Course Syllabus

Dynamic Web Applications

INST 377
Spring 2019

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 database servers, web servers, modules, 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. Articulate the basic approaches and key development elements for building databases and dynamic user interfaces.
2. Acquire, install and maintain a web server as a stand-alone component or as part of a bundled software distribution.
3. Acquire, install and maintain applications that facilitate interactions between different layers of the application or site architecture.
4. Build basic web interfaces that allow a wide range of users to interact with underlying databases.
5. Program basic interface components that will add dynamic functionality to websites.
6. Articulate the relationships between JavaScript, PHP, databases, CSS, and HTML.
7. Identify security issues in dynamic web applications and develop approaches to address them.
8. Maintain code versions and update servers using Git.

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(pronouns: he/him/his)

Class Meets
Section 0101
Tues & Thurs
3:30pm – 4:45pm
TYD #1118

Section 0102
Tues & Thurs
9:30am – 10:45am
HJP #2242

Office Hours
Thursdays
1-2:30pm
HBK 4111G

Teaching Assistants
Abhishek Venkatesh
Thursdays
11-1:00 PM
HBK 0215D

Prerequisites
INST327

Course Communication
Announcements relating to this course will be made in the courses ELMS page. Helpful guidance on writing professional emails (ter.ps/email).

9. Understand universal usability and how it applies to web applications
10. Explain how programming is situated in and reflects social issue (e.g. racism or sexism) and describe actions that individuals or organizations are taking to counteract disparities and inequities in software and programming/technical organizations.

Required Resources

Course website: **elms.umd.edu**

Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5
Nixon, Robin
Fifth edition (2018).
ISBN # 1491978910
(Fourth edition from 2014 is also acceptable, but watch page and chapter numbers may differ from syllabus)

Other Resources

- Course material repo: https://github.com/donalus/INST377
- W3schools.com: https://www.w3schools.com/
- Github guides: https://guides.github.com/

Activities, Learning Assessments, & Expectations for Students

Homework Assignments

There will be five assignments over the semester, each of which will include 2 to 4 questions.

1. Points: Each assignment is worth 50 points.
2. Types of Assignments: Most assignments are coding or server configuration tasks. You will have 1 to 2 weeks to work on and complete each assignment. The assignments are individual work. This means that although you may consult with your classmates and the instructor to develop general approaches to solving the coding challenges, you are expected to work individually while you build, type, test and debug the code.
3. Notifications: Assignment questions will be made available on Canvas.
4. Submissions: Completed assignments will be submitted via Github.
5. Late Submission Policy: Timely submission of the completed assignments is essential. Each one-day late submission subtracts 1/3 letter grade, so submitting an assignment a single day late will take an A+ to an A, five days late will result in an A+ becoming a B-. After 11 days, the best grade, regardless of quality, will be failing. Late submissions will also receive less feedback from me. 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.
6. Help Scores: If an assignment is marked as “help scores available”, it means you can help or being helped by any classmates to finish the assignment. In this case, students who helped another student get extra credits when both students agree that there were help activities between the two students. Helping one student will add 5 points per help activity to his or her original points (i.e., 5 * the number of

students you helped). This means, ideally, a student can earn more than the full points for a help-score-available assignment. Note that helping a classmate DOES NOT mean that a helper student does an assignment on behalf of another. It means literally helping the classmate to understand the process/code fully. If a student who was helped by another does not have basic understanding of an assignment, the help score will not be applied.

7. If “help scores available” is not specified, students should work on the assignment by himself/herself. Any help more than a general, high-level discussion could be regarded as plagiarism or cheating.

Group Project

Students will work in 4-to 6-student 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 database, 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 the 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. The following are brief descriptions of the different parts of the group project.

- *Mid-term Presentation:* A mid-term presentation will be administered (1) to test students' understanding of course materials and (2) to check the progress on the group project. The mid-term presentation may include explaining particular concepts/technologies that will be used in the final deliverable, interface/DB design, and the rationale of the project.
- *Final Presentation:* Each group is expected to
    - Introduce and justify the project
    - Demo the final website that runs on a production server (Google Cloud)
    - Explain technologies and architectures used
    - Describe development processes and strategies
    - Discuss limitations and future work.
- *Deliverables:* Along with the final presentations, each group needs to submit:
    - The URL of the final system
    - Scripts and database dump files through Github
    - Technical documentation and user manuals
    - A final report for the project.

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.

Technology Policies

Laptops - We will do live programming exercises during most classes, so bring your laptop and be prepared to write code. Any reasonably current operating system can be used. If you don't have access to a laptop, contact me before the first class. However, laptops are a significant distraction, not only for yourself but those around you and there is significant research behind policies limiting their use in class. This isn't feasible in a programming-focused course, but please be courteous to your peers and keep distractions to a minimum.

Mobile Devices - I expect you to make the responsible and respectful decision to refrain from using your cellphone in class. If you have critical communication to attend to, please excuse yourself and return when you are ready. For more information about the science behind the policy watch: http://youtu.be/WwPaw3Fx5Hk

Get Some Help!

You are expected to take personal responsibility for you own learning. This includes acknowledging when your performance does not match your goals and doing something about it. Everyone can benefit from some expert guidance on time management, note taking, and exam preparation, so I encourage you to consider visiting http://ter.ps/learn and schedule an appointment with an academic coach. Sharpen your communication skills (and improve your grade) by visiting http://ter.ps/writing and schedule an appointment with the campus Writing Center. Finally, if you just need someone to talk to, visit http://www.counseling.umd.edu.

Everything is free because you have already paid for it, and **everyone needs help**… all you have to do is ask for it.

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 of your fellow Terps.

Grades

Grades are not given, but earned. Your grade is determined by your performance on the learning assessments in the course and is assigned individually (not curved). If earning a particular grade is important to you, please speak with me at the beginning of the semester so that I can offer some helpful suggestions for achieving your goal.

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), 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 I have made a mistake I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

Learning Assessments	Category Weight
Assignments	35%
Reading Quizzes	25%
Group Project	35%
Participation	5%

Final letter grades are assigned based on the percentage of total assessment points earned. To be fair to everyone I have to establish clear standards and apply them consistently, so please understand that being close to a cutoff is not the same this as making the cut (89.99 ≠ 90.00). It would be unethical to make exceptions for some and not others.

Final Grade Cutoffs									
+	97.00 %	+	87.00 %	+	77.00 %	+	67.00 %		
A	93.00 %	B	83.00 %	C	73.00 %	D	63.00 %	F	<60.0 %
-	90.00 %	-	80.00 %	-	70.00 %	-	60.00 %		

Course Schedule

Week 00 - Introduction

	Topic	Readings	Notes
1/29, 1/31	• Introduction & Overview • Development environment; web application stacks	• Mozilla Developers Network: How the Web Works • Mozilla Developers Network: What is a web server? • Mozilla Developer Network: Upload files to a server	

Week 01 – HTTP & HTML

	Topic	Readings	Notes
2/5, 2/7	• HTTP & HTML	• Nixon, Ch. 1 • W3Schools HTML Tutorial	

Week 02 – CSS

	Topic	Readings	Notes
2/12, 2/14	• CSS	• W3Schools CSS Tutorial	

Week 03 - Intro to PHP

	Topic	Readings	Notes
2/19, 2/21	• Introduction • Variables, operators, and conditionals • Arrays and Functions	• Nixon, Ch. 3 • Nixon, Ch. 5 • Nixon, Ch. 6	

Week 04 - HTML Forms

	Topic	Readings	Notes
2/26, 2/28	• Introduction to Forms • Using PHP with Forms • PHP Database Operations	• Nixon, Ch. 11 • Nixon, Ch. 12	

Week 05 - Database & SQL Review

	Topic	Readings	Notes
3/5, 3/7	• Creating tables and adding data • Running queries	• Nixon, Ch. 8 • Nixon, Ch. 9	

Week 06 - Forms & Databases

	Topic	Readings	Notes
3/12, 3/14	• Add / Delete / Update Queries • Saving form data to SQL	• Nixon, Ch. 10	

Spring Break

	Topic	Readings	Notes
3/19, 3/21	***Spring Break***		

Week 07 - JavaScript

	Topic	Readings	Notes
3/26, 3/28	• Intro to JavaScript and the DOM • Variables, Strings, Operators	• W3Schools JS Tutorial • Nixon, Ch. 13 • Nixon, Ch. 14	

Week 08 - Midterm Presentations

	Topic	Readings	Notes
4/2, 4/4	• Presentations		

Week 09 – Validating Forms

	Topic	Readings	Notes
4/9, 4/11	• Client-side form validation • Server-side form validation	• Nixon, Ch. 16	

Week 10 – Advanced JavaScript

	Topic	Readings	Notes
4/16, 4/18	• Functions • Objects • AJAX & JSON	• Nixon, Ch. 15 • Nixon, Ch. 17	

Week 11 - jQuery & AJAX

	Topic	Readings	Notes
4/23, 4/25	• jQuery Events & Effects • Server Data with jQuery AJAX • jQuery UI	• Nixon, Ch. 21 • W3Schools jQuery Tutorial • http://jqueryui.com	

Week 12 - Frameworks

	Topic	Readings	Notes
4/30, 5/2	• PHP Frameworks • JavaScript Framworks • CSS Frameworks	• TBA	

Week 13 - Advanced Topics & Presentations

	Topic	Readings	Notes
5/7, 5/9	• Advanced Topics • Presentations	• TBA	

Week 14 – Presentations

	Topic	Readings	Notes
5/14	• Presentations		

Note: 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.