18BC203DATABASE MANAGEMENT SYSTEMS

Course Description and Objectives:

The objective of this course is to present the issues of database management systems, with an emphasis on how to organize, maintain and retrieve.

Course Outcomes:

The students will be able to:
- Understand the elements of relational database management systems.
- Analyze the basic concepts of relational data model, entity-relationship model, relational database design, and relational algebra.
- Design ER-models to represent simple database application scenarios.
- Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
- Create and improve the database design by normalization.
- Familiar with basic database storage structures and access techniques: file and page organizations, indexing methods including B tree, and Hashing.

Skills:

- Design a conceptual database using ER-Model.
- Formulate database queries using Structured Query Language (SQL).
- Build and run DDL and DML commands.
- Design and implement normalized databases.
- Construct B+ Trees.

Activities:

- Design of ER diagram for the development of web applications.
- Transformation of ER diagram into a relational schema.
- Creation of relations with entity and referential integrity constraints for a givenRelational schema.
- Representation of queries using Relational Algebra.
- Formulation of queries using SQL.
- Design of relational database using normalization techniques.

Syllabus

UNIT – 1   **12 Hours**

ESSENTIALS OF DATABASES:Introduction, Characteristics of the database approach, Actors of database, Advantages of databases, History of database applications, Database system concepts & architecture - Data models, Schemes, Instances; Database languages interfaces database system environment architectures for DBMS, Classification of DBMS.

UNIT – 2   **12 Hours**

DATA MODELING USING THE ER MODEL: **N**otations, Entity types, Entity sets, Attributes, Keys, Relationships, Roles, Constraints, Weak entity types, Binary and ternary

relationships, EER modeling specialization, Generalization, University EER schema example.

UNIT – 3   12 Hours

RELATIONAL MODEL:Relational Model & Relational Database constraints, ER-EER to relational mapping, SQL Basics.

UNIT – 4   12 Hours

NORMALIZATION: Normalization, Design guidelines, Definition of FD, Normal forms based on primary keys.

UNIT – 5   12 Hours

DISK STORAGE:Introduction secondary storage devices placing records on disk RAID technology, Transaction processing, properties of transaction, serializabilitytwo phase locking, recovery concepts.

List of experiments:
1. Database Creation- usage of Data types
2. Execute a single line and group functions for a table.
3. Execute DCL and TCL Commands.
4. Create and manipulate various DB objects for a table.
5. Create views, partitions and locks for a particular DB.
6. Writing Triggers
7. Write PL/SQL procedure for an application using exception handling.
8. Write PL/SQL procedure for an application using cursors.
9. Write a DBMS program to prepare reports for an application using functions.
10. Write a PL/SQL block for transaction operations of a typical application using triggers.
11. Procedures and Functions
12. Designing a basic application.

Typical Applications – Banking, Course registration, Electricity Billing, Library Management, Pay roll, Insurance, Inventory etc.

Text Book:

RamezElmasri and Shamkant B. Navathe, "Fundamentals of Database Systems", 5th Edition, Pearson Education, 2008.

Reference Books:

1. Silberschatz, Korth, "Database System Concepts", 4th Edition, McGraw hill, 2006.
2. Raghu Ramakrishnan and Johannes Gehrke, "Database Management Systems", 3rd Edition, McGraw Hill, 2003.
3. Peter Rob and Carlos Coronel, "Database Systems- Design, Implementation and Management", 7th Edition, Cengage Learning, 2007.