INLS 523-001 Intro to Database

Schedule: Monday and Wednesday, 12:20-1:35pm in Manning 001

Instructor: Eric Chernoff, eric_chernoff@unc.edu, 919-270-6916

Course Website: https://sakai.unc.edu/portal/site/super_fun_database_class

Office hours: I will be in Manning Hall for 30-45 minutes after each class. I am also available to meet by appointment. I will respond to email and messages within 24 hours.

Course Overview

Hopefully, this course will be a pleasant introduction to the wonderful world of database systems. By the end of the semester, you will have a solid understanding on:

1. Why databases are used and how they represent real world information.
2. How information is organized within relational databases.
3. Methods to determine the data needs for IT projects.
4. The use of Structured Query Language (SQL) to retrieve, create, and update information in a relational database.
5. Best practices for designing relational databases in the professional world.
6. The use cases for document database and NoSQL.

We will be using MySQL to explore these topics. You will learn a lot about MySQL, but the key concepts will apply to all relational database systems.

Mandatory Required Necessities

Before participating in this exciting course, all must students must have:

- Completed the required prerequisite INLS 161.
- A proper laptop with a SSH client.
- A copy of Murach's MySQL 3rd Edition (Joel Murach, ISBN 978-1-943872-36-7)
- Access to Sakai to submit the assignments and access the course materials.

Grading / Expectations

While I am friendly and often entertaining, this is a very important course for your education and career. We will have fun, but everyone is expected to attend class, be on-time, participate, leave smart devices locked, and treat one another respectfully.

Much of our class time will be interactive lectures with plenty of time for questions and discussion. Approximately one-third of the class time will be in-class labs and practice with small groups followed by discussion. The classes and assigned readings combine to allow you to accomplish the graded assignments. It will be very difficult to pass without attending class. Please reach out to me if there is an emergency that prevents you from attending class.

The grading scale will be:

A = 90-100	B = 80 - 89.9	C = 70 - 79.9	D = 60 - 69.9	F = 0 - 59.9

Your grade will be based on the following:

Homework assignments	45%	Take home SQL exercises and design projects.
Midterm exam assignment	20%	Take home SQL exercises and short-form essay questions.
Final exam assignment	25%	Take home SQL and database design exercises and short-form essay questions.
Participation in-class labs and discussions.	10%	Active collaboration with your lab partners, contributing your thoughts and ideas. Asking your questions.

This course is about learning key information and concepts, so grading will be objective.

Our conduct in this class will be governed by the UNC Student Code of Conduct and UNC Honor Code. Information on both codes is available here: https://studentconduct.unc.edu/ While completing the assignments, please do make use of your notes, the textbox, and online reference sites (Stackoverflow.com, MySQL.com, etc.). However, you must cite your sources and you may not copy-and-paste text into your essay. (Believe me, I can tell. Use your own words.)

Your questions are welcome! Chances are someone else has the same question but might be shy -- so please ask for everyone's benefit. I am happy to answer questions in class, during office hours, and via email. I will broadcast many answers via Sakai Announcements, so help out your classmates.

Class Meeting Plan

The plan below is my most sincere intention, but is subject to change in the event of severe weather or if class discussions go long. Do plan for the indicated assignment due dates.

Audio and video recording is not allowed without the instructor's written permission.

Date	**Class Plan**
Wed, 8/21	Introduce this fantastic course, meet our wonderful classmates, and discuss the concept of databases. Brief history of database technology, then discuss how databases are used in the (real) world.
Mon, 8/26 Wed, 8/28	Things that deserve capitalization for emphasis: Relational Database Concepts, Semantic Modeling and Entity Relationships. Reading: Murach's, pages 4-21 Friday Assignment: Logging into the class MySQL server
Mon, 9/2	LABOR DAY, NO CLASS
Wed, 9/4	Review of relational databases, plus Why I Love the Structured Query Language (SQL) Reading: Murach's, pages 22-33, 66-69
Mon, 9/9 Wed, 9/10	SQL Operators: SELECT info FROM instructor WHERE will_be_on_exam = 'Yes' AND (importance > 10 OR is_boring = 'No'); Reading: Murach's, pages 74-103 Friday Assignment: Basic Querying Tasks
Mon, 9/16 Wed, 9/18	You too can be a SQL guru: Clauses, Order-by, Limit, Grouping (Aggregation) Reading: Murach's, pages 104-109 and 170-183 Friday Assignment: Intermediate Querying Tasks
Mon, 9/23	Reading is no fun without writing: SQL for creating, updating and deleting data. Reading: Murach's, pages 152 - 163
Wed, 9/25	Schema schemes: Column Data Types and SQL for defining tables (DDL) Reading: Murach's, pages 232-247 and 344-345 Friday Assignment: Aggregate Querying Tasks

Mon, 9/30 Wed, 10/2	Simple tricks for great magicians: Table Joins along with Keys and Indexes. Reading: Murach's, pages 114 - 139 and 356-357
Mon, 10/7 Wed, 10/9	The Three, Four, or Maybe Seven Forms of Database Normalization. Also, why does it need to be fast? Readings: Murach's, pages 306-331 https://blog.udemy.com/normalization-in-database-with-example/ Friday Assignment: Basic Join Queries
Mon, 10/14	Review / Q&A Session for Midterm Exam Assignment
Wed, 10/16	**1:00pm Midterm exam assignment is due.**
Mon, 10/21 Wed, 10/23	Don't be sad -- your favorite SELECT can live forever! Creating Table Views (virtual tables) Bonus: How to write slow SQL: Unions and sub-selects Reading: Murach's, pages 382-397; 200-211
Mon, 10/28 Wed, 10/30	Wisdom from the Oracle: ACID compliance and Database Transactions Reading: Murach's, pages 430-443; 42 -63 Friday Assignment: Intermediate Join Queries
Mon, 11/4 Wed, 11/6	SQL is code too: All above Stored Procedures and Triggers Reading: Murach's, pages 402-425 Friday Assignment: Creating Normalized Tables
Mon, 11/11	Calculating the right time to talk about date/time functions. Reading: Murach's, pages 270-283
Wed, 11/13	In-Class Design Lab Friday Assignment: Date and Time Calculations
Mon, 11/18 Wed, 11/20	Things your boss will ask about: 1. Database security: Encryption and SQL Injection 2. The boring stuff that saves the world: Data sanity and integrity. Readings: https://www.owasp.org/index.php/SQL_Injection https://en.wikipedia.org/wiki/Data_at_rest https://www.lifewire.com/common-database-mistakes-4140757 Friday Assignment: Advanced Join Queries

Mon, 11/25	The class where we talk about Document Databases and NoSQL Reading: https://ils.unc.edu/courses/2018_fall/inls523_004/nosql.pdf ➜ OK to skip the 'Indexing' bits, but please read the comments under the article.
Wed, 11/27	THANKSGIVING, NO CLASS
Mon, 12/2	Additional advanced concepts for DBA's, developers, and sysadmins.
Wed, 12/4	Review / Q&A Session for Final Exam Assignment Friday Assignment: Database Design Exercise (25% of Assignment grading)
Fri, 12/13	**12:00PM -** FINAL EXAM ASSIGNMENT IS DUE