Course Title : Introduction to Database Systems
Course Code : CS3462
Units : 3
Level : B3
Prerequisites : CS2362 Computer Programming for Engineers and Scientists or CS2363 Computer Programming
Precursors : NIL
Equivalent Courses : *CS0366 Files and Database

Teaching Pattern
Hours (Group Size) : Lectures 26 hours
                   Tutorials 13 hours (24)

Aims & Objectives

The course provides a sound foundation in the principles of database design implementation and management in a ‘centralized database’ environment.

Upon completion, students should be able to:

1. identify and execute the steps involved in the design of a relational and hierarchical database;

2. implement the design via a proprietary database management system developing, where necessary, calls from the application program;

3. management database best fit user’s needs; database performance tuning, database concurrency control and relational database normalisation.

Syllabus

1. File structures: sequential, indexed sequential, direct, list-structured and tree-structured files.

2. Introduction to the database concept; comparison with files; introduction to the basic database models.

3. Relational data model: relational algebra, SQL.

4. Hierarchical data model: basic constructs and terminology on example system IMS.

5. Database design methodology: conceptual, logical and internal design.

6. Database administration: security, integrity and recovery.
7. Database concurrent update control: serialisability, deadlock, locking and timestamp techniques.

8. Relational database performance considerations; query optimisation.

9. Normalisation Theory: 1NF, 2NF, 3NF, BCNF.

10. Role of database administrator: planning, application development, access control and training.

Teaching Methods

Teaching methods will be based on traditional lectures, tutorials and case studies. Theoretical concepts will be introduced in lectures and reinforced through small group tutorial exercises. Case study exercised will develop practical application skills which will apply the theory to real-life problems.

Assessment

Coursework : 30%
Examination : 70% (2 hours)

Grading pattern : Standard (A+AA-…F)

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained.

Students will be tested on both their technical skills and theoretical foundation. There will be one assignment for the continuous assessment as follows:

Each group of five students will work on a retail store inventory data management project. Each team will investigate, design and implement an inventory database system using a relational database management system with the help of a CASE tool. The deliverables of the project are: Entity-Relationship Model, Relational Schema, Embedded SQL Programs and Relational Database with actual test data. A prototype of a workable database system is to be presented and demonstrated by each team along with the submission of the project report. The deadline for the project is before the end of semester.

Booklist

Essential Reading


Reference

C J Date : An Introduction to Database Systems (Addison Wesley)