

INF 315E Introduction to Databases
School of Information
Fall 2015

Class Hours: Tuesday & Thursday 10:30 am-12:00 pm

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Course Description

Almost every website and every information system in an organization is backed by a database. If you have wondered about the following questions, this course is for you.

- How does one develop a useful database?
- What types of information go into the database?
- How is the information structured in the database?
- How do data items connect?
- How does one ask questions of the database? And how does one modify, delete or update the database?

This course introduces students to fundamental concepts of databases and practical experiences in relational database management systems (DBMS) using SQL, which is the language most often used in relational DBMS. This course will cover conceptual modeling techniques using Entity-Relationship (ER) model, SQL concepts and syntax, and how to actually use SQL in a precise way.

Learning Objectives

By the end of the semester, students will:

- Understand fundamental concepts of relational database design
- Understand the need for DBMS end users
- Have basic database skills
- Understand what SQL is conceptually, what SQL syntax is, and how to structure queries using SQL in a precise way.
- Have an ability to apply learning to define innovative and uncommon database systems

Prerequisite and Technology background

There are no prerequisites. This course is intended for non-Computer Science undergraduate students. This course assumes that students have basic computer skills, including the ability to browse the web and access web pages. No additional computer skills are assumed or required.

Recommended Books

There are no required text books for this course, but, you will find these books useful. They are available in the library. The lecture slides provided by an instructor cover the contents of those books.

Churcher, C. (2012). *Beginning Database Design: From Novice to Professional* (2nd ed.).
Apress

Forta, B. (2005). *MySQL Crash Course*. Sams

Computing resources

We will be using the class server for in-class activities and take-home assignments. Students can access the class server on-campus as well as off-campus. Students can use Mac computers in the lab, however, it is also welcomed to bring and use personal laptops.

Grading

Lab exercises (in-class) 20%

Assignments (take-home) 25%

Midterm exam (in-class) 25%

Quiz (in-class) 10%

Group project 20%

Lab exercises: Students will work on exercises in the classroom and those exercises will be submitted in Canvas. Students can work on the in-class exercises individually or in consultation with one or more other students. However, each student is expected to make his or her own submission in Canvas on time.

Assignments: Students will work individually on more advanced exercises as needed and these take-home assignments will be submitted in Canvas on time. The lowest score will be dropped in the final grade.

Midterm exam: Students will take a midterm exam in the class. The goal of midterm exam is to gauge whether students have fundamental understandings of databases and database design.

Quiz: Students will take a quiz in the class. The goal of quiz is to gauge whether you accumulated the appropriate amount of technological knowledge and developed technological skills.

Group project: Students will also work on the group project that can help understand materials through group discussions and how what they learned can be applied to real-world (This is also for fun!).

Forming groups:

In the second class meeting, we will form groups with 2-3 students per group (i.e., Each group has no more than three students). How to form groups will be discussed in the first class meeting, considering two options.

Option 1) The instructor will assign each student random number using a random number generator. Based on generated random numbers, groups will be formed.

Option 2) Students find group members who will work throughout the semester on your group project outputs and presentation. To help you find a member, we will do some in-class activities such as speed dating in the 2nd class meeting.

Each group will submit a brief information about their group (group name & group member's name) in Canvas by September 6th. It aims to help group members to get to know each other better and inform that everyone in this class successfully formed groups.

Group project outputs:

The students will work with their group members to design database and tables, using ER modeling. Then, the students will create tables and insert sample data on the class server, using the SQL statements. Each group will submit their outputs on Canvas by specified dues.

- 1 Individual project ideas—September 13th
 - This “individual” assignment aims to help every group member come up with project ideas, which will be input to decide what each group will be working on throughout this semester.
- 2 Requirements analysis (Output 1)—September 27th
- 3 ER Modeling & Relational tables (Output 2)—October 25th
 - 3.1 ER Diagram (Output 2-1)
 - 3.2 Relational tables (Output 2-2)
- 4 Database implementation & SQL queries (Output 3)
 - 4.1 Creating tables (Output 3-1)—November 15th
 - 4.2 Inserting sample data from real-world (Output 3-2)—November 29th
- 5 Associated queries for each use case (Output 4)—December 3rd

Role Playing for Group project presentation

For each group presentation session, each “individual” sign up for the session chair, the time keeper, and the discussants to keep our discussion alive. The detailed logistics and instructions for the role of chair, time keeper, and discussants will be provided in the class.

Group project presentation

Each group will give a presentation about the purposes of their databases and database design. This group presentation will be between 8 and 10 minutes in length. After

presentation, we will have 5-7 minutes for questions and discussion from everyone, of course, including your friendly discussants.

Class participation

Attendance and participation are essential. Students are expected to attend all class lectures. Failures to do so will impact your lab exercises and assignments grade. If you cannot attend, it is imperative that you let the instructor know well ahead of time.

Sending an email to the Instructor

When you send an email to the instructor, please use a brief, informative subject, which can help the instructor handle your message efficiently.

Late assignment policy

All assignments must be submitted via Canvas. Late assignments will only be excused in situations following university policy with proper documentation and timely notification. In all other cases, assignments received after the deadline will be penalized 10% per 24-hour period (e.g., if you are ten days late, your assignment will not be graded).

Grading scale

	B+	87-89	C+	77-79	D+	67-69			
A	93-100	B	83-86	C	73-76	D	63-66	F	0-59
A-	90-92	B-	80-82	C-	70-72	D-	60-62		

Course Schedule

Week	Lecture & Lab Topics	
1 st	Class Introduction	August 27 th
2 nd	Introduction to Database concepts & Data modeling using the Entity-Relationship (ER) Model: The Entity-Relationship diagram	September 1 st September 3 rd
3 rd	Data modeling using the Entity-Relationship (ER) Model: The Entity-Relationship diagram From ER Model to Relational Model	September 8 th September 10 th
4 th	Intro to Normalization: Anomalies & FD Normalization—1NF	September 15 th September 17 th
5 th	Normalization—2NF	September 22 nd , 24 th
6 th	Normalization—3NF	September 29 th October 1 st
7 th	Mid Review/ Midterm exam	October 6 th , 8 th
8 th	Introduction to SQL: basic data types CREATE Database & Tables Inserting, Deleting & Updating data	October 13 th , 15 th

	Working with the class server	
9 th	Retrieving data: The SELECT statement Filtering data: Using the WHERE clause	October 20 th , 22 nd
10 th	Summarizing data: Aggregate Functions in SQL & Subqueries	October 27 th , 29 th
11 th	Advanced SELECT: Sorting Retrieved Data & Grouping/Filtering Data	November 3 rd November 5 th
12 th	The Join Operation in SQL: Inner Join & Joining multiple tables Quiz	November 10 th , 12 th
13 th	The Join Operation in SQL: Outer Join Query optimization	November 17 th , 19 th
14 th	Thanksgiving—No class	November 24 th , 26 th
15 th	Group project presentation	December 1 st , 3 rd