**20IT4304 – DATABASE MANAGEMENT SYSTEMS**

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| **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. |