

DATABASE MANAGEMENT SYSTEMS**Course Code: CSE 304****Credit Units: 03****Total Hours: 30****Course Objective:**

The objective of this course is to get students familiar with Databases and their use. They can identify different types of available database model, concurrency techniques and new applications of the DBMS.

Course Contents:**Module I: Introduction: (6 Hours)**

Concept and goals of DBMS, Database Languages, Database Users, Database Abstraction.

Basic Concepts of ER Model, Relationship sets, Keys, Mapping, Design of ER Model, Concept of Generalization, Aggregation and Specialization. transforming ER diagram into the tables. Various other data models object oriented data Model, Network data model, and Relational data model.

Module II: Relational Data models: (6 Hours)

Domains, Tuples, Attributes, Relations, Characteristics of relations, Keys, Key attributes of relation, Relational database, Schemas, Integrity constraints. Referential integrity, Intension and Extension, Relational Query languages: SQL-DDL, DML, integrity constraints, Complex queries, various joins, indexing, triggers, Relational algebra and relational calculus, Relational algebra operations like select, Project, Join, Division, outer union. Tuple relational calculus.

Module III: Data Base Design: (6 Hours)

Data Base Design: Introduction to normalization, Normal forms, Functional dependency, Decomposition, Dependency preservation and lossless join, problems with null valued and dangling tuples, multivalued dependencies.

Module IV: Transaction Processing Concepts: (6 Hours)

Transaction System, Testing of Serializability, Serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures. Log based recovery. Checkpoints deadlock handling. Concurrency Control Techniques: – Concurrency Control, locking Techniques for concurrency control, time stamping protocols for concurrency control, validation-based protocol, multiple granularity. Multi version schemes, Recovery with concurrent transaction.

Module V: Relational Database Management Systems: (6 Hours)

Study of Relational Database Management Systems through Oracle/Postgres SQL/MySQL: Architecture, physical files, memory structures, background process. Concept of table spaces, segments, extents and block. Dedicated server, multi-threaded server, distributed database. Introduction of ANSI SQL. Usage of like, any, all, exists, views and other commands, Special operators. Hierarchical queries, inline queries, flashback queries

Course Outcomes:

The student will learn

- Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models.
- Identify basic database storage structures and access techniques such as file organizations, indexing methods including B-tree, and hashing.
- Learn and apply Structured query language (SQL) for database definition and database manipulation.
- Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database.
- Understand various transaction processing, concurrency control mechanisms and database protection mechanisms.

Examination Scheme:

Components	A	CT	S/V/Q/HA	ESE
Weightage (%)	5	15	10	70

A: Attendance, CT: Class Test, S/V/Q/HA: Seminar/Viva/Quiz/ Home Assignment, ESE: End Semester Examination;

Text & References:**Text:**

- Korth, Silberschatz, “Database System Concepts”, 4th Ed., TMH, 2000.
- Steve Bobrowski, “Oracle & Architecture”, TMH, 2000

References:

- Date C. J., “An Introduction to Database Systems”, 7th Ed., Narosa Publishing, 2004
- Elmsari and Navathe, “Fundamentals of Database Systems”, 4th Ed., A. Wesley, 2004
- Ullman J. D., “Principles of Database Systems”, 2nd Ed., Galgotia Publications, 1999.