Guideline for CSSE 370 Introduction to Database Systems

370

Catalog description: Introduction to database management systems, architecture, and environment. Database design process and database data modeling include entity relationship (ER), enhanced ER techniques, relational and extended relational data models. Overview of the fundamental concepts of transaction management, security and recovery control. Pre-requisite: C(2.0) or better in CSSE 250 Data Structures.

Course objective: Provide hands-on understanding of the foundation of database management systems (DBMS), relational database design and related topics. Overview of the concepts of transaction processing, concurrency control, and recovery.

Pre-requisite knowledge: CSSE 250 Data Structures (arrays, stacks, queues, linked lists, etc.)
Programming skill in a high-level language

Topics covered:

1) Overview of database management systems (DBMS): basic system architecture and environment (various types of users, data models, database languages, …)
2) Relational Database design
3) Overview of relational data model, relational algebra and database languages
4) ER and EER design techniques
5) Query languages with emphasis on SQL
6) ER/EER-to-relational transformation
7) functional dependencies
8) normalization, 1NF, 2NF, 3NF, BCNF, mulitivalued dependencies and 4NF
9) algorithms for relational database schema design
10) overview of transaction processing, concurrency control, and recovery

Assessment: Students to demonstrate mastery of all concepts and practical skills via homework assignments, a quarter-length database design and implementation project, and exams.

Comments:

1) A database design and implementation project is required to develop facility in the:
   - use of a professional DBMS, e.g., Oracle, SQL Server, Access, etc.
   - design of a relational database emphasizing:
     - ER/EER design of a database
     - ER/EER-to-relational transformation
     - normalization through 4NF
   - construction and deciphering of basic SQL queries with emphasis on the DML.
2) Homework assignments provide practice and allow the student to demonstrate conceptual understanding of topics. Assignments are a combination of written problems, and SQL programming exercises. Some instructors may wish to include QBE, also.

Demonstrable Outcome:

1) demonstrate knowledge of basic database terms/definitions, concepts, design techniques and SQL query writing.

2) understand and evaluate the tradeoffs between ER and EER design techniques and different levels of normalization.

3) recognize and evaluate varied SQL queries.