III Year II Semester L T P C
Code: 20CS6719 4 0 0 4

# **DATA BASE MANAGEMENT SYSTEM (Minors)**

# **Course Objectives:**

- 1. To introduce about database management systems
- 2. To give a good formal foundation on the relational model of data and usage of Relational Algebra
- 3. To introduce the concepts of basic SQL as a universal Database language
- 4. To demonstrate the principles behind systematic database design approaches by covering conceptual design, logical design through normalization
- 5. To provide an overview of physical design of a database system, by discussing Database indexing techniques and storage techniques

## **Course Outcomes:**

- 1. Describe a relational database and object-oriented database
- 2. Create, maintain and manipulate a relational database using SQL
- 3. Describe ER model and normalization for database design
- 4. Examine issues in data storage and query processing and can formulate appropriate solutions
- 5. Outline the role and issues in management of data such as efficiency, privacy, security, ethical responsibility, and strategic advantage

### **UNIT-I**

**Introduction:** Database system, Characteristics (Database Vs File System), Database Users(Actors on Scene, Workers behind the scene), Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

#### **UNIT-II**

**Relational Model:** Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance

**BASIC SQL:** Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).

## **UNIT-III**

Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.

**SQL:** Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view (updatable and non-updatable), relational set operations.

#### **UNIT-IV**

**Schema Refinement (Normalization)**: Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency (1NF, 2NF and 3 NF), concept of surrogate key, Boyce-Codd normal form (BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF), Fifth Normal Form (5NF).

### **UNIT-V**

**Transaction Concept:** Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

# **Text Books:**

- 1. Database Management Systems, 3/e, Raghurama Krishnan, Johannes Gehrke, TMH
- 2. Database System Concepts, 5/e, Silberschatz, Korth, TMH

#### **Reference Books:**

- 1. Introduction to Database Systems, 8/e C J Date, PEA.
- 2. Database Management System, 6/e RamezElmasri, Shamkant B. Navathe, PEA
- 3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.