**Data Base Management Systems (TCS-503)**

**Syllabus**

**UNIT-1**

**Introduction:** An overview of DBMS; Advantages of using DBMS approach; Database systems vs File Systems, Database system concepts and architecture Data models, schemas and instances; Three-schema architecture and data independence; Database languages and interfaces; The database system environment; Centralized and client-server architectures; Classification of Database Management systems.

**UNIT-2**

**Entity-Relationship Model:** Using High-Level Conceptual Data Models for Database Design; An Example Database Application; Entity Types, Entity Sets, Attributes and Keys; Relationship types, Relationship Sets, Roles and Structural Constraints; Weak Entity Types; Refining the ER Design; ER Diagrams, Naming Conventions and Design Issues; Relationship types of degree higher than two.

**UNIT-3**

**Relational Model and Relational Algebra :** Relational Model Concepts; Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations : JOIN and DIVISION; Additional Relational Operations ; Examples of Queries in Relational Algebra; Relational Database Design Using ER- to-Relational Mapping.

SQL – 1: SQL Data Definition and Data Types; Specifying basic constraints in SQL; Schema change statements in SQL; Basic queries in SQL; More complex SQL Queries.

Insert, Delete and Update statements in SQL; Specifying constraints as Assertion and Trigger; Views (Virtual Tables) in SQL; Additional features of SQL; Database programming issues and techniques; Embedded SQL, Dynamic SQL; Database stored procedures.

**UNIT-4**

**Database Design – 1**: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form

Properties of Relational Decompositions; Algorithms for Relational Database Schema Design; Multivalued Dependencies and Fourth Normal Form; Join Dependencies and Fifth Normal Form; Inclusion Dependencies; Other Dependencies and Normal Forms

**UNIT-5**

**Transaction Management**: The ACID Properties; Transactions and Schedules; Concurrent Execution of Transactions; Lock- Based Concurrency Control; Performance of locking; Transaction support in SQL; Introduction to crash recovery; 2PL, Serializability and Recoverability; Lock 9Management; Log Files; Checkpointing; Recovering from a System Crash; Media Recovery

**Text Books:**

1. Elmasri and Navathe: “Fundamentals of Database Systems”, 5th Edition, Pearson Education, 2007.

2. Raghu Ramakrishnan and Johannes Gehrke: “ Database Management Systems”, 3 rd Edition, McGraw-Hill, 2003.