CA3T2   **DATA BASE MANAGEMENT SYSTEMS**   **Credits : 4**

Lecture Hours : 4 periods / week

Internal assessment : 30   Marks

Semester and Examination: 70   Marks

Course Objective:
The course database management system aims at introducing the fundamental concepts of databases its modeling and design. The popular database design like RDBMS is introduced. The aspect of database design like ER-modeling is introduced. The concepts of file structures are learnt by the student and SQL is introduced as a language to create database and to store and retrieve data from the database

Course Description:
- Understand Data base management system, its characteristics, applications and advantages.
- Illustrate ER model using ER diagrams for creating a conceptual design
- Apply integrity constraints to create logical data base design.
- Model a query using Relational algebra and Relational calculus
- Interpret SQL Queries using logical connectives and satisfying integrity constraints
- Refine schema into various normal forms including First, Second, Third and BCNF
- Summaries Transaction concepts to guarantee atomicity, isolation, consistency and durability.
- It refines with recovery of transactions.

Unit I:
Database Systems Concepts And Architecture: Introduction, data models, schemas and instance; three-schema architecture and data independence; database language and interface, the database system environment; centralized and client/server architecture of DBMSs; classification of DBMS. Data Modeling Using The E-R Model: High- level conceptual data models for database design; Entity types, entity sets, attributes and keys; relationship types, relationship sets, roles and structural constraint; weak entity types, ER diagrams, naming conventions and design issues.

Unit II:
Enhanced ER and Object Modeling: Subclasses, super classes and inheritance; specialization and generalization; constraints and characteristics of specialization and generalization, modeling of union types using categories; representing specialization/ generalization and inheritance in UML class diagrams; relationship types of degree higher than two; data abstraction.

Unit III:
The Relational Data Model and Relational Database Constraints:
Relational model concepts, relational model constraints and relational database schemas; updating operations and dealing w ith constraints violations

Unit IV:
The Relational Algebra and Relational Calculus: Unary relational operations: SELECT and PROJECT; relational algebra operations from set theory; binary relational operations: JOIN and DIVISION; additional relational operations; the tuple relational calculus; the domain relational calculus

Unit V:
Relational Database Design By ER And EER-To-Relational Mapping:
Relational database design using ER -to-Relational mapping; mapping EER model constructs to relations, Functional Dependencies And Normalization For Relational Databases: Informal design guidelines for relational

schemas; functional dependencies; normal forms based on primary leys; general definitions of 2nd and 3rd normal forms; Boyce-Codd normal forms

Unit VI:

Transaction Processing Concepts: Introduction to transaction processing; transaction and system concepts; desirable properties of transaction; characteristics schedule based on recoverability; characteristics schedule based on serializability.

Unit VII:

Concurrency Control Techniques: Two phase loc king techniques for concurrency control; concurrency control based on timestamp ordering; multi-version concurrency control techniques; validation(optimistic) concurrency control techniques; granularity of data items and multi granularity locking.

Unit VIII:

Database Recovery Techniques: Recovery concepts; recovery techniques based on deferred updates; recovery techniques based on immediate update; shadow paging; the ARIES recovery algorithm.

Learning Resources

Text Book:

1. Fundamentals of Database Systems Ramez Elmasri and Shamkant B. Navathe, Pearson Education, 4/e, 2004.

Reference Books:

1. Database Concepts, Abraham Silberschatz, Henry F Korth, S.Sudarshan, McGraw - Hill. 5/e, 2006.
2. Database Management Systems, Raghu Ramakrishnan & Johannes Gehrke - McGraw - Hill. 3/e 2003.