



V Semester

Department of Computer Science & Engineering

Course Code : CST351

Course : Database Management Systems

L: 3 Hrs, T: 0 Hr, P: 0 Hr, Per Week

Total Credits : 03

Course Objectives

1. To understand the role of a database management system in an organization.
2. To construct simple and advanced database queries using a data language.
3. To understand and apply logical database design principles and database normalization.
4. To recognize the need for transaction management and query processing.

SYLLABUS

UNIT - I : Introduction to Database System Concepts and Architecture

Databases and Database Users, Characteristics of the Database Approach, Advantages of Using the DBMS Approach, When Not to Use a DBMS, Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment. Introduction to NoSQL databases and In-Memory databases.

UNIT - II : The Relational Data Model and SQL

Relational Model Concepts, Relational Model Constraints and Relational Database Schemas, Update Operations, Transactions, and Dealing with Constraint Violations, SQL Data Definition, Data Types and Constraints, Data Management in SQL, Transforming ER Model into Relational Model.

UNIT - III : Database Design and Normalization

Functional Dependencies, Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decomposition, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Other Dependencies and Normal Forms.

UNIT - IV : Indexing and Hashing

Ordered Indices, B+-Tree Index Files and its Extensions, Static Hashing and Dynamic Hashing, Comparison of Ordered Indexing and Hashing, Bitmap Indices, Some General Issues Concerning Indexing.

UNIT - V : Query Processing and Optimization

Measures of Query Cost, Query Operation: Selection, Sorting and Join Operation, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans.



UNIT - VI : Transaction Processing, Concurrency Control and Recovery

Introduction to Transaction Processing, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability, Two-Phase Locking Techniques for Concurrency Control, Deadlock Handling and Multiple Granularity, Database Recovery Techniques.

Course Outcomes

On completion of the course the student will be able to

1. Model data requirements for an application using conceptual modeling tools.
2. Design database schemas by applying normalization techniques.
3. Execute efficient data storage and retrieval queries using SQL.
4. Use concurrency control and database recovery in transaction management.

Text Books

1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan; Database System Concepts, Sixth Edition, Tata McGraw Hill, 2011.
2. Ramez Elmasri and Shamkant Navathe; Fundamentals of Database Systems, Sixth Edition, Addison Wesley 2011.

Reference Books

1. Raghu Ramakrishnan and Johannes Gehrke; Database Management Systems; Third Edition; Tata McGraw Hill Publication, 2003.
2. C. J. Date; Database in Depth - Relational Theory for Practitioners; O`Reilly Media, 2005.

