CS 385 Applied Database Management Systems

Course Description:	A study of basic Database Management Systems (DBMS) concepts. Topics include DBMS models, query languages, existing DBMS, data integrity, database recovery and concurrency control.
Prerequisites:	CS250
Credits:	3 S.H.
Textbook:	Database System Concepts, 6th Edition, by Abraham Silberschatz, Henry F. Korth and S. Sudarsham, ISBN 978-0-07-352332-3

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Database management system is the system in which related data is stored in an "efficient" and "compact" manner. It plays an important role in many areas of our life. Businesses uses directory services that provided prompt searches for their company information, web search engine queries are able to locate data within the World Wide Web, retailers have also benefited from the developments with data warehousing, etc.
We will cover DBMS models, relational database and its query language, data transactions, concurrency control and recovery system.

Course Objectives and Expectations:

Upon entering CS 385, students should have

- one year of experiences in computer programming using packages or modules in Java, C, or C++.

Upon completing CS 385, student should

- understand concepts of relational algebra and relational calculus;
- understand the entity-relationship model and use it to correctly design relational database;
- be able to program in SQL, and
- Boyce-Codd normal form (3.5NF).

Course Outline:

1. Introduction to database management systems
    a. Types of database management systems
    b. Applications of database management systems
    c. Database server and integrated development environment
    d. Relational database systems
2. Relational algebra
    a. Set operators

   b. Selection, projection and renaming
   c. Natural join and outer joins
   d. Aggregations
   e. Implementation of relational operators
3. The Design of a database system
   a. Entity-relationship model
   b. Entity and weak entity
   c. Relationships, roles and cardinalities
   d. Foot notions
4. Database normalization
   a. Functional dependencies
   b. Canonical cover
   c. Closure of attributes
   d. The first normal form (1NF)
   e. The second normal form (2NF)
   f. The Boyce-Codd normal form (BCNF)
   g. Normalization algorithms
5. Data Storage
   a. Hierarchy of physical storage media
   b. File organization

Course Grading:

Labs & Homework (20%)
Term Project (25%):
Status Report (5%), Final Implementation (15%), Presentation (5%)
Two Quizzes 10% each
Midterm 15%, and Final Exam (20%)

Suggestions by Instructor:

Please note that programming projects which are not done with a "good faith" effort, especially those which have compiler errors, will receive minimal (if any) points. I encourage you to talk to me or our tutor if you have difficulty understanding the material or getting "stuck", or if you are unsure of what is expected of you for the assignment. Programming projects, which are based on those in the text, will have their due dates announced in class or on the assignments. Projects may be done in pairs **only** when clearly designated on the assignment.