

CMSI 586 Database Design and Database Systems I

Spring 2014 -- 3.0 units

Monday, 6:30-9:30 p.m. in Doolan 222

Final exam **6:30 p.m. on Monday, May 5, 2014**

Course Overview

Dr. Stephanie E. August *Associate Professor*

Office Hours: Monday, 5:00-6:00 p.m.

Wednesday, 1:00-4:00 p.m. *and by appointment.*

Office: Doolan 201b

Students are welcome to drop by any time and check whether instructor is available

Phone: (310) 338-5973

Internet: saugust@lmu.edu

Prof. August plans to respond within one business day.

Saturday, Sunday, and holidays are not business days.

Website: <http://myweb.lmu.edu/saugust>

Course Website: MYLMU Connect

Course Description

This course introduces the essential principles that guide the design, implementation, and management of systems capable of managing large amounts of data efficiently. Topics include database system structure, semantic data modeling, relational databases, formal query languages, integrity and security, physical design of databases, indexing and hashing. Query processing and optimization, transaction processing, concurrency, and crash recovery are introduced. The course includes hands-on experience with a DBMS and database design tool. Additional topics, such as XML, spatial databases, data warehousing, and data mining, are surveyed, based upon student interest.

Specific Learning Outcomes:

Upon completion of this course, it is anticipated that the student will be able to:

- Use an entity-relationship diagram to design a small relational database
- Document a relational database
- Normalize an existing database
- Create and populate database tables
- Write basic database queries using SQL
- Map database schema to class diagrams
- Design and perform an acceptance test for a database
- Estimate the time required to process basic database queries
- Identify factors that determine the efficiency and effectiveness of a database
- Identify trade-offs among hierarchical, network, object, object-relational, relational, and XML data models

Prerequisites

Graduate student standing or permission of the instructor. Prior programming experience is not required.

Required

- . Willingness to participate in class discussions, workshops, and classroom activities, and to complete readings prior to lectures. Classroom activities will include both individual and group assignments.
- . One 15-minute meeting with the instructor during the first half of the semester, either during office hours or by appointment.
- . One-on-one demonstration of the database project for the instructor at the end of the term.

Expected Work

Readings prior to lectures, and participation in class discussions and workshops.

One 1500-word paper and oral presentation to the class during the final exam period on a recent advancement in database technology.

Hands-on sessions in the computer lab to learn data modeling and a database query language. Class time will be set aside for some but not all of this work. The amount of time required outside of class will depend upon student preparation for the in-class sessions.

Term project involving the description and definition of a DBMS for a business enterprise.

- . The course project is due on the last day of class.
- . The course project includes multiple deliverables outlined in the project handout.
- . The deliverables are treated as homework assignments.
- . They are reviewed and returned, with the expectation that each subsequent deliverable will incorporate the previous, and now revised, deliverables.
- . If you complete all class assignments well and on time, the majority of the work for the project will be completed before the project is due.
- . The final project submission is the basis for the full project grade, which means that working on the project throughout the semester can lead to a perfect score on the project.

Project Notebooks

- . A 3-ring binder has proved to be the most effective way to (a) review consistency among components of the project, e.g., requirements, ERD, and DDL, and (b) to keep track of comments made on the various iterations of the project for each student.
- . I expect each student to store in a 3-ring binder, neatly organized, all documents related to the term project. The project binder must be complete, up-to-date, and available on each project due date. At the end of the term, students turn in the notebook for final grading. Students can pick up their graded project notebooks at the beginning of the following term. Any projects remaining after three weeks into the subsequent term will be recycled.

MyLMU|Connect will be used to distribute course updates, assignments, and documents. Students are expected to check the MyLMU|Connect course twice a week and make certain they receive email addressed to their LionMail email account.

Completion of all book problems related to the assigned readings is recommended

Work Load Expectations

Students are expected to spend an average minimum of eight hours per week on class-related learning activities, in line with LMU's Credit Hour Policy (see http://www.lmu.edu/Assets/LMU+Credit+Hour+Policy_Final.pdf). Programming assignments might require additional time for some students to complete.

Slip Days

You have three (3) *Slip Days*.

- . Use them to extend a due date, 1 slip day for a 1-day extension
- . Use them one at a time or all at once or in any combination
- . They follow you around when you pair up – you are counted individually!
 - E.g. A has 2, B has 0. Project is late by 1 day. A uses 1, B is 1 day late
- . Late is 1/3 off per day

Exams

Two midterms.

Text and Required Materials

Silberschatz, Abraham, Korth, Henry F. and Sudarshan, S. *Database System Concepts*. 6th ed. Mc Graw-Hill, 2011. ISBN 978-0-07-352332-3 Any edition or similar textbook will do, but it will be the student's responsibility to identify relevant portions of the text.

Required technology:

- Access to a computer running MySQL Workbench or similar DBMS engine. This is available online in the Keck Lab.
- Access to a computer running Embarcadero's ER/Studio. This is available in the Keck Lab and in the D217 Lab. A trial version can also be downloaded for use for a limited time.
- Access to course information on *MyLMU Connect*. Students are expected to inspect the course MyLMU|Connect frequently for announcements, updates, assignments, and documents, and to use MyLMU|Connect to communicate among class members.
- *LionShare* or similar file sharing software to make student files available to the instructor and other students.

Useful technology:

- Laptop for in-class activities. Not required; these group activities simply require *someone* in each group to bring a laptop to class.

Additional References

Churcher, Clare. *Beginning database design: from novice to professional*. Apress, Berkeley, CA, 2007. ISBN978-1590597699

Connolly, Thomas, Begg, Carolyn E., and Begg, Carolyn. *Database Systems: A practical approach to design, implementation and management*. 4th ed. Addison-Wesley, Harlow, England, 2004. ISBN 978-0321210258

Date, C. J. *An Introduction to Database Systems*. 8th edition. Addison-Wesley Publishing Company, Reading MA, 2003.

Date, C.J and Darwin, Hugh. *A Guide to the SQL Standard: A user's guide to the standard relational language SQL*. 4th ed. Addison-Wesley, Reading MA, 1997.

Elmasri, Ramez and Navathe, Shamkant B. *Fundamentals of Database Systems*. 5th ed. Addison-Wesley, Reading MA, 2006.

Shah, Nilesh. *Database Systems Using Oracle: A Simplified Guide to SQL and PL/SQL*. 2nd ed. Prentice Hall, 2004.

Garcia-Molina, Hector; Ullman, Jeffrey D; and Widom, Jennifer D. *Database Systems: The Complete Book*. Prentice Hall, 2001.

Supplementary materials as posted on MyLMU|Connect or handed out in class.

Tentative Nature of the Syllabus

If necessary, this syllabus and its contents are subject to revision; students are responsible for any changes or modifications distributed in class or posted on LMU's course management system MYLMU Connect.

Grading

Your final grade will be weighted as follows:

Activity	Percentage of Total Grade
Participation	20%
Project	30%
Midterms (two)	40%
Paper and Presentation	10%

Participation rewards good behavior. Think EPA:

- . Effort: Office hours, doing every single reading, writing, programming, presentation assignment
- . Participation: Actively participating in all classroom activities, engaging in online discussions
- . Altruism: Helping other students in lab sessions, answering questions on the discussion board

All assignments, project materials, and oral presentations will be graded on content (50%) and presentation (50%). Assignments and other materials are to be uploaded to MyLMU|Connect or left on the instructor's desk, depending upon the assignment, before class on the due date. Papers not submitted by 10 minutes after class has started are considered late. Late assignments are penalized as noted in *Slip Days* above.

The course project includes multiple deliverables outlined in the project handout. Each deliverable is reviewed, graded, and returned, with the expectation that each subsequent deliverable will incorporate the previous, and now revised, deliverables. The final project submission is the basis for the full project grade, which means that working on the project throughout the semester can lead to a perfect score on the project.

Students will participate in several group activities in the classroom over the course of the semester. Students will be graded both on the group product and on their individual contribution to the group effort. Students who miss these activities will receive no credit for the group product. Make sure your name is on each group report.

A request for a grade of Incomplete will be considered only when the student requesting the incomplete has completed 80% of the coursework, and has at least a B average in the coursework completed.

Refer to the *Teaching Philosophy and Course Policies* handout for additional information.