Sisi Virasak
CS275 – Database Systems Winter 2020 Syllabus

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Course Description and Objectives:
This course introduces the design, purpose and maintenance of a database system. Topics covered include the entity-relationship (ER) model, relational systems, data definition, data manipulation, query language and database management environments. Prerequisites: CS 161 Introduction to Computer Science I with a grade of "C" or better.

Learning resources:

1. Textbook: Open Source https://opentextbc.ca/dbdesign01/ Database Design 2nd Edition Adrienne Watt
2. (required) USB thumb drive with a minimum capacity of 16MB.
3. (required...) The SQL language – available through several media; we may also discuss Oracle specific extensions to the SQL language (we will discuss this some as the class progresses).
4. (strongly recommended) A desire to learn and experiment, to design, test, and problem solve with code (both on and off of a computer).

Learner Outcomes:

1. Upon successful completion of this course, students will be able to:
2. Describe and explain a select list of common database management system terms.
3. Design and produce relational database models using entity relationship diagrams, integrity rules and normalization.
4. Write structure query language (SQL) statements to select, update and delete records. Write SQL statements to create, modify and drop tables.
5. Write SQL statements that use joins and set operators with multiple tables.

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Grades Table:

Assignments/Exams	Weight
Assignments	50%
Final Project	50%
TOTAL	100%
Grades: **IMPORTANT:** A grade of "C" or higher is considered passing.	A: 90-100% B: 80-89% C: 70-79% D: 60-69% F: < 60% P: >= 70% NP: < 70%

Academic Honesty:

Helping, or being helped by, another student during an exam will be considered a breach of academic honesty and is grounds for receiving a zero grade and/or failing the course among other possible remedies.

Classroom Conduct:

1) Please silence cell phones and do not use during class.
2) Please respect the learning environment of others and keep distractions to a minimum.

LBCC Center for Accessibility Resources:

Students who may need accommodations due to documented disabilities, or who have medical information which the instructor should know, or who need special arrangements in an emergency, should speak with the instructor during the first week of class. If you believe you may need accommodations, but are not yet registered with CFAR, please go to http://linnbenton.edu/cfar for steps on how to apply for services or call 541-917-4789.

LBCC Comprehensive Statement of Nondiscrimination:

LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws.

LBCC Statement of Inclusion:

The LBCC community is enriched by diversity. Each individual has worth and makes contributions to create that diversity at the college. Everyone has the right to think, learn, and work together in an environment of respect, tolerance, and goodwill (related to Board Policy #1015).

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*** As the course progresses, assignments and due dates may be subject to change.**

Week	Activity
Week-1 April 6	➢ Welcome, introductions, scope & set clear expectations ➢ Basics of a relational database (reduce redundancy, ensure accuracy and integrity, reliable access) ➢ Database concepts and the relational model ➢ (design) ER-diagram basics (entity, attribute, relationship, cardinality, optionality) ➢ Assignment 1 (due 19 April): Create a design for a database with at least 4 entities and its related attributes and relationships (a business or other organization works very well)
Week-2 April 13	➢ Discuss how you named your entities, attributes, and (hopefully) your naming convention (design) use-cases, business rules ➢ (design) identify candidate keys (consider compound keys?) and select primary keys ➢ (design) identify potential relationships, consider intersection entities ➢ Assignment 2 (due 03 May): identify relationships, intersection entities, candidate keys, choose primary key, write down any special rules that come up, and write down at least three use-cases for users of the database.
Week-3 April 20	➢ (implementation) database, table, field, size, datatype, row, primary and foreign keys SQL intro (create, drop, insert, update, select, delete)
Week-4 April 27	➢ (implementation) integrity checks (constraints), indices More SQL (aliases, like, order by, where, group by, having) Assignment 3 (due 17 May): create a prototype database with tables, fields with appropriate data types (jot down a reason for picking each data type in a document to go along with the design), primary key, and foreign keys as appropriate, fill in the database with some simple data, test your data with a couple simple select queries, and lastly create a script that will create this structure and test it for you!

Week-5 May 4	➢ (implementation) More advanced SQL (distinct, range, set membership, patterns, NULL, functions and ➢ aggregates, select into, insert into select)
Week-6 May 11	➢ (design and implementation) Even more SQL (subqueries, joins, set operations (implemented with joins))
	➢ Intro to stored procedures. ➢ Permissions? ➢ Assignment 4 (due 28 May): Create a query including a subquery, and a query for each of the common joins ➢ (inner, left, right, full)
Week-7 May 18	➢ (design and implementation) Optimizations?
Week-8 May 25	O Discuss Final Project (due Thursday, 11 June)
Week-9 June 01	➢ Final Projects
Week-10 June 8	➢ **Final Project Due: Thursday 23:59, 11 June, 2020**

Potentially helpful links:

Database design:

General tips: http://www.vertabelo.com/blog/notes-from-the-lab/9-tips-for-better-databasedesign

Detailed design process and example:
http://www.cs.cityu.edu.hk/~helena/cs34622000B/DBDesign.pdf

Final project requirements:

Design: ER diagram, candidate keys, use cases, business rules
Implementation: script to create database, tables, fields, constraints, prototype data Testing:
SQL queries that verify the prototype data (at least proof of concept that the data is
correctly in there) and demonstrate the various relationships that are throughout the data.
Reflection:
What items were most challenging to decide on?
What items might other have missed if they were supposed to implement your database?
Are there any ways you could improve your database (design, implementation, or optimization)?

Common SQL commands:

Generic CREATE TABLE:
create table <tableName>
(columnName dataType [null | not null][, …]) Generic
DROP TABLE:
drop table <tableName> [restrict | cascade] Generic
INSERT:
insert into <tableName>
values(<value(s)>)
Generic UPDATE:
update <tableName>
set <columnName> = <value> [, <columnName> = <value>...]
where <condition> Generic SELECT:
select [distinct] <column(s)>
from <tableName> [where
<condition>]
[group by <column(s)>]
[having <condition>]
[order by <column(s)>]
Generic DELETE: delete
from <tableName>
[where <condition>]