COSC 304
Introduction to Database Systems

Course Introduction

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My Course Goals

My goals in teaching this course:

- Summarize and document the information in a simple, concise, and effective way for learning.
- Strive for ***all*** students to understand the material and pass the course.
- Be available for questions during class time, office hours, and at other times as needed.
- Provide a solid foundation on database systems and database application development.
- Teach students how to be a sophisticated database user (by understanding SQL), a database application programmer, and a database designer.
- Encourage students to continue with other database courses.

Course Objectives

1) To learn the relational model and relational algebra

2) To be able to query databases using SQL

3) To understand how to build database applications

4) To practice designing databases using ER/UML diagrams

5) To develop with current database systems

6) To be exposed to XML/JSON and cloud databases

Academic Dishonesty

Cheating in all its forms is strictly prohibited and will be taken very seriously by the instructor.

A guideline to what constitutes cheating:

- Assignments
  - ⇨ Working in groups comparing answers to questions once they have been solved.
  - ⇨ Copying code, even small code fragments, from other students.
  - ⇨ You may discuss general ideas and syntax, but never share code!
- Exams
  - ⇨ All exams are closed book, so no course materials should be present.

Cheating may result in a "F" for the assignment or course.

Why this Course is Important

Database systems is a required course because most systems require a database as part of their implementation.

As a developer you will need to:

- ***Query/update databases*** – SQL and relational algebra are the languages to extract information from pre-existing databases.
- ***Program with databases*** – All languages require interfaces for retrieving/updating data from databases into program code for displaying reports or processing transactions.
- ***Design databases*** – Building a new application often involves storing data persistently in a database. The ability to design a database is a leading-edge skill.
- ***Be aware of data technologies*** – XML, NoSQL, JSON, web services, and a variety of other technologies are used for web and mobile applications.

How to Pass This Course

The most important things to do to pass this course:

- Attend class
  - ⇨ Read notes *before* class.
- Do the assignments
  - ⇨ They are for marks, and they are good practice and exam questions.
- Develop a good project
  - ⇨ Spend time on selecting a good project that you will find interesting.
  - ⇨ Make sure to get started on the project early and budget sufficient time.
- Do additional questions
  - ⇨ Practice, practice, practice...

To get an “A” in this course do all the above plus:

- Do as many practice questions as possible.
- Create a really great project.

The Database Implementation Project

A significant part of your mark for the course is devoted to a major database development project.

In this project you will:

- Design a database using ER/UML diagrams.
- Write SQL to query and update the database.
- Develop a web user interface to your database.
  - ⇨ In the process you will learn HTML and JSP/PHP.

These skills are highly valuable to potential employers. Note that limited background will be given on web programming.

The project can involve teams of 3 to 4. Larger teams must develop better projects.

The Lab Assignments

Lab assignments are worth ***20%*** of your overall grade.

Lab assignments may take ***more than the two hours*** lab time.

You have at ***least one week*** after your lab to complete it.

- No late assignments will be accepted.
- An assignment may be handed in any time before the due date.

Lab assignments are done individually or in groups of two depending on the assignment.

The lab assignments are critical to learning the material and are designed to prepare you for the exams!

Real-world experience with database development.

The In-Class Clicker Questions

To help with effort and understanding, ***5%*** of the overall grade is allocated to answering in-class questions using a clicker.

- The clicker can be purchased at the bookstore and sold back to the bookstore like a used textbook.
- The clicker is personalized to you with your student number.
- At different times during the lectures, questions reviewing material will be asked. Reponses are given using the clickers.

There will be at least 70 questions throughout the semester. Each question is worth 1 mark, and you need at least 50 right answers to get the full 5%.

- That is, if you answer 40 questions right, you get 40/50 or 4%.
- **No make-ups for forgetting clicker or missing class.**

Systems and Tools

Connect is used for a discussion board, for posting marks, and for anonymous feedback.

- Please use the discussion board and feedback survey.

All software is available in the laboratory (SCI 234).

Access to both MySQL and SQL Server will be provided in the course. Access to a web server for web development will also be given. These systems will have separate user ids and passwords.

My Expectations

My goal is for you to learn the material and walk out of this course confident in your abilities:

- To query and update an existing database
- Write code interfacing with a database to build standalone and web-based applications
- Be confident in your ability to design and model a database using UML

I have high standards on the amount and difficulty of material that we cover. I expect a strong, continual effort in keeping up with readings, doing assignments, and working on projects.

The course will be very straightforward – If you do the work, you will do well.

Your mark is 80% perspiration and 20% inspiration.

Why are you here?

A) It is a required course for the COSC major.

B) This is an optional elective for my program.

What Topic are You Most Interested In?

A) What is a database and how do you use them?

B) Querying using SQL

C) Designing databases

D) Using databases with programs (stand-alone, web, mobile)

E) None of the above

What Grade are You Expecting to Get?

A) A

B) B

C) C

D) D

E) F

Database Survey Question

Question: Have you used any of these database systems?

A) MySQL

B) Microsoft Access or SQL Server

C) PostgreSQL

D) Used more than two different databases

E) Used no databases

The Essence of the Course

If you walk out of this course with nothing else you should appreciate that:

Databases are the best way for storing and manipulating *persistent* information. You will learn the skills to exploit the full power of database systems.

The skills you will acquire are in high demand for many software development jobs. Database skills make you more marketable and allow you to construct more sophisticated systems.

- Note: This is a course on how to use/program with databases. It is a very applied course with specific skills.
- If you want to learn how to build database systems and what is "inside the box", that is the subject of COSC 404!