2/4 B.Tech - SECOND SEMESTER

IT4T2 **DATABASE SYSTEMS** **Credits: 3**
Lecture: 3 Periods/week **Internal assessment: 30 marks**
Practice/Interaction: 1Period/week **Semester end examination: 70 marks**

Objectives:

- To provide knowledge on fundamental concepts of DBMS, architecture and components.
- To apply SQL to create, update and query database.
- To give an introduction to systematic database design approaches covering conceptual design (ER Modeling), relational database design and normalization.
- To provide knowledge on the role of transaction processing and concurrency control in a modern DBMS which includes query processing, scheduling, security, concurrency and integrity.

Outcomes:

Students will be able to

- Understand the database approaches, data models, types of languages and Interfaces that DBMSs support.
- Understand the formal relational languages and able to write relational algebra expressions.
- Apply SQL commands to create, update and fetch data from database.
- Understand and analyze the different issues involved in the design and schema refinement.
- Understand the transaction management system, concurrency techniques and database recovery techniques.

Syllabus:

UNIT -I

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Data Storage and Querying, Transaction Management, Database Architecture, Specialty Databases, Database Users and Administrators.

Introduction to the Relational Model: Structure of Relational Database, Database Schema, Keys, Schema Diagrams, Relational Query Languages, Relational Operations.

UNIT-II

Formal Relational Query Languages: The Relational Algebra, The Tuple Relational Calculus, The Domain Relational Calculus.

Introduction to SQL: Overview of the SQL Query Language, SQL Data Definition, Data Types, Basic Structure of SQL Queries, Additional Basic Operations, Set Operations, Aggregate Functions, Modification of the Database.

UNIT-III

Advanced SQL: Dynamic SQL, embedded SQL, Integrity constraints, Nested Sub queries, joins views, Functions and Procedures, Triggers in SQL.

Database Design and ER Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E -R Design Issues, Extended E-R Features, Alternative Notations for Modeling Data.

UNIT-IV

Relational Database Design: Features of Good Relational Designs, Atomic Domains and First Normal Form, Decomposition Using Functional Dependencies , Functional-Dependency Theory , Decomposition Using Multi valued Dependencies , Database-Design Process.

UNIT-V

Transactions: Transaction concept, A Simple transaction model, Storage structure, Transaction Atomicity and Durability, Transaction Isolation, Serializability, Transactions as SQL statements. Concurrency Control, Recovery Systems: Introduction to Lock-Based Protocols, Failure classification, Introduction to Recovery and Atomicity

Text Book:

1. Abrahim Silbersehatz, Henry F Korth, Sudharshan, "Database Systems Concepts", 6th Edition, McGraw-hill international edition, 2010.

Reference Books:

1. Date CI, Kannan A, Swamynathan S, "An introduction to Database Systems", 8th Edition, Pearson education, 2006.
2. Raghu Rama Krishnan, Johannes Gehrke, "Database Management Systems", 3rd Edition, McGraw-hill international edition , 2003.
3. RamezElmasri, Durvasul VLN Somayazulu, Shamkant B Navathe, Shyam K Gupta, "Fundamental of Database Systems", 4th Edition, Pearson education , 2006.
4. Peter Rob, Carlos Coromci, "Database Systems", Thomson, 2007.

e- Learning Resources:

1. http://nptel.ac.in/video.php?subjectId=106106093.
2. http://freevideolectures.com/Course/2668/Database-Management-System#
3. http://csvls.blogspot.in/2010/04/database-management-system-video.html
4. http://cosmolearning.org/courses/database-design-417/video-lectures/