EECS 485: Web Systems Syllabus

The University of Michigan, Winter 2021

A holistic course of modern web systems and technologies, covering front end and back end. Build an Instagram clone in the first half of the semester, and a Google clone in the second.

Instructors

John Kloosterman and Nicole Hamilton

Remote Instruction

Due to COVID-19, EECS 485 will be remote this semester. You can complete the the entire course from anywhere in the world.

Lectures

There will both asynchronous (recorded) and synchronous (Zoom) options for lectures. Faculty will hold Q&A video conferences to answer questions and discuss lecture material. Links to recordings and Zoom sessions will be posted on eecs485.org.

Projects

Projects will be completed in groups and turned in to an autograder. Groups will use Git to share code, and the communication technology of their choice. You can find a group using the "Search For Teammates" post on Piazza. If you'd like, we'll help you find a group based on preferences like time zone.

Labs

Labs will be completed remotely in optional groups. Expect hands-on tutorials that teach useful web tools and help you get started on projects. During regularly scheduled lab time, IAs and GSIs will host office hours to help with the labs.

There will be synchronous (Zoom) lab sessions that you may optionally attend.

All students, regardless of whether they attend a synchronous lab or not, must complete weekly lab quizzes.

Exams

Exams will be completed remotely and be similar in format to our practice exams.

Details about exams, including topics and times for review sessions, will be posted on eecs485.org.

Office hours

Office hours will be held via video conference, both one-on-one and in groups.

Computer and network recommendations

Make sure you have a laptop consistent with CAEN recommendations.

Test your internet connection with the U-M Custom Speedtest website and make sure it meets the minimum requirements for any UM service. You'll need more bandwidth if there will be multiple simultaneous users in your household.

Resources for help with computing equipment:

- Information and Technology Services (ITS) Laptop loaner program
- College of Engineering (CoE) Office of Student Affairs, email requests to coe-studentaffairs@umich.edu

Contact

Please direct technical questions to our Piazza forums linked from eecs485.org. For other questions, complete the "Contact Us" form linked in the sidebar of eecs485.org.

Overview

EECS 485 is a contemporary exploration of modern web systems. The course integrates concepts from multiple computer science disciplines used in the design, development, and deployment of web applications and services.

While broad in scope, this course will cover several key concepts in depth, including: web applications, web services, web search, web-relevant security issues, and scalable web infrastructure.

Students will use technologies such as HTTP, HTML, CSS, JSON, Python, JavaScript, asynchronous programming, map reduce and others.

Projects include life-like web applications that mimic a social network like Instagram or Facebook, and a search engine like Google or Bing. Project implementions use open source components on Linux-based web servers.

At the end of this course, students will understand the science behind web-based information systems and the engineering principles for building them.

Objectives

This course is about the design and development of information systems in wide area networks. Its primary goal is to take a holistic view of modern web systems and their constituent technologies. By the end of this course, successful students will be able to:

- Design and develop web applications
- Balance the trade-offs between static pages, server-side dynamic pages and client-side dynamic pages
- Use JavaScript and asynchronous programming to invoke remote procedure calls in web user interfaces
- Use JSON as a messaging and data exchange mechanism
- Understand designs for modern search engines and data centers
- Understand web "semantic systems," such as auctions, recommendation systems, and search ranking.
- Understand critical components of the modern web infrastructure: DNS, Content Delivery Networks, etc.
- Be confident about picking up a manual and quickly mastering any new web-related language, at any level of the software "stack"

Prerequisites

The prerequisite for EECS 485 is EECS 281.

This course requires substantial independent learning. Programming languages and libraries will not be a major topic of lectures. Independent learning of HTML, CSS, SQL, Python, Javascript, and several libraries and frameworks will be required.

Textbook

There is no comprehensive textbook. Optional books include:

JavaScript: The Good Parts, 1st Edition, by Douglas Crockford. O'Reilly, 2008. University of Michigan Library digital access.

Flask Web Development: Developing Web Applications with Python by Miguel Grinberg, O'Reilly. University of Michigan Library digital access.

Website (eecs485.org)

The first place to go for any course materials or resources is our course website at eecs485.org. All course materials and assignments are made available there, and are considered required reading. A detailed schedule, including lecture topics, assignment due dates and exam dates, is also available there. Other resources such as Piazza, and the Autograder are linked from the site.

Schedule

See the course website, eecs485.org.

Forum

Our course forum will be on Piazza and linked from eecs485.org. Read it regularly for announcements.

Do not post solutions, project code, test cases, or output to the forum. Doing so is considered a violation of the Honor Code.

Projects

This course contains 5 programming assignments. The first is individual, and the remainder are in groups of 2 to 3. You may modify group membership between projects. If you need help forming a group, contact the staff.

All team members will normally earn the same grade on a project. We may adjust the grades of students who substantially under-participate based on feedback from their group members.

For those retaking the course: if you submitted a project in a previous term, you may not be in a group for that same project this term.

Labs

There will be a lab each week. Labs will be hands-on tutorials that teach useful web tools and help you get started on projects. Each lab will be graded on short questions at the end of the lab.

Complete labs and lab questions in optional groups of 2-3. You may modify lab group membership between labs.

Exams

There will be one midterm and one final examination. Exams will cover material from lecture, lab and projects. There will be no make-up exams. The exam dates and times are posted on eecs485.org.

Exam Technical Difficulties

If you experience technical difficulties with signing in, accessing, completing, or submitting the assessment or should you lose internet connectivity during the exam time, then you should immediately send an email message to Prof. Kloosterman (jklooste@umich.edu) to register the difficulty you are having with the system. Finally, document your need for assistance by emailing 4HELP@umich.edu and calling 734.764.HELP (4357).

The faculty and teaching assistants will be on stand-by during examination time periods to ensure that we receive your message and can provide you with immediate assistance. In the case of a timed assessment, your testining time will be counted from the time you are able to log in (or re-enter the system) to ensure that you have the full time allotted for all assessments.

Finally, it's always a good idea to have a back-up plan! If you encounter technical problems, you can:

- Create a pdf and email that, if submission methods don't work.
- Send screenshots or photos of the screen to verify the problem.
- Take an emergency alternate exam, once course staff have verified the issues you're having with the technology.

Grading

Your grade for the class will be determined by the following weighting. Updated 2020-08-19 to reduce exam weight.

Assignment	Percentage of Grade
Programming Projects	5 projects x 10% each = 50%
Labs	10%
Midterm Exam	20%
Final Exam	20%
Total	100%

To pass EECS 485, your average project score must be a passing score, and your average exam score must be a passing score.

Regrade Requests

If you believe we graded an assignment of yours incorrectly, you can submit a regrade request no later than one week after the graded work is first returned to students. The deadline for the final will be shorter due to the need to submit final grades. Regrade requests must be submitted in writing via GradeScope or email.

Due Dates

Due dates are written on each assignment. Late assignments will receive a zero. We will consider extension requests made in person and at least 2 weeks in advance. Additionally, we will consider requests for documented, unanticipated medical or personal emergencies. If you can't see the instructor in advance due to the emergency, then see him/her as soon as you possibly can. In all cases, we require documentation of nature and the date of the emergency.

Academic Integrity

You may give or receive help on any of the concepts covered in lecture, lab, or the textbook, and on the specifics of the language or library syntax. You are allowed to consult with other students in the class to help you understand the assignment specification (the definition of the problem).

You may not collaborate in any way with people outside your group when constructing your solution; your group working alone must generate the solution to a programming assignment and must submit your code for grading together (i.e. your partnership may only submit one version of your code for grading). You are not allowed to work out the programming details of the problems with anyone outside your own partnership or to collaborate to the extent that your programs are identifiably similar. You may not derive your solution in any way from other solutions. You may not share code outside of your partnership, including making it publicly available in any form (e.g. a public GitHub repository).

If you have any questions as to what constitutes unacceptable collaboration, please talk to the instructor right away. You are expected to exercise reasonable precautions in protecting your own work. Do not let other students borrow your account or computer. Ensure that the computers you use to access project code are password protected. Do not leave your program in a publicly accessible directory, neither during the semester, nor after. Take care when discarding printouts. You are still responsible for following these rules even after finishing the course.

We report suspected violations to the Engineering Honor Council. To identify violations, we use both manual inspection and automated software to compare present solutions with each other and with prior solutions. The Honor Council determines whether a violation of academic standards has occurred, as well as any sanctions. Read the Honor Code for detailed definitions of cheating, plagiarism, and other forms of academic misconduct

Recordings

Course sessions may be audio/video recorded and made available to other students in this course. As part of your participation in this course, you may be recorded. If you do not wish to be recorded, please contact us using the "Contact Staff" link on eecs485.org the first week of class (or as soon as you enroll in the course, whichever is latest) to discuss alternative arrangements.

Students are prohibited from recording/distributing any class activity without written permission from the instructor, except as necessary as part of approved accommodations for students with disabilities. Any approved recordings may only be used for the student's own private use.

Accommodations for Students with Disabilities

If you think you need an accommodation for a disability, please let your instructor know during the first three weeks of the semester. Some aspects of this course may be modified to facilitate your participation and progress. As soon as you make us aware of your needs, we can work with the Services for Students with Disabilities (SSD) office to help us determine appropriate academic accommodations. SSD (734-763-3000; http://ssd.umich.edu) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. Any information you provide is private and confidential and will be treated as such.

Student Well-Being

Students may experience stressors that can impact both their academic experience and their personal well-being. These may include academic pressure and challenges associated with relationships, mental health, alcohol or other drugs, identities, finances, etc. If you are experiencing concerns, seeking help is a courageous thing to do for yourself and those who care about you. If the source of your stressors is academic, please contact me so that we can find solutions together. For personal concerns, U-M offers many resources, some of which are listed at Resources for Student Well-being on the Well-being for U-M Students website. You can also search for additional resources on that website.

Commitment to Equal Opportunity

As indicated in the General Standards of Conduct for Engineering Students, we are committed to a policy of equal opportunity for all persons and do not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight, or veteran status. Please feel free to contact us with any problem, concern, or suggestion. We ask that all students treat each other with respect.
