INF 315E Introduction to Databases
School of Information
Summer 2017

Class Hours: Monday & Thursday 10:00 am-12:30 pm
Instructor: Eunyoung Moon
Email: eymoon@utexas.edu
Office hour: Monday & Thursday 12:30 pm-1:30 pm

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.


**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 students are late for the class, they will be 10% penalized. Plan ahead. In every class, 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, for example:
o One-line brief summary states the major points of the lecture “in your own words”, not a couple of topic keywords.
o 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 that are interesting or 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. There is no penalty for incorrect answers but students are strongly encouraged to state where they are stuck or which part needs more explanations. Rubric will be provided in the first class meeting.

**Attendance policy:**
If a student cannot attend, it is imperative that he or she 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 a student should leave the classroom early, he or she should get approval from the instructor before class starts with proper documentation. Otherwise, his or her minute paper will not be accepted.

**A note about Religious Holy Days**
By UT Austin policy, a student must notify the instructor of his or her pending absence at least fourteen days prior to the date of observance of a religious holy day. If a student must miss a class, an examination, a work assignment, or a project in order to observe a religious holy day, the instructor will give him or her 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 as well as 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 their knowledge and skills 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 two students per group (i.e., Each group has no more than two 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 classroom.

Output:
Each group will submit a brief information in Canvas:
• Group name & the rationale behind it
• Group member’s name
• A plan for collaboration
  o Where and when to meet for face-to-face meetings
  o Tools which will be 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. Instructor will provide plenty of resources in which students can explore and get inspired for the project idea.

2 Presentation on individual ideas & Open discussion
Each student will present an individual idea for three minute. After presentation, we will have time for questions, suggestions, and constructive comments from everyone!

8.3 Collaborative outputs for group project
Once each group makes a decision on the idea to work on throughout 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 will be provided in the class.

1 Requirements analysis
2 ER Modeling & Relational tables
   2.1 ER Diagram
   2.2 Relational tables
   2.3 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 students great opportunity to apply conceptual skills and theoretical knowledge to real-world practice. Working in a group provides students 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 students’ 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, students should be “professional”. Based on the evidence of “who did what”, each student will assign his or her member a value for each listed category. Each student will do this for oneself as well. Each student will fill out by hand and submit this form on our last class day. Failure to submit this form will get the student 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**

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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tr>
<td>A</td>
<td>94-100</td>
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<td>A-</td>
<td>90-93.99</td>
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<td>84-86.99</td>
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<td>67-69.99</td>
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<td>F</td>
<td>0-59</td>
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**Course Schedule (Tentative)**
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.

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<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture &amp; Lab Topics</th>
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<tbody>
<tr>
<td>1-1</td>
<td>June 1st</td>
<td>Introduction to Database concepts</td>
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<td>Data modeling using the Entity-Relationship (ER) Model:</td>
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<td>The Entity-Relationship diagram</td>
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<td>2-1</td>
<td>June 5th</td>
<td>Data modeling using the Entity-Relationship (ER) Model:</td>
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<td>The Entity-Relationship diagram</td>
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<td>2-2</td>
<td>June 8th</td>
<td>From ER Model to Relational Model</td>
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<td>3-1</td>
<td>June 12th</td>
<td>Intro to Normalization: Anomalies &amp; FD</td>
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<td>3-2</td>
<td>June 15&lt;sup&gt;th&lt;/sup&gt; Normalization—1NF</td>
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<td>4-1</td>
<td>June 19&lt;sup&gt;th&lt;/sup&gt; Normalization—2NF</td>
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<td>4-2</td>
<td>June 22&lt;sup&gt;nd&lt;/sup&gt; Normalization—3NF</td>
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<td></td>
<td><strong>Review: Prep for Exam 1</strong></td>
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<tr>
<td>5-1</td>
<td>June 26&lt;sup&gt;th&lt;/sup&gt; <strong>Exam1 (in-class)</strong></td>
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<td>5-2</td>
<td>June 29&lt;sup&gt;th&lt;/sup&gt; Introduction to SQL: basic data types</td>
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<td>Working with the class server</td>
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<td>CREATE Database &amp; Tables</td>
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<td><em>Group project presentation 1</em></td>
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<td>6-1</td>
<td>July 3&lt;sup&gt;rd&lt;/sup&gt; Manipulating Data: Inserting, Deleting, Updating</td>
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<td>July 6&lt;sup&gt;th&lt;/sup&gt; Filtering data: Using the WHERE clause &amp; Operators</td>
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<td>July 10&lt;sup&gt;th&lt;/sup&gt; Summarizing data: Aggregate Functions in SQL &amp; Subqueries</td>
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<td>Group meeting: Middle-point check of progress</td>
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<td>Other data manipulation functions</td>
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<td>7-2</td>
<td>July 13&lt;sup&gt;th&lt;/sup&gt; Advanced SELECT: Sorting Retrieved Data &amp; Grouping/Filtering Data</td>
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<td>July 17&lt;sup&gt;th&lt;/sup&gt; Advanced SELECT: Filtering Groups—HAVING vs. WHERE</td>
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<td>The Join Operation in SQL: Cartesian product</td>
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<td><strong>Review: Prep for Exam2</strong></td>
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<td>8-2</td>
<td>July 20&lt;sup&gt;th&lt;/sup&gt; <strong>Exam2 (in-class)</strong></td>
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<td>Natural Join &amp; Inner Join</td>
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<td>Joining multiple tables</td>
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<td>9-1</td>
<td>July 24&lt;sup&gt;th&lt;/sup&gt; The Join Operation in SQL: Outer Join</td>
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<td>Query optimization</td>
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<td>9-2</td>
<td>July 27&lt;sup&gt;th&lt;/sup&gt; <strong>SQL Quiz (in-class)</strong></td>
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<td>*Group project presentation2</td>
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