CSCI 403: Database Management
Winter/Spring 2012, M/W/F 3-4PM, Green Center 249

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Office hours are M/W/F 12PM – 2PM and by appointment.

Course Web home: http://mines.humanoriented.com/403/

Prerequisite: CSCI 262 Data Structures

Texts: The Definitive Guide to SQLite. 2nd Ed. Allen & Owens. Apress. 2011.
MySQL Tutorial. Welling, Thomson. MySQL Press, 2003.

Both texts are required.

Course Objectives

The goal of this course is to understand and *to be able to apply* the basic concepts of modern database systems. Topics include:

- The entity-relationship model
- Relational data model, constraints, relational algebra
- Fundamental design principles and techniques of relational databases, eg, normalization.
- SQL
- Stored procedures, triggers
- Database programming, ORM tools
- File structures and indexes
- Fundamentals of administration, performance and optimization
- Postmodern, distributed and document-oriented databases

Grading

- Attendance/Participation 10%
- Homework/Quizzes 20%
- Projects 40%
- Midterm 15%
- Final 15%

Attendance/Participation

You are expected to be present for class (of course!), to participate in discussion/presentations and to participate in our online forum. This is a fun but challenging class that demands your consistent participation. A 24-hour advance notice via email of your pending absence will excuse you from class. *More than two unexcused absences will be met with my eeeevil wrath.*

Homework

There will reading assignments and quizzes assigned frequently, with the goal of preparing you for the midterm and final. *Late homework will not be accepted*, unless discussed *in advance* with the instructor.

Projects

We will be engaged in multiple projects designing, implementing, maintaining and programming with a relational database system. This is the most critical component in reaching our course objectives. Additional details will be provided during class.

Exams

One midterm exam will be conducted the week of March 5, 2012.

The final exam will be conducted during the week of May 7, 2012.

A makeup examination can be arranged only when a student has an emergency (eg, medical emergency or urgent family matter). The student may be asked to provide the instructor with an appropriate document, such as a doctor's note.

Accommodation

If you need certain accommodation based on disability, talk to the instructor in person so that appropriate arrangements can be made. *If you will be absent from class, you will be excused if you send me an email or tell me in person ahead of your absence.*

Course Schedule

This schedule is not fixed in stone and is subject to change according to the actual progress of the course.

Week	Lecture	Reading*
1	Introduction, Basic Concepts, History	SQLite 1
2	Data Storage, Data Models, SQLite	SQLite 2, FDBS 1, 2 (pdf)
3	Design, ER Model, EER, UML	FDBS 3 (pdf)
4	Design, Relational Model, SQL & SQLite	SQLite 3, FDBS 5, 7 (pdf)
5	Design, ER-to-Relational Mapping, SQL	SQLite 4
6	Design, Normalization, Relational Algebra, Relational Calculus, SQL	SQLite 4
7	Transactions, Locking, Joins, Views, Triggers, SQL	
8	Database Programming (All languages), Intro to Ruby	
9	**Midterm**, ORMs, ActiveRecord	SQLite 5
10	(Spring Break)	
11	Client-Server, MySQL, Stored Procedures	MySQL
12	Backup, Security, Exploits, Disaster Recovery	MySQL
13	Performance, Scalability, Clustering, Hardware, Topologies	MySQL
14	Data Warehousing, Cloud-Based Infrastructures	
15	XML Databases, Key-Value Stores, Column-Oriented DBs	
16	Document-Oriented, OODBs, Graph-Oriented	
17	(Dead Week) Problems, Trends, Big Data	
18	Final Exam	

* Chapters noted are from textbooks and provided pdfs and are provided here merely as a guide.

On Collaboration & Academic Integrity

Students are encouraged to discuss and collaborate as much as possible. However, it is obviously not acceptable to copy another student's solution. Your work must be your own. In addition, simply copying solutions found online is not acceptable. Be aware that homework assignments, project and midterm will not just focus on producing correct code, but explaining how things work.

Please review the Student Handbook for details on academic dishonesty.

Examples of Academic Misconduct

To clarify what constitutes illegitimate collaboration, please note the following examples of what is considered inappropriate.

- Viewing another student's quiz, test, paper, code or database schema while working on your own.
- Providing another student a copy, electronic or otherwise, of your work.
- Accepting a copy, electronic or otherwise, of another student's work.
- Copying and pasting *any* component of another student's work into your own.
- Copying solutions found online or otherwise, pasting it into your own work without proper citation.

Academic Integrity Pledge

Being enrolled in this class means that you pledge to uphold the high standards of academic ethics and integrity expressed by the Colorado School of Mines Student Honor Code by which you are bound. In particular, you will not misrepresent the work of others as my own, nor will you give or receive unauthorized assistance in the performance of academic coursework. You should understand that your instructor will report any infraction of academic integrity to the department head and that any such matter will be investigated and prosecuted fully.