

INF 315E Introduction to Databases
School of Information
Spring 2016

Class Hours: Wednesday & Friday 10:30am-12:00pm

Instructor: Eunyoungh Moon

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Office hour: By appointment via email

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

Class attendance and Participation 10%

In-class individual exercises 15%

In-class group activities 10%

Assignments (take-home) 10%

Exam1 (in-class) 15%

Exam2 (in-class) 15%

SQL Quiz (in-class) 10%

Group project 15%

1. Class attendance participation (10%)

Please note that regular attendance and active learning within the classroom are critical for receiving a good grade in this course. The minute-paper is the evidence of attendance and participation in active learning in the class.

The instructor will hand out the “minute-paper” at the start of every class. If the students are late for the class, they will be 10% penalized. Plan ahead. The students will be asked to write about at least one of the following points, depending on lecture/lab topic:

- A brief summary of what students learned from the lecture, in-class individual exercise, and in-class group activities;

- One-line brief summary states the major points of the lecture “in your own words”, not a couple of topic keywords.
- A brief summary states what you learned from in-class exercises individually or collaboratively.
- The answer to the instructor’s question in the middle of lecture
- The points are interesting/surprising.

The minute-paper can be submitted only at the end of the class. The minute-paper graded will be returned in the next class. Rubric will be provided in the first class meeting.

Attendance policy:

If you cannot attend, it is imperative that you let the instructor know well ahead of time. Absences will only be excused in situations following university policy (illness, religious holidays, participation in University activities at the request of university authorities, and compelling absences beyond your control) with proper documentation and timely notification (prior to class for non-emergencies).

If you should leave the classroom early, you should get approval from the instructor before class starts with proper documentation.

A note about Religious Holy Days

By UT Austin policy, you must notify me of your pending absence at least fourteen days prior to the date of observance of a religious holy day. If you must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, I will give you an opportunity to complete the missed work within a reasonable time after the absence.

2. In-class individual exercises (10%)

Students will work on exercises in the classroom and those exercises should 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 must make his or her own submission in Canvas on time, and hand in the minute-paper that states what he or she learned from the exercises in the classroom.

3. In-class group activities (15%)

Students will be randomly paired up with another student for collaborative learning opportunity. Students will work on exercises with their partner, and informally present the output in the classroom. Students should submit output in Canvas during class time, and the minute-paper that states what the students collaboratively learned from the activities.

4. Take-home Assignments (10%)

Students will work individually on more advanced exercises as needed and these take-home assignments will be submitted in Canvas on time.

5. Exam1 (15%)

Students will take two short-answer exams in the class. The goal of exam1 is to gauge whether students have fundamental understandings of databases and database design.

6. Exam2 (15%)

Students will take an Exam2 in the class. The goal of Exam2 is to gauge whether students accumulated the appropriate amount of knowledge about SQL part.

7. SQL Quiz (10%)

Students will take a quiz in the class. The goal of SQL quiz is to gauge whether students can write query in an accurate way to retrieve information from the database and optimize the given query.

8. Group project (15%)

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!).

8.1 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 generate sets of random numbers, using a random number generator. Each student will pick a random number. Based on a set of random numbers, each student will pair up another student.
- Option 2) Students find group members who will work throughout the semester. To help students find a group member, we will do some in-class activities such as speed dating in the third class meeting.

Output:

Each group will submit a brief information about their group in Canvas:

- Group name & why your group decided to name it
- Group member's name
- A plan for collaboration

- Where and when to meet for face-to-face meetings
- Tools used to communicate and collaborate
 - e.g., Google Docs, email etc.

It aims to help group members to get to know each other better and inform that everyone in this class successfully formed groups. Further, it helps group members make a plan about how to communicate and collaborate throughout the semester.

8.2 Individual outputs for group project

1. Individual project ideas

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 Presentation on individual ideas & Open discussion

Each student will present an individual idea for 2-3 minutes. After presentation, we will have 2-3 minutes for questions, suggestions, and constructive comments from everyone!

8.3 Collaborative outputs for group project

Once each group decides the idea to work on through semester, the students will work with their group members to develop the objectives of the database, elicit requirements, and design relational database, using ER modeling. Then, the students will create tables and insert sample data on the class server, using the SQL statements. Finally, the students will write associate query for each use case. Each group will submit their outputs in Canvas by specified dues. Instructions to help the students produce outputs will be provided in the class.

- 1 Requirements analysis
- 2 ER Modeling & Relational tables
 - 2.1 More specified requirements
 - 2.2 ER Diagram
 - 2.3 Relational tables
 - 2.4 Normalization process
- 3 Improvement of ER Modeling & Relational tables
- 4 Database implementation & SQL queries
 - 4.1 Creating tables
 - 4.2 Inserting sample data from real-world
- 5 Associated queries for each use case

8.4 Group project presentation

Group project presentation1

Each group will give a presentation about the purposes of their databases and database design. This group presentation will be between 3 and 5 minutes in length. After presentation, we will have 3-5 minutes for questions and constructive comments from everyone, of course, including your friendly discussants.

Group project presentation2

Each group will give a presentation about the purposes of their databases, how to define data types, tables populated with sample data, and associated queries for each use case. This group presentation will be between 3 and 5 minutes in length. After presentation, we will have 3-5 minutes for questions and constructive comments from everyone, of course, including your friendly discussants.

Role Playing for Group project presentation

For each group presentation session, each “individual” signs up for the session chair, 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.

8.5 Peer evaluation on collaborative group work

Group work gives you great opportunity to apply conceptual skills and theoretical knowledge to real-world practice. Working in a group provides you the opportunity to hone skills to work with group members, contribute knowledge, and manage time in a safe environment. Working in a group aims to help your collaborative learning, while working on a solo project can be a challenging task. Group project assignments are larger, more comprehensive, which individuals are not able to cope with. This peer evaluation aims to help each group effectively divide group work in advance, produce quality of work, and manage time.

The instructor will hand out the evaluation form in the class. In doing peer evaluation, you should be “professional”. Based on the evidence of “who did what”, you will assign your member a value for each listed category. You’ll do this for yourself as well. You’ll fill out and submit this form on our last class day. Failure to submit this form will get you a zero.

Academic Integrity

Each student in this course is expected to abide by the University of Texas Honor Code. Please obey **the UT Honor Code**. Any work submitted by a student in this course for academic credit will be the student’s own work.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the

assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Sending an email to the Instructor

When you send an email to the instructor, please use a brief, informative subject with a prefix [INF315E], which can help the instructor handle your message efficiently.

Late submission policy

All assignments must be submitted via Canvas. Late assignments will only be excused in situations following university policy with proper documentation (e.g., medical proof of illness) and timely notification (see Attendance Policy). In all other cases, **assignments** received after the deadline will be **docked 20% per 24-hour period** (i.e., if you are five days late, your assignment will not be graded).

Grading scale

		B+	87-89.99	C+	77-79.99	D+	67-69.99		
A	94-100	B	84-86.99	C	74-76.99	D	64-66.99	F	0-59
A-	90-93.99	B-	80-83.99	C-	70-73.99	D-	60-63.99		

Course Schedule

The schedule might be adjusted to enhance the class learning opportunity. The students have responsibility and obligation to come to class and keep track of ongoing class schedule.

Week	Date	Lecture & Lab Topics
1 st	January 20 th	Class Introduction **In-class activity: Break the ice ☺
1 st	January 22 nd	Introduction to Database concepts
2 nd	January 27 th	Data modeling using the Entity-Relationship (ER) Model: The Entity-Relationship diagram
2 nd	January 29 th	Data modeling using the Entity-Relationship (ER) Model: The Entity-Relationship diagram
3 rd	February 3 rd	Data modeling using the Entity-Relationship (ER) Model: The Entity-Relationship diagram

3 rd	February 5 th	From ER Model to Relational Model
4 th	February 10 th	**Presentation—individual idea for group project & Open discussion
4 th	February 12 th	Intro to Normalization: Anomalies & FD
5 th	February 17 th	Intro to Normalization: Anomalies & FD
5 th	February 19 th	Normalization—1NF
6 th	February 24 th	Normalization—2NF
6 th	February 26 th	Normalization—3NF
7 th	March 2 nd	Review
7 th	March 4 th	**Exam1 (in-class)
8 th	March 9 th	**Group project presentation1
8 th	March 11 th	Introduction to SQL: basic data types Working with the class server
9 th	March 16 th , 18 th	Spring break—No class
10 th	March 23 rd	CREATE Database & Tables Inserting, Deleting & Updating data
10 th	March 30 th	Retrieving data: The SELECT statement Filtering data: Using the WHERE clause
11 th	April 6 th	Summarizing data: Aggregate Functions in SQL & Subqueries
12 th	April 13 th	Advanced SELECT: Sorting Retrieved Data & Grouping/Filtering Data
13 th	April 20 th	**Exam2 (in-class) The Join Operation in SQL: Cross Join, Natural Join & Inner Join
14 th	April 27 th	Joining multiple tables
14 th	April 29 th	The Join Operation in SQL: Outer Join Query optimization
15 th	May 4 th	**SQL Quiz (in-class)
16 th	May 6 th	*Group project presentation2