

Syllabus for CS304, Databases with Web Interfaces

Welcome to what I think will be an exciting class! This page describes the topics and requirements of the class.

TABLE OF CONTENTS

Instructor¶

My name is Scott Anderson. Feel free to call me Scott. My office is in E116 and my office phone is extension 3249, but the best way to reach me is by email at scott.anderson@wellesley.edu. My **office hours** for the semester are listed on my **home page**

I love to talk with students one-on-one — it's the best part of my job — so please visit me during office hours. You don't even need to have a question!

Tutors¶

We have some great tutors:

- Hala Lotfy (hlotfy), holding drop-ins on Tuesdays from 8-10 in E101
- Anah Lewi (alewi), holding drop-ins on Mondays from 7-9 in L140
- Emma Shumadine (eshumadi), holding Sundays in L140 from 4-6 in L140

Description¶

This course covers web applications based on a “three tier architecture”: a web page interface to a relational database. We will learn about relational databases, focusing on creating, updating and querying tables in MySQL, an open-source relational database management system.

We will focus on one middleware technology, namely Flask, a Python-based micro-framework. We'll also learn about jQuery and Ajax, for richer web environments. Other middleware we may touch on are Node.js, and MongoDB.

We will also learn about theoretical issues and practical issues, such as designing tables using entity-relationship diagrams, modeling tables using relational algebra, normalizing databases, representing data using JSON and XML, and protecting the security of our data.

Prerequisites¶

CS304 has *CS230 Data Structures* as a prerequisite. Students with equivalent programming ability may also be admitted.

Accommodations¶

It is my goal that **every** student in this course succeed, regardless of whatever challenges they may face. That includes documented disabilities and conditions, as well as other challenges.

If you have a disability or condition, either long-term or temporary, and need reasonable academic adjustments in this course, please contact Disability Services to get a letter outlining your accommodation needs, and submit that letter to me. You should request accommodations as early as possible in the semester, or before the semester begins, since some situations can require significant time for review and accommodation design. If you need immediate accommodations, please arrange to meet with me as soon as possible. If you are unsure but suspect you may have an undocumented need for accommodations, you are encouraged to contact Disability Services. They can provide assistance including screening and referral for assessments. Disability Services can be reached at disabilityservices@wellesley.edu, at 781-283-2434, by scheduling an appointment online at their website www.wellesley.edu/adr, or by visiting their offices on the 3rd floor of Clapp Library, rooms 316 and 315.

If you have special needs of any kind, please meet with me to discuss accommodations that may be helpful to you.

Instruction¶

We'll take a couple of minutes to look at my **policies**. Please read them in more detail after class. My policies cover questions like attendance, lateness (and lateness coupons), extensions, grading standards, collaboration and the like.

Here is a list of the class topics for this year:

1. 3-tier arch, unix skills
2. databases and SQL queries
3. creating tables, inserting, updating and deleting data
4. Joins
5. Subqueries, Complex queries, sorting.
6. MySQL referential integrity and datatypes
7. Entities and Relationships
8. Web Pages and Forms; Group work
9. MySQLdb, a Python API for MySQL
10. Flask 1
11. Flask 2, Templating with Jinja2
12. Flask 3
13. JavaScript and jQuery
14. Ajax and JSON
15. Cookies
16. Sessions
17. Passwords/Logins
18. File Upload
19. Security
20. Online Transaction Processing (OLTP), transactions, locks
21. Threads
22. Relational Algebra; SQL Views; Normalization
23. Node.js
24. MongoDB
25. i18n, CAS
26. Ethics

Evaluation¶

Student work will consist of homework assignments, a semester project and an exam. They are weighted as follows:

component	weight
homework	30
project	50
exam	15
quizzes	5

Quizzes¶

We will be using the “quiz” feature of Sakai to administer online quizzes before most, maybe all, lecture classes. These will be a few (3-5) multiple-choice questions that are based solely on the readings for that lecture. The questions are not intended to be difficult; rather, we want to make your pre-class reading more effective and educational by making you a more engaged reader. These quiz questions will be accumulated over the semester into the equivalent of one test. (For example, if we had four questions per lecture for 25 lectures, each question would be worth 1 point.)

Part of my inspiration for the idea of using quizzes is this NY Times article entitled **To Really Learn, Quit Studying and Take a Test**

Homework Assignments¶

There will be approximately 6-7 homework assignments. The assignments will usually all have about the same weight; but I will give additional weight to those that have more problems or are more time-consuming. The schedule lists the assignments and due dates as currently planned:

Coding Style¶

The bulk of the grade in each assignment will be for getting the code working, but coding style is still important. Assignments will link to the following page of relevant **coding criteria**:

Take Home Exam¶

There will be one exam, which will be a take-home exam near the end of classes, covering all the course material up to that point. It will mostly consist of “essay” questions, rather than code, though there may be some SQL and ER diagrams and there will still be an emphasis on problem solving.

Lateness coupons may *not* be used for the exam. I will give a generous amount of time to do the exam, and I expect it to be turned in on time. I will have to enforce a draconian lateness policy (such as 25% off per day) if necessary. I hope not.

Project¶

The **project** consists of phases which are not equally weighted:

- **P0 Individual Ideas (10 percent)**
- **P1 Team Proposals (10 percent)**
- **P2 Design and Plans (10 percent)**
- **P3 Draft Version (20 percent)**
- **P4 Alpha Version (20 percent)**
- **P5 Beta Version (20 percent)**
- **P6 Final Document (10 percent)**

The last two phases of the project are due at the end of the final exam period.

Pair Programming¶

There is a lot of evidence that students learn more and produce better work when working in pairs. For that reason, I am encouraging pair work for all homeworks and projects.

I am going to assign partners and I will assign a different partner for each homework assignment. If, for whatever reason, you are unable to connect and work with your partner, you can and should work solo. Don't lose most of a week trying to connect with your partner. Do let me know if you've decided to work solo.

Students must work in groups of three on the project. Here are some **project ideas**, but I encourage you and your partners to work out your own ideas.

No Laptop Policy¶

To promote interaction in class, I ask you not to bring your laptop, but to share a college Mac with someone else in the class.

Lateness¶

All assignments are due at 11pm on the date indicated on the **schedule** which will usually be a Wednesday.

Each assignment will have 4 lateness coupons, good for a free, one-day, no-excuses extension. This will allow you to turn the assignment in as late as the following Sunday at midnight if your life has **blown up** some difficult way.

This may possibly be **overly** generous system of 4 lateness coupons per assignment. That allows you to finish it over the weekend and hope to get the next one in on time.

You may not use lateness coupons to extend either of the project deadlines: I want to see your presentations, and I cannot extend anything beyond the end of exams. Also, you cannot use them for the take-home exam. They are really just for homework assignments. Let me know if this is a problem.

In extenuating circumstances (e.g. sickness, personal crisis, family problems), you may request an extension without penalty. Please try to contact me before the due date.

Honor Code¶

I believe that collaboration fosters a healthy and enjoyable educational environment, and encourage you to talk with other students about the course and to form study groups.

Unless otherwise instructed, feel free to discuss problem sets with other students and exchange ideas about how to solve them. However, there is a thin line between collaboration and plagiarizing the work of others. Therefore, I **require that you must compose your own solution** to each assignment. In particular, while you may discuss problems with your classmates, **you must always write up your own solutions from scratch**. It is **unacceptable** for two students who are not partners to turn in copies (or near copies) of each other's solutions. I will interpret such a situation as a violation of the Honor Code, and will bring it before the General Judiciary. When in doubt about acceptable levels of collaboration, please ask me for clarification.

In keeping with the standards of the scientific community, you must give credit where credit is due. If you make use of an idea that was developed by (or jointly with) others, please reference them appropriately in your work. For example, if person X gets a key idea for solving a problem from person Y, person X's solution should begin with a note that says "I worked with Y on this problem" and should say "The main idea (due to Y) is ..." in the appropriate places. It is **unacceptable** for students to work together but not to acknowledge each other in their write-ups.

When working on homework problems, it is perfectly reasonable to consult public literature (books, articles, etc.) for hints, techniques, and even solutions. However, you must cite any sources that contribute to your solution. Assignments and solutions from previous terms of this course are **not** considered to be part of the "public" literature. You must refrain from looking at any solutions from previous terms of this course. It is my policy that consulting solutions from previous terms of this course constitutes a violation of the Honor Code.

Pair Programming means that the pair of you act as an individual would as described above, so one pair can discuss the problem with another pair but cannot look at the code of the other pair.

I often distribute a "model" or "example" of what I would like you to build. That model is some running code, and having it allows you to look at the scene from all angles and try different behaviors. You are not permitted to try to reverse engineer my code, instead of trying to solve the problem from scratch.

Books¶

There are no textbooks for this course. Everything is from online readings, with occasional references on the web.

Schedule¶

The current, **tentative schedule** is online. My goal is to make sure everyone is comfortable with a topic before going on, so we may spend more time on these topics than I have allocated. If so, topics will be moved later, and the last topics will be omitted. I expect we will not fall more than a couple of days behind, but we'll see.

Responsible Employee¶

Pursuant to Wellesley College policy, all employees, including faculty, are considered responsible employees. That means that any disclosure of discrimination, harassment, or sexual misconduct to a faculty member will need to be shared with the College's Director of Non-Discrimination Initiatives / Title IX and ADA / Section 504 Coordinator, Sonia Jurado (781-283-2451; sjurado@wellesley.edu). Students who do not wish to have these issues disclosed to the College should speak with confidential resources who are the only offices at the College that do not have this same reporting obligation. On campus, confidential resources include Health Services (781-283-2810 available 24/7), the Stone Center Counseling Services (781-283-2839 available 24/7) and the Office of Religious and Spiritual Life (781-283-2685). You should assume that any person employed on campus outside of these three confidential offices has an obligation to share information with Wellesley College through the Office of Non-Discrimination Initiatives.

© Scott D. Anderson. This work is licensed under a **Creative Commons License**.