

UNIVERSITY OF MICHIGAN SCHOOL OF INFORMATION
Database Applications
Syllabus

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Website: <https://umich.instructure.com/courses/268412>
Course Materials: <https://www.dj4e.com>

Course Description

This course is an introduction to interactive web applications. It covers both theoretical and practical aspects of web applications, including database design, object-relational models, Model-View-Controller, HTML templating, APIs and Structured Query Language (SQL). Students use the open-source MySQL database and the PHP scripting language for Web development throughout the course.

Pre-Requisites

Students should be familiar with the material covered in pre-requisite courses (HTML, CSS, Python Programming, Simple JavaScript, APIs, etc) either through having taken these courses relatively recently, or from other experience. Students who have no experience with these topics because they have bypassed the pre-requisite courses or taken those courses a long time ago will find the first few weeks of this course taxing. I do not recommend taking this course in the same semester you are taking a first programming course.

Learning Objectives

The purpose of this course is to provide students with all necessary skills for building and deploying database-backed web sites. The Learning Objectives for this course are to help students develop solid competency in:

- Understand the structure of a web application, the Request-Response-Cycle, and the MVC model
- Understand and explain the benefits of the relational model and normalization
- Transform data models into database designs
- Create data models using an Object Relational Mapping system (ORM)
- Increase skill in the Python programming language
- Increase skill in browser front-end technologies like HTML, CSS, JavaScript, and JQuery
- Build and use JSON based APIs and use them in web applications
- Using JavaScript libraries like jQuery
- Be skilled in developing complete web applications (Front End and Back End) using Django

Course Textbook

There is no official textbook for this course. Since Django is free and open source, there are a wide range of free materials available that describe Django. As you grow as a programmer, finding and using online resources is an important part of skill building. Print books tend to stagnate and have limited scopes - online resources tend to expand, grow, and remain updated.

The first part of this course will depend heavily on the Mozilla Developer Network (MDN) Django Tutorial

<https://developer.mozilla.org/en-US/docs/Learn/Server-side/Django>

We will reference other materials as the course progresses.

Lecture Materials and Sample Code

The course has a supporting web site that will contain materials, video lectures, assignments:

<http://www.dj4e.com/>

All materials from this site will be pulled into Canvas at the appropriate time and given due dates, so you may ignore this site if you like. Some homework assignments will be available on the site before they are assigned in Canvas - doing the homework on DJ4E site is not the same as doing the homework from Canvas. You can watch this site for a preview of upcoming events. Note that this web site is under construction this semester, so it may only be a few days ahead of the course.

Required Tools

The software used for the course is 100% free. Most of the course will be done in a free online python web development environment called PythonAnywhere (www.pythonanywhere.com). Students will also need a GitHub account and store homework solutions in GitHub private repositories. Advanced students can install Django and develop the homework assignments on their personal computers if they like, but most of the examples and demonstrations will be using PythonAnywhere.

Course Outline

WEEK	Date	LECTURE TOPIC	Assignments
1	January 11	HTTP, Getting Started w/ Django	MDN 1-2, DJ4E 1-4
2	January 18	Django Models	MDN 3-4, DJ4E 6-5
3	January 25	Django Views	MDN 5-6, DJ4E 7-8
4	February 1	Django Sessions / Authentication	MDN 7-8
5	February 8	Django Forms	MDN 9
6	February 15	CRUD	
7	February 22	Django and REST APIs	
8	March 1	Practical Midterm Exam	
	March 8	Spring Break	
9	March 15	JavaScript / JQuery	
10	March 22	JavaScript / JQuery	
11	March 29	Advanced topics	
12	April 5	Flask / Single Page Applications	
	April 12	Flask / Single Page Applications	Optional Project Due
13	April 19	Practical Final Exam	

Note: Schedule, topics, and assignments may be changed/adjusted as the semester progresses.

Late Policy

Late assignments will be penalized by 20% times the number of days late. Homework that is late 5 days or more will receive zero credit.

Homework

Throughout the course there will be one or more weekly programming assignments that will require a Django application to be developed and turned in - often to an automatic grader which will run tests on the running application. Most weeks there will also be an online quiz. Some weeks will assign more than one assignment. Students should carefully monitor the "Modules" tab in the course Canvas site to make sure not to miss any assignments.

Optional Individual Student Project

Students will be given an opportunity to develop a web application as a project for this class. If the-a student chooses to do a project as part of the class, it will be due the second-to-the-last week of class and exempt the student from the Final Exam.

Projects are to be completed by single individual (i.e. they are not group projects). There are minimum complexity requirements for the projects, but students are welcome to create more complex projects if they wish, and believe they have the necessary skills to produce a more advanced project.

At any point in the semester if a student feels their project is not going well or taking too much of their time, they may simply stop working on the project and take the Final Exam. If a student is dissatisfied with the grade they receive on their project, they may take the final exam and be given the higher of the two scores.

The specifications and required milestones for the projects will be handed out by the third week of class.

Grading

The graded work in the course will be weighted as follows to determine a final percentage grade:

Quizzes	10%
Programming Assignments	40%
Written Midterm	25%
Practical Exam / Project	25%

Grades will be awarded as follows:

A	93% and above
A-	90% and above
B+	87% and above
B	85% and above
B-	77% and above
C	73% and above
D	70% and above
F	Below 70%

Giving and Receiving Assistance

Learning technical material can be challenging. We move quickly through a wide range of topics. Our goal is for you to succeed in the course, and we encourage you to get help from anyone you like, especially in the portion of the course before the midterm.

You may get help even in completion of assignments. However, you are responsible for learning the material. Be sure that the assistance you receive is focused on gaining knowledge, not simply to complete assignments. If you receive too much help and/or fail to master the material, you will crash and burn at the midterm, which you must perform on your own.

If you receive assistance with any assignments, please indicate the nature and the amount of assistance you received. If the assignment involves computer code, add a comment crediting sources (as in any academic paper) or indicating who helped you and how.

If you are a more advanced student and are willing to help other students, please feel free to do so. Just remember that your goal is to help teach the material to the student receiving the help.

It is always appropriate to ask for and provide help on assignments via the course mailing list or during the optional labs.

Academic Integrity

Collaboration

UMSI strongly encourages collaboration while working on some assignments, such as homework problems and interpreting reading assignments as a general practice. Active learning is effective. Collaboration with other students in the course will be especially valuable in summarizing the reading materials and picking out the key concepts. You must, however, write your homework submission on your own, in your own words, before turning it in. If you worked with someone on the homework before writing it, you must list any and all collaborators on your written submission. Each course and each instructor may place restrictions on collaboration for any or all assignments. Read the instructions carefully and request clarification about collaboration when in doubt. Collaboration is almost always forbidden for take-home and in class exams.

Plagiarism

All written submissions must be your own, original work. Original work for narrative questions may not include mere paraphrasing of someone else's completed answer: you must not share written answers with each other at all. At most, you should be working from notes you took while participating in a study session. Largely duplicate copies of the same assignment will receive an equal division of the total point score from the one piece of work.

You may incorporate selected excerpts, statements or phrases from publications by other authors, but they must be clearly marked as quotations and must be attributed. If you build on the ideas of prior authors, you must cite their work. You may obtain copy editing assistance, and you may discuss your

ideas with others, but all substantive writing and ideas must be your own, or be explicitly attributed to another. See the (Doctoral, MSI, BSI) student handbooks available on the UMSI intranet for the definition of plagiarism, resources to help you avoid it, and the consequences for intentional or unintentional plagiarism.

Accommodations for Students with Disabilities

If you think you need an accommodation for a disability, please let me know at your earliest convenience. Some aspects of this course, the assignments, the in-class activities, and the way we teach may be modified to facilitate your participation and progress. As soon as you make me aware of your needs, we can work with the Office of Services for Students with Disabilities (SSD) to help us determine appropriate accommodations. SSD (734-763-3000; ssd.umich.edu/) typically recommends accommodations through a Verified Individualized Services and Accommodations (VISA) form. I will treat any information that you provide in as confidential a manner as possible.

Student Mental Health and Wellbeing

The University of Michigan is committed to advancing the mental health and wellbeing of its students, while acknowledging that a variety of issues, such as strained relationships, increased anxiety, alcohol/drug problems, and depression, directly impacts students' academic performance.

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 (732) 764-8320 and <https://www.uhs.umich.edu/mentalhealthsvcs>, or for alcohol or drug concerns, see www.uhs.umich.edu/aodresources.

For a more comprehensive listing of the broad range of mental health services available on campus, please visit: <http://umich.edu/~mhealth/>

Credit where credit is due

This is a new course for me, but builds on much prior effort from folks who taught this course earlier. These include Jackie Cohen, Anthony Whyte, and others.