering principles for how to build software user interfaces, especially web-based user interfaces, that are usable by humans with minimal or no training

2. Understanding the client-server and message-passing computing models in the context of web applications

3. Knowledge for how to build usable, secure, and effective web applications

4. Theoretical and practical knowledge about how data are stored and shared in web applications

5. Component software development

6. Understanding that usability is more important than efficiency for almost all modern software projects, and often the primary factor that leads to product success

Class Approach

Class Format

The class focuses on implementing the weekly topics into the group project. In general, the material is presented during one week, technical labs or exercises completed and then incorporated into the project the following weeks. The material is introduced through readings, labs and videos, knowledge checked

through quizzes, and key points highlighted in the lectures with small group or individual exercises supplementing the lecture when possible. The class will be hands-on and may include several small programming assignments in addition to a group project.

Course Website

Blackboard will be used for this course. You can access the site at http://mymasonportal.gmu.edu. Login and click on the "Courses" tab. You will see SWE 432. NOTE: Username and passwords are the same as your Mason email account. You must have consistent access to an Internet connection in order to complete the assignments in this course through Blackboard (http://mymason.gmu.edu).

Discussion Board

Piazza is used to maintain communications between classroom sessions, make announcements and allow students the opportunity to interact with each other on the group project. An "Ask the Professor" is provided for any questions or topics that may be of interest to the entire class. These types of inquiries are not accepted by email and must be posted on the Discussion Board for all to see. (Personal or sensitive topics are still handled via email.)

All electronic postings must be professional, respectful, positive and courteous. The Core Rules of "Netiquette" provide guidelines on how to carefully craft your communications in the online classroom to avoid misinterpretation.

Readings

Readings, as given on the schedule page, allow you to understand the concepts and the theory behind the applications. The readings provide insights, background and information in more detail and scope than we can cover in class but are critical for your success (academic and professional). The readings are needed to perform at an A level on the project, exam and quizzes. The lectures will not cover everything in the readings and will often include material not found in the readings.
In order to fully participate in class and score well on the associated quiz, the assigned readings need to be completed by the first class for that lesson.

Quizzes

We will have in-class quizzes starting the second week and these will usually be given in the first class for a lesson. The primary purpose of the quiz is to encourage students to complete the assigned readings and have a basic understanding of the material **prior** to the first class for each lesson. This approach enables us to focus on addressing questions and more complex topics plus some preparation for and doing in-class exercises based on the weekly topic. Therefore the quizzes will focus on the assigned readings for that lesson with an emphasis on the weekly learning objectives. The quizzes take the place of a mid-term exam.

Quizzes are available on Blackboard in the first ten minutes of class. Quizzes are closed-book, closed notes, no access to other web sites, and no other assistance allowed. Quizzes submitted after the ten minute limit will be assessed a 10% late penalty unless an accommodation is already in place.

The quizzes consist of a combination of multiple-choice, true/false, and fill-in-the-blank to evaluate understanding of the terms and concepts.   There are no-retakes or make-up quizzes but the lowest three scores are dropped.

Participation

Learning can only happen when you are playing an active role. It is important to place more emphasis on developing your insights and skills, rather than transmitting information. Knowledge is more important than facts and definitions. It is a way of looking at the world, an ability to interpret and organize future

information. An active learning approach will more likely result in long-term retention and better understanding because you make the content of what you are learning concrete and real in your mind.

Although an active role can look differently for various individuals, it is expected in this class that you will work to explore issues and ideas under the guidance of the professor and your peers. You can do this by reflecting on the content and activities of this course, asking questions, striving for answers, interpreting observations, and discussing issues with your peers. A participation grade will be awarded based on attendance, classroom contributions, class and discussion board interactions and the successful completion of in-class exercises throughout the semester. The in-class exercise may be a short (2-3 question) quiz on the material covered in the class.

Textbook Labs/Projects

There are two options for practicing the underlying technical skills on the project. For beginners and others who would prefer a guided learning process, there are a set of labs available for purchase to address each chapter. For more advanced or self-learners, an option will be provided to do one or two of the projects at the end of the chapter to demonstrate competency. You can change between the two options for different chapters once the labs have been purchased.

Group Project

The group project will implement the knowldege and technical skills learned through the text labs/projects into working software. The project will help you understand how to design usable software interfaces and implement them on the web, how to build software that accepts information from users across the web and returns data to the user, and how to separate and connect front-end user-facing software with back-end business processing software. SWE 432 covers the software design, interface design, and development side of web applications. Programming skills are required and students are expected to know HTML and Java. Your final grade for this component will include peer evaluation grades provided by your teammates. Also, each team member will be assessed by the instructor.

NOTE: Almost every class will allocate the last section of the time period to group meetings. Therefore regular attendance is even more critical to support your fellow group members in a successful project.

Exam

The final exam will cover the learning objectives listed for each lesson. The final will be composed of a knowledge component plus a cumulative technical component to develop an simple, working web application. A laptop is required to complete the on-line exam during the assigned time period.   A study guide will be provided to facilitate preparation at least one week prior to the exam plus an in-class practice for the technical exam. The knowledge component exam is closed book, notes, phone, tablet or any other type of assistance while the technical component is open book including the use of sample code from the class and project.

Course Grades
- Participation: 10%
- Quizzes: 10%
- Textbook Exercises: 15%
- Group Project: 35%
- Final Exam: 30%

The following scale will be applied to compute final course letter grades:

A+ (>= 97.0%) A (>= 92.0%) A- (>= 90.0%)

B+ (>= 87.0%) B (>= 82.0%) B- (>= 80.0%)

C+ (>= 77.0%) C (>= 72.0%) C- (>= 70.0%)

D (>= 60.0%) F (< 60.0%)

Submission Deadlines

All assignments are due by midnight on the assigned date unless otherwise noted on the schedule or assignment listing. Late submissions are subject to a 10% penalty for missing the deadline, are accepted after 48 hours with a 25% deduction and not accepted after one week without prior permission. Assignments will be submitted in Blackboard via the Assignment feature. You are expected to verify your own Blackboard responses by returning to the appropriate place in Blackboard after the work has been posted.

Grading

Most project and assignment grading will be completed by the Graduate Teaching Assistants (GTAs) based on the rubric provided with the assignment. If you disagree with the grades assessed, contact the GTA first with the basis of your request and the grade you believe should have been assigned. If you and the GTA are unable to come to a resolution, escalate the matter to your Professor along with the email thread for the GTA discussion.

Class Policies

E-mail

I will occasionally send important announcements to your Mason email account. If I am running late for the class or have some other issue that will impact the class, I will make that announcement through Blackboard. Emails sent to me should start the subject line with "SWE 432"and then include a topic. Questions about the technical material, class policies, discussions or other topics of interest to the entire class must be posted on the associated Piazza discussion board or *Ask the Professor* discussion board and not sent by email. E-mails of this type will not be answered and redirected to Piazza.

My goal is to answer emails and board postings within one business day. In accordance with GMU policy, all email communication will be sent only to your Mason email account.

Before sending an email, please check the following unless the email is of a personal nature:
1. Syllabus
2. *Ask the Professor* discussion board

Feel free to respond to other students in the *Ask the Professor* forum if you know the answer.

Schedule

Every attempt is made to adhere to the posted Blackboard schedule. All schedule updates will be announced on Blackboard. Changes are made to facilitate learning, provide opportunities to thoroughly address topics within the class or address unforeseen circumstances. Changes are announced via Blackboard and the revised schedule is posted on the Blackboard site.

Recordings

I will often record classes for the use of students who can make an individual session or for review afterwards. These are not a substitute for attending in-person classes, are not guaranteed to be available, are not edited and may have issues such as audio, readability of the slides and boards, or focus. These videos will only be posted to Blackboard.

All course materials posted to Blackboard or other course site are private to this class; by federal law, any materials that identify specific students (via their name, voice, or image) must not be shared with anyone not enrolled in this class.

Video recordings -- whether made by instructors or students -- of class meetings that include audio, visual, or textual information from other students are private and must not be shared outside the class.

Live video conference meetings (e.g. Collaborate or Zoom) that include audio, textual, or visual information from other students must be viewed privately and not shared with others in your household or recorded and shared outside the class.

Technology

You will need a reliable computer with sufficient capabilities for tasks such as compiling and running web servers, functional camera and microphone, and Internet access to view course materials in Blackboard, take the quizzes and exam, complete the coding for the group project, and record assignments for the group project which captures the screen and voice.

In-Class Computer Use

Computers will be used extensively during in-class exercises, quizzes, discussions, and examples. Outside note taking and referring to class slides, their use during lectures should be minimized as a courtesy to your fellow students. Complaint(s) about specific students using computers inappropriately will result in the loss of their use during lectures.

AI Use

ChatGPT or other Generative-AI models may not be used in this course as an assistant in projects and homework assignments unless otherwise specifically stated by the instructor.

In terms of learning in this class and the associated software development processes, students who replace their own learning and project work with materials prepared by Generative-AI models:

• Sacrifice the opportunity to acquire the knowledge, skills, and critical thinking taught in the course.
• Risk being unable to perform to expectations in the academic environment when Generative-AI models are unavailable, such as in exams
• Ultimately endanger their employability if they are unable to produce work other than that produced by Generative-AI models

Social Media

I accept LinkedIn requests from current and former students – please be sure to include the class and year in the request. In general, I do not accept other social media requests on my personal accounts from school or work.

University-Based Policies and Support

Office of Disabilities

If you need academic accommodations, please see me and contact the Disability Resource Center (DRC) at 703-993-2474. All academic accommodations must be arranged through the DRC and you must inform me, in writing, at the beginning of the semester. All academic accommodations must be arranged through that office. Please note that accommodations MUST BE MADE BEFORE assignments or exams are due. I cannot adjust your grade after the fact.

GMU Support Services

If you are need of assistance outside the classroom, many services are provided by Student Support and Advocacy Services (SSAC) including Patriot Pantry, personal crisis, survivor support, financial well-being, substances abuse and more at https://ssac.gmu.edu/

Counseling and Psychological Services (CAPS) partners with the Student Support and Advocacy Center to provide in-person and virtual, free and confidential, mental health services for enrolled students https://caps.gmu.edu/ .

Religious Holidays

If you need accommodations for a religious holiday, it is your responsibility to let me know the dates of major religious holidays on which you will be absent or unavailable due to religious observances within the first two weeks of the semester. The university calendar is available at https://ulife.gmu.edu/religious-holiday-calendar/ for your reference.

Honor Code Statement

As with all GMU courses, SWE 432 is governed by the GMU Honor Code https://oai.gmu.edu/full-honor-code-document/ and the CS Department Honor Code https://cs.gmu.edu/resources/honor-code/ (which provides technical guidance). In this course, all quizzes and exams carry with them an implicit statement that it is the sole work of the author. When joint work is authorized, including on the group project, all contributing students must be listed on both the submission and individual sections of the assignment but must not include students who did not participate. Guidance on the group project coding will be provided in the project description and must be adhered to in order to avoid violations. Any deviation from this is considered an Honor Code violation, and as a minimum, will result in failure of the submission and as a maximum, failure of the class.

Weekly Topics

The planned course topics are found below. The specific reading and course assignments will be posted on the Blackboard schedule.

Week 1	Introduction to Web App Development
Week 2	Usability and UI/UX
Week 3	HTML and CSS
Week 4	More HTML and CSS
Week 5	JavaScript
Week 6	Using JavaScript
Week 7	Additional JavaScript Features
Spring Break	
Week 8	Server Side – Node.JS
Week 9	More Node.JS and Testing
Week 10	Working with Databases
Week 11	State Management
Week 12	Security
Week 13	React
Week 14	DevOps