

**CB/CD/CM/
CO/CS/IT223**

DATABASE MANAGEMENT SYSTEMS

**L T P C Int Ext
3 - - 3.0 30 70**

Semester IV [Second Year]

COURSE OBJECTIVES:

The main objectives of this course are to:

1. Provide fundamental concepts and architectures of database systems.
2. Enable to use formal relational languages and SQL to query, update, and manage databases
3. Explain the concepts and protocols related to transaction processing, concurrency control, and recovery

COURSE OUTCOMES:

After successful completion of the course, the students are able to

1. Explain the fundamental concepts and architecture of database systems.
2. Query the database using relational algebra, Calculus and SQL
3. Develop conceptual database schema for a given specification
4. Design databases using normalization process
5. Discuss the role of transaction processing, concurrency control and recovery in a multiuser database system

UNIT I

[CO:1] (10)

Introduction: Database system Applications, Purpose of Database Systems, View of Data, Database Languages, Database Design, Database Engine, Database and Application Architecture, Database Users and Administrators

Introduction to the Relational Model: Structure of Relational Databases, Database Schema, Keys.

UNIT II

[CO:2] (14)

Relational Query Languages: The Relational Algebra, Relational Calculus. **SQL:** Overview of the SQL Query Language, SQL Data Definition, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Null Values, Aggregate Functions, Nested Subqueries, Modification of the Database, Join Expressions, Transactions, Integrity Constraints, SQL Data Types and Schemas, Views.

UNIT III

[CO:3,4] (12)

Database Design and the E-R Model - Overview of the Design Process, The Entity-Relationship Model, Constraints, Removing Redundant Attributes in Entity Sets, Entity-Relationship Diagrams, Reduction to Relational Schemas **Relational Database Design** - Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies, Functional-Dependency Theory, Algorithms for Decomposition, Decomposition Using Multivalued Dependencies, More Normal Forms, Database-Design Process

UNIT IV

[CO:5] (12)

Transactions: Transaction Concept, A Simple Transaction Model, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transaction Isolation and Atomicity, Transaction Isolation Levels

Concurrency Control: Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes, Snapshot Isolation

Recovery System: Failure Classification, Storage, Recovery and Atomicity, Recovery Algorithm, Buffer Management

LEARNING RESOURCES:

REFERENCE BOOK:

Database System Concepts by Abraham Silberschatz, Henry F. Korth and S. Sudarshan, Seventh Edition, Mc Graw Hill Publishers