DATABASE MANAGEMENT SYSTEMS

Credits: 4 **Semester: III**

Subject Code:BS23301 **No. of Lecture Hours: 75**

Objective: To form the basis for bulk management of data. This marks the beginning and maintenance of the databases. It offers the power to logically present the databases to individual usage as well. Provides facilities for data access, enforcing data integrity, managing concurrency and restoring the data from backups.

Course Outcome: Students will be able to

CO1: To **describe** Entity Relationship and Enhanced ER model.
CO2: To **understand** the relational model, reduction to relation schema, relational algebra and normalization.
CO3: To **use** SQL- the standard language of relational databases and PL/SQL programming.
CO4: To **understand** the storage and file structure, storage access, indexing and hashing techniques of the database.
CO5: To **understand** the need for NoSQL databases and their characteristics, the concepts of NoSQL databases

UNIT – I

15hrs

1.	Database-System Applications, Purpose of Database Systems	1
2.	View of Data, Database Languages, DDL, DML	2
3.	Relational Databases, Object-Based and Semistructured Databases	2
4.	Data Storage and Querying, Transaction Management	2
5.	Database Architecture, Database Users and Administrators	2
6.	Enhanced entity relationship model : Generalization, Specialization, Aggregation, Design Considerations.	2
7.	**E-R Model**: Entity Relationship Model, Constraints	1
8.	Entity Relationship Diagrams, Design Issues	2
9.	Weak Entity Sets, Extended E-R Features	1

UNIT – II

15hrs

1. Relational Model: Structure of Relational Databases 2
2. Fundamental Relational-Algebra Operations 2
3. Additional Relational Algebra Operations 2
4. Extended Relational- Algebra Operations 2
5. Null Values, Modification of the Database 1
6. Normalization: First, second 3
7. Third Normal forms and BCNF 3

UNIT – III

15hrs

1. **SQL**: Data Definition, Basic Structure of SQL queries 1
2. Set operations, Aggregate functions. 2
3. Null Values, Nested Sub queries 1
4. Joins, Modifications of the database, Views 1
5. Integrity Constraints 2
6. **PL/SQL** : Functions, Procedures 1
7. Triggers, Cursors, Exception Handling, Packages 2
8. Authorization in SQL, Granting, Revoking of privileges, Roles 2
9. Authorization on Views, Functions and Procedures, Audit Trail 2
10. Application Security 1

UNIT – IV

15hrs

1. **Storage and File Structure**: Overview of Physical Storage Media 1
2. Magnetic Disks, Physical Characteristics of Disks 2
3. Performance Measures of Disks, Optimization of Disk-Block Access 2
4. **Storage Access:** Buffer Manager, Buffer Replacement Policies 2
5. File Organization, Organization of Records in Files 1
6. **Indexing and Hashing**: Basic Concepts, Ordered Indices 1
7. B+ Tree Index Files-Structure of a B+ Tree, Queries on B+ Trees 2
8. Updates on B+ Trees, B+ Tree File Organization 2
9. Static Hashing, Dynamic Hashing 1
10. Comparison Ordered Indexing and Hashing 1

UNIT -V **15hrs**

1. **Why NO SQL:** The Value of relational Databases, Impedance Mismatch, Application & Integration Databases, Attack of the clusters, The Emergence of NoSQL 3

2. **Aggregate Data Models:** Aggregates, Column-Family Stores, Summarizing Aggregate-Oriented Databases 3

3. More Details on Data Models: Relationships, Graph Databases, Schemaless Databases, Materialized Views, Modeling for Data Access 3

2. **Distribution Models:** Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication 3

3. **Consistency:** Update Consistency, Read Consistency, Relaxing Consistency, Relaxing Durability, Quorums 3