

Introduction to COSC 3318

Dr. Bing Zhou

Course Information

- **Instructor** Dr. Bing Zhou
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 - Office Hours: MWF 9:00-10:00am, M 1:30-3:30pm, W 1:30-4:30pm, F 1:30-2:30pm
- **Teaching Assistant**
 - TBA
 - Help session: TBA
- **Keeping in Touch**
 - Course materials will be updated regularly through Blackboard

Prerequisite

- COSC 1437
- Data structures, algorithms
- Discrete math
- Software system, software engineering
- Programming language
- Algebraic expressions and laws, logic
- Basic programming environment (IDE)

Course Objective

- The student will learn how to use a database management system to record data and provide users with access to that data.
- The student will become familiar with the use of declarative query language (SQL) and how to utilize it from within programs written in some other language.
- The student will learn the importance of appropriate database design techniques for preserving the integrity of the data.

Textbook

- A First Course in Database Systems, Ullman and Widom, Prentice Hall. (3rd Ed).

Web page for the book

<http://www-db.stanford.edu/~ullman/fcdb.html>

- Optional materials: SQLite Administrator (or mySQL, PostgreSQL, Office Access, Oracle, SQL Server, etc.) should be downloaded and installed on a computer for trying examples and testing homework answers. An alternative reference for the SQL language may be helpful during those sections of the course on SQL.

Attendance Policy

- In accordance with University Policy (<http://www.shsu.edu/students/guide/polpro/attendance.html>), regular attendance is required and your attendance will be seriously monitored. So, **don't forget to give your signature on the roster**. Students are expected to arrive to the classroom *on time*, otherwise no full attendance credit for the day will be given. You are responsible for all material covered in classes, regardless of whether you attended or not. It is your responsibility to obtain class materials and class schedule information from fellow classmates if you miss a class.
- Students are also expected to pay attention during lectures, to be respectful listening when the instructor or your peers are speaking, and to be fully engaged in your learning without texting, checking your phone or email, or participating in other digital distractions. If you are distracting others in your lack of participation, you will hear from instructor via email or in a short face-to-face conference before, during or after class, and participation points will be taken away throughout the semester.

Course Grading

Homework	25%	5
First exam	15%	TBA
Second exam	15%	TBA
Third exam	15%	TBA
Course project	25%	3 parts
	5%	Proposal
	15%	Report and Implementation
	5%	Presentation
Student Participation	5%	

- Late exams are not permitted unless the student can document the serious situation that caused this to occur. Students need to attend **ALL** three exams in order to get a final grade.

Course Project

- The goal of the class project is to design, document, and implement a database system application with an appropriate user interface.
- The project includes the following activities spread over the entire semester:
 - Identify an application area for which database systems may prove beneficial,
 - Determine the functionalities of the database application,
 - Model the data stored in the database (Identify the entities, roles, relationships, constraints, etc.),
 - Design, normalize, and perfect the relational database schema,
 - Write the SQL commands to create the database, find appropriate data, and populate the database, and
 - Finally and most importantly, write the software needed to embed the database system in the application.

Course Project

- The end result should be a functioning application that runs **native and/or on the web** and that uses your database to allow useful functionality.
- A group of 3-5 students should do each project. You are free to choose your own project members. (I need to know who's in which group when you submit your project proposal)
 - Three monks have no drinking water.
 - Everybody's business is nobody's business.
- There will be 3 project assignments including project proposal, project report including source code for implementation, and class presentation to demonstrate the functionality of your application.
- **Each group should turn in a single solution to each assignment. Every member of the group will get the same grade.**

Classroom Rules of Conduct

- students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process.
- Students should turn off or mute their cellular phones and/or pagers before class begins.
- Students are prohibited from using tobacco products, making offensive remarks, using inappropriate language, socializing at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction.
- Students will be warned, then directed to leave the class and/or report to the Dean of Students for disciplinary action in accordance with university policy.

Remind

- Academic dishonesty
- Visitors in the Classroom
- Americans with Disabilities Act
- Religious Holidays

What Will You Learn in COSC3318?

- Basic concepts (what is DBMS? Basic components of DBMS...)
- Design of database (how does one build a useful database? What kind of information is stored in database? What is the structure of data?)
- Database Programming (how to query and operate on database?)

Course Goals and Outcomes

- Take an English language description and convert it into a working database application.
- Create E/R models from application descriptions.
- Convert E/R models into relational designs.
- Identify redundancies in designs and remove them using normalization techniques.
- Create databases in an RDBMS and enforce data integrity constraints using SQL.
- Write sophisticated database queries using SQL.
- Understand tradeoffs between different ways of phrasing the same query.
- Implement an application to a database.

Lecture content 1: Database Modeling

- Relational model of data (chapter 2)
- Design theory for relational model (chapter 3)
- High-level database model (chapter 4)
E/R model, UML (Unified Modeling Language), ODL (Object Definition Language)

Content 2: Relational database programming

- Abstract programming language (chapter 5) : algebra and logic
- The Standard Database Language SQL:
 - 1.DML introduction (chapter 6)
 - 2.Constraints and triggers (chapter 7)
 - 3.Views and Indexes (chapter 8)
 - 4.SQL in a server environment (chapter 9)
 - 5.Advanced topics in Relational databases (chapter 10)

Content 3: Modeling and Programming for semi-structured data

- Semi-structured-data model (chapter 11)
- Programming language for XML (chapter 12)

Any questions?