# EECS 485: Web Systems Syllabus

*The University of Michigan, Winter 2020*

## Instructors

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## Contact

Please direct technical questions to our Piazza forums. For other questions, you can reach the course staff using the "Contact Staff" link posted on eecs485.org.

## Overview

This course is a contemporary exploration of modern web-based information systems. It will integrate concepts from multiple computer science topics used in the design, development, and deployment of web-based applications, services, and knowledge systems. While broad in scope, it will also cover several key concepts in depth, including: web networking protocols, web databases and applications, web services, web search, web-relevant security issues, web infrastructure, and web-relevant data mining. Students will learn how to incorporate these concepts into an engineering process that includes design, analysis, development and testing, using technologies such as HTTP, XML, JavaScript, AJAX, and others.

Students will form teams to implement assignments on Linux-based web servers using open-source components. These assignments will culminate in students implementing their own large-scale web search engine, roughly comparable to Google or Bing. 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:

- Understand how n-tiered architectures can be used to implement secure, scalable systems
- Design and develop database-driven websites and applications
- Understanding XML and JSON as messaging and data exchange mechanisms
- Utilize JavaScript to improve database-driven websites
- Analyze server logs to understand system performance and user behavior
- 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.

### Lecture, lab and office hours schedule

See the course website, eecs485.org.

## Forum

We will be using Piazza to host a course forum. You are encouraged to read this regularly and post technical questions as it will be a significant source of help and hints on the projects.

We do not answer technical questions via email. In order to save everyone time, we want all students to have the benefit of seeing each question and its answer, so please use the forum.

We prohibit posting your own solutions, project code, test cases, or output to the forum. Doing so is considered a violation of the Honor Code. Also, please search the forum before posting to

avoid questions that have already been asked and answered.

## Projects

This course contains 5 programming assignments. The first is individual, and the remainder are in groups of 2 to 3. You can form a different group for each project. If you need help forming a group, contact the instructional staff.

All team members will normally earn the same grade on their joint work. At the end of each group assignment, we will ask each group member to describe and evaluate the contributions of other group members. Based on this feedback, we may adjust the grades for students who substantially under-participate in projects to reflect their actual level of participation. In case of disputes regarding participation, an instructor may examine commit logs and/or interview group members on the project's design and implementation.

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.

## Exams

There will be one midterm and one final examination. These will cover material covered in lecture, lab and projects. There will be no make-up exams. The exam dates are:

| | |
|---|---|
| Midterm exam | Tue Feb 25, 2020, 7:00 pm - 9:00 pm |
| Final exam | Thu Apr 23, 2020, 8:00 am - 10:00 am |

## Canvas Quizzes

There will be a weekly quiz posted on Canvas, due on Fridays at 8PM. Your final score will be the average of each quiz score with the bottom 2 scores dropped. You may work with others on the quizzes and get help with them in office hours, but written answers must be in your own words.

# Grading

Your grade for the class will be determined by the following weighting:

| **Assignment** | **Percentage of Grade** |
|---|---|
| Programming Projects | 5 projects x 10% each = 50% |
| Midterm Exam | 20% |
| Final Exam | 20% |
| Canvas Quizzes | 10% |
| Total | 100% |

To pass EECS 485, your average project score must be a passing score, and your average exam score (excluding Canvas quizzes) 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 using the "Contact Staff" link on eecs485.org. There are no regrades for quizzes.

## 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

## 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.

## 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.

## Students' Mental Health and Well-being

University of Michigan is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of support, services are available. For help, contact Counseling and Psychological Services (CAPS) at (734) 764-8312 and https://caps.umich.edu during and after hours, on weekends and holidays, or through its counselors physically located in schools on both North and Central Campus. You may also consult University Health Service (UHS) at (734) 764-8320 and https://www.uhs.umich.edu/mentalhealthsvcs, or for alcohol or drug concerns, see www.uhs.umich.edu/aodresources. For a listing of other mental health resources available on and off campus, visit: http://umich.edu/~mhealth.