

CMPE 226 – Database Systems
Spring 2008

Course Information

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Office Hours: T 3:00 – 5:00 PM

Th 5:00 – 8:00 PM

(or by appointment)

Course Description

Catalog Description (Keywords)

Database concepts and architecture. Logical and physical data organization. Relational, hierarchical and network databases. Security/integrity, recovery/concurrency. Design project.

Prerequisite: CMPE 200 or instructor's consent

The main focus of this course is to understand database management systems. We will examine database systems from the point of view of the database user, designer and application programmer. More specifically, we will cover several approaches for designing the database, such as the entity-relationship data model and the relational model, and study how we can describe queries about the content of the database using relational algebra. We will also overview SQL, which is the high level language used by most commercial database management systems. Finally, we will cover other important aspects of database systems, such as sequential dependencies, transaction management, storage, and indexing.

This course involves a group-based term project to provide students with the opportunity to build a simplified database-backed application, and to enhance their professional engineering skills including teamwork, technical leadership, and effective communication skills. The course also includes a set of individual assignments to enable students deepen their knowledge on the material.

Student Learning Objectives

Upon successful completion of this course, the students will:

- Have in-depth knowledge of the fundamental concepts and techniques that are related to database management systems.

- Understand the process of designing a database.
- Understand how data is organized within a database and be able to use relational algebra in order to query this data.
- Be able to effectively use SQL to query a DBMS.
- Understand how transaction management, data storage, indexing, and query evaluation is performed within a database system.
- Gain hands-on experience by conducting a group-based term project on designing and developing a database application.
- Be able to effectively present and communicate the knowledge they have acquired in the course.

Reading Material

Textbook:

Database Systems, The Complete Book

by Hector Garcia-Molina, Jeffrey D. Ullman, and Jennifer Widom
Prentice Hall (2002)

IMPORTANT NOTICE: Most homework assignments will use the [Gradiance](#) on-line homework system. Each student will need a unique code in order to gain access to the homeworks. If you do not own a copy of the textbook that includes an access code, you should purchase an access code separately from the textbook. Please contact the instructor if you have any questions on this matter.

Other Material (available from the class web site):

- Various papers and online resources
- Handouts

Required Software

- The group project will be built using the open source DBMS [MySQL](#). The front-end of the application will be built using any programming language, including Java, C++, or PHP.

Syllabus (tentative)

<i>Topics</i>	<i>Lectures</i>
Introduction	1
E-R model	1
Relational model	1
Relational Algebra/Calculus	1-2
SQL	1-2
Transaction Management	1-2

Functional Dependencies	1-2
Data Storage and Buffering	1
Indexing	1
Query Evaluation	1
Logical Query Languages	1
Alternative Data Models	1
Data Warehousing and Data Mining	1

Student Assessment

Class attendance and participation	5%
Individual Homework Assignments	15%
Term Project	20%
Midterm Examination	25%
Final Examination (comprehensive)	35%

- (A-, A, A+) ≥ 90 ,
- (B-, B, B+) ≥ 70 and < 90 ,
- (C-, C, C+) ≥ 60 and < 70 ,
- (D-, D, D+) ≥ 50 and < 60 ,
- (F) < 50

- **Students must obtain a passing grade ($>50\%$) in all components of the course in order to pass the class**
- **No late assignments will be accepted.** An extension will be granted only if a student has a written medical excuse (doctor's note).
- **The exam dates are final.**

Descriptions of Assignments/Exams

Exams: Exams will be in the form of short answer questions and will be based on the individual assignments and course material.

Class Attendance and Participation: Students will be evaluated based on their participation in class and online discussions and in-class written assignments.

Individual Written and Programming Assignments: Students will have to complete a homework assignment every 1-2 weeks. All homework assignments will use the [Gradiance](#) (GOAL) on-line homework system.

Group Project: Groups of 2 students will be formed to work on a term-long group project related to database systems. The project has deliverables throughout the semester. The quality and completeness of all