20IT4304 – DATABASE MANAGEMENT SYSTEMS

UNIT I :

Databases And Database Users:

- Introduction
- characteristics of the database approach
- actors on the scene
- workers behind the scene
- advantages of using the DBMS approach

Database System Concepts And Architecture:

- Data models,
- schemas, and instances
- three schema architecture and data independence
- Database languages and interfaces
- The database system environment

Relational Data Model And Relational Database Constraints:

- Relational Model Concepts
- Relational Model Constraints and Relational Database Schemas

UNIT II:

SQL:

- SQL Data Definition and Data Types
- Specifying Constraints in SQL
- Basic Retrieval Queries in SQL
- Insert
- Delete and Update Statements in SQL

More SQL :
Complex Queries, Views and Schema Modification :

- More Complex SQL Retrieval Queries
- Views (Virtual Tables) in SQL
- Schema Change Statements in SQL.

Indexing Structures for files and Physical Database Design :

- Primary indexes
- Clustering indexes
- Secondary indexes
- Multilevel indexes.

The Relational Algebra:

- Unary Relational Operations: SELECT and PROJECT
- Relational Algebra Operations from Set Theory
- Binary Relational Operations: JOIN and DIVISION

UNIT III:

Data Modeling Using The Entity-Relationship (ER) Model:

- Using High-Level Conceptual Data Models for Database Design
- Entity Types
- Entity Sets
- Attributes and Keys
- Relationship types
- Relationship Sets
- Roles and Structural Constraints
- Weak Entity Types

Database Design Theory And Methodology:
Basics of Functional Dependencies and Normalization for Relational Databases –

- Informal Design Guidelines for Relation Schemas
- Functional Dependencies
- Normal forms based on Primary keys
  - First Normal Form
  - Second Normal Form
  - Third Normal Form
  - Boyce-Codd Normal Form
  - Multi valued dependency
  - Fourth normal form
- Properties of Relational Decompositions.

UNIT IV:

Introduction to Transaction Processing Concepts And Theory :

- Introduction to Transaction Processing
- Transaction and System Concepts
- Desirable Properties of Transactions
- Characterizing schedules based on Recoverability
- Characterizing schedules based on Serializability.

Concurrency Control Techniques:

- Two Phase Locking Techniques for concurrency control – Types of locks and system lock tables,
- Guaranteeing Serializability by Two-Phase Locking.

NoSQL Databases :

- Introduction to NoSQL systems - Emergence of NOSQL Systems
- Characteristics of NOSQL Systems
- Categories of NOSQL Systems**.**

Graph Database :

- Introduction
- High level view of graph space
- The Power of Graph Databases.