Course Syllabus

Professor: Stan Gunn

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Office Hours: I am available via Zoom, Google Hangout, FaceTime, or phone conference on request.

Course Description

The primary goal of this class is to learn principles and practices of database management and database design. Over the course of the semester we will discuss relational database design, data types, sorting, indexing, and normalization. We will learn and practice the fundamentals of Structured Query Language (SQL) and how it can be used to store and retrieve data from a relational database, database security, and the impact of databases on society. Class modules will build up a theory of database design with instruction, examples, and exercises that focus on the fundamentals of creating and normalizing database structures, as well as developing increasing sophisticated queries against multiple related tables. For the later modules of the class we will learn the fundamentals of database design using MySQL. MySQL is a powerful relational database management system used at companies such as Google and Facebook. We use MySQL as our primary platform because it is commonly (and freely) available and provides substantially the same functionality as commercial databases such as Microsoft SQL Server and Oracle. While we will discuss and review non-relational/NoSQL databases (either "Non SQL" or "Not Only SQL" depending on the source) our primary focus will be on more formally-structured relational databases, as these still **make up the large majority of databases** ⤷ **(https://db-engines.com/en/ranking)** in use. No previous programming or database experience is required for this course.

Assignments and Grading

Assignments for the class will include a few short written analyses of database-related topics and series of short database exercises designed to complement the examples provided in each module. These exercises must be completed by the assigned deadline. They will represent not only a demonstration of the students' grasp of concepts covered in the course, they will also provide a convenient knowledge base from which students can draw when designing their own final project. There will also be a final project that will represent the culmination of the information students learn throughout the course. While assignments must be turned in individually I actively encourage students to collaborate with their classmates.

Late Assignment Policy: I do accept late assignments, though there will be some deduction of points from your grade if it is turned in late without explanation. If you have circumstances that you believe will cause you to be late in turning in an assignment, or are impeding you from completing an assignment, I urge you to contact me as soon as possible. I will be flexible on this policy if you let me know in advance.

Lecture Order

The order and amount of time spent on each topic may vary from semester to semester, but the overall structure of the class will include the topics below:

- Discussion of databases and society
- Databases and database management systems
- Database structures
- Data types
- Primary keys and foreign keys
- Data security
- Normalization
- Building Tables and relationships
- Introduction to MySQL
- sorting and indexing
- Troubleshooting your queries
- Using SELECT statements
- JOINs across tables
- Refining your searches

Format

This section of INF 385M will be taught as a fully online, and mostly asynchronous, class. What does this mean? It means that the class will be taught using a variety of different methods including video lectures, teleconferencing, and individual assignments -- all of it in a virtual environment. It also means that, while assignments are due on a regular basis, the lectures and readings can be done on a schedule that works best for you.

Class Structure

This course is divided into modules. A module covers a week of activities during the fall and spring and 5 days during summer sessions. Modules for the class will be released on a regular schedule, though usually just 2-3 weeks in advance because I frequently update and revise course material. For each module you will receive links to lectures, readings, notes as well as assignments and group activities. Exercises are expected to be completed by the assigned deadline unless you have made prior arrangements with me.

Readings for this Course

Over the last few years I have made a concerted effort to eliminate the need for students to purchase textbooks or supplemental material for this class. We use online, open educational resources (OER) to eliminate any costs beyond your tuition and fees. All readings to supplement the class video lectures and material are linked to or taken from a curated selection of web-based sources, or are downloadable in the Files section of the course's Canvas page.

That said, occasionally I am asked if I can recommend books that address the subjects we cover in class. If you would like reference texts to supplement the in-class materials I recommend these books:

- Data and Goliath, Bruce Shneier
- MySQL Pocket Reference, George Reese

Database Tools

Because learning how to construct and query databases is best done in a hand-on learning environment we will be using MySQL and MySQL Workbench that you can download for free and install on any Windows, Mac, or Linux-based computer, although you will find that everything we learn in this class should translate to any other commercial or open source relational database management system (RDBMS).

Welcome to class and I look forward to meeting all of you!

Course Summary:

Date	Details	Due
Fri Jan 13, 2023	📝 __What is a database?__ (https://utexas.instructure.com/courses/1360999/assignments/6153311)	due by 10:59pm
Fri Jan 20, 2023	📝 __Measuring your data shadow__ (https://utexas.instructure.com/courses/1360999/assignments/6153298)	due by 10:59pm
Fri Jan 27, 2023	📝 __Defining an entity__ (https://utexas.instructure.com/courses/1360999/assignments/6153296)	due by 10:59pm
Fri Feb 3, 2023	📝 __Problematic data collection__ (https://utexas.instructure.com/courses/1360999/assignments/6153301)	due by 10:59pm
Fri Feb 10, 2023	📝 __Words and Word Order__ (https://utexas.instructure.com/courses/1360999/assignments/6153312)	due by 10:59pm

Date	Details	Due
Fri Feb 17, 2023	📝 **Normalizing a simple database** (https://utexas.instructure.com/courses/1360999/assignments/6153299)	due by 10:59pm
Fri Feb 24, 2023	📝 **Normalizing your database** (https://utexas.instructure.com/courses/1360999/assignments/6153300)	due by 10:59pm
Fri Mar 3, 2023	📝 **All sorts of sorts** (https://utexas.instructure.com/courses/1360999/assignments/6153293)	due by 10:59pm
Fri Mar 10, 2023	📝 **Using MySQL** (https://utexas.instructure.com/courses/1360999/assignments/6153310)	due by 10:59pm
Fri Mar 17, 2023	📝 **Build a database schema** (https://utexas.instructure.com/courses/1360999/assignments/6153294)	due by 10:59pm
Fri Mar 24, 2023	📝 **Understanding SELECT statements** (https://utexas.instructure.com/courses/1360999/assignments/6153309)	due by 10:59pm
Fri Mar 31, 2023	📝 **Building a SELECT statement using JOIN** (https://utexas.instructure.com/courses/1360999/assignments/6153295)	due by 10:59pm
Mon Apr 24, 2023	📝 **Final Project: Expanding your database - schema and queries** (https://utexas.instructure.com/courses/1360999/assignments/6153297)	due by 10:59pm
Thu Apr 27, 2023	📅 **Instructor Course Evaluations Fall 2022** (https://utexas.instructure.com/calendar?event_id=3405225&include_contexts=course_1360999)	11:59pm
	📅 **In-person meeting** (https://utexas.instructure.com/calendar?event_id=3405224&include_contexts=course_1360999)	
	📝 **Readings for Module 10 - Building database schemas** (https://utexas.instructure.com/courses/1360999/assignments/6153302)	

Date	Details	Due
	📝 **Readings for Module 11 - JOINs** (https://utexas.instructure.com/courses/1360999/assignments/6153303)	
	📝 **Readings for Module 11 - SELECT Statements** (https://utexas.instructure.com/courses/1360999/assignments/6153304)	
	📝 **Readings for Module 2** (https://utexas.instructure.com/courses/1360999/assignments/6153305)	
	📝 **Readings for Module 3** (https://utexas.instructure.com/courses/1360999/assignments/6153306)	
	📝 **Readings for Module 4** (https://utexas.instructure.com/courses/1360999/assignments/6153307)	
	📝 **Readings For Module 6** (https://utexas.instructure.com/courses/1360999/assignments/6153308)	