DATABASE MANAGEMENT SYSTEM (303105203)
IMPORTANT TOPICS

UNIT 1: INTRODUCTION (10%)

- Difference between DBMS and File Processing System
- ANSI/SPARC 3-level architecture
- Data Independence (Logical & Physical)
- Role of DBA and different types of users
- Database system architecture (basic block diagram)

UNIT 2: SQL (10%)

- SQL command types (DDL, DML, DCL, TCL)
- Syntax and examples of:
    - CREATE, INSERT, UPDATE, DELETE, SELECT
    - GRANT and REVOKE
- Use of WHERE, BETWEEN, LIKE, IN, NOT IN, logical operators
- Aggregate Functions (SUM, COUNT, etc.)
- SQL queries with conditions, sorting, and functions

UNIT 3: DATA MODELS & ER DIAGRAM (10%)

- Types of Data Models (Hierarchical, Network, Relational, OOP)
- Components of E-R Diagram:
    - Entities, Attributes, Relationships
- Specialization, Generalization, Aggregation
- Weak Entity Sets
- Drawing ER diagram for a scenario

UNIT 4: RELATIONAL DATA MODEL (10%)

- Relational Model terms: Tuple, Attribute, Degree, Cardinality
- Key types: Primary, Foreign, Candidate, Super Key
- Constraints: NOT NULL, UNIQUE, CHECK
- Relational Algebra operations:
    - Selection, Projection, Joins, Union, Intersection, Set Difference
- Practical examples of relational algebra expressions

UNIT 5: RELATIONAL DATABASE DESIGN (20%)

- Functional Dependency: Definition, types, examples
- Armstrong's Axioms
- Attribute and FD closure
- Candidate key identification
- Normalization (1NF to BCNF mandatory, 4NF & 5NF optional)
- Lossless and Dependency-Preserving decomposition
- Database anomalies

UNIT 6: TRANSACTION & CONCURRENCY CONTROL (20%)

- ACID properties
- Transaction states and lifecycle
- Schedules: Serial, Non-serial, Interleaved
- Serializability: Conflict and View
- Concurrency control:
    - Two-phase locking, Deadlock handling (Wait-Die, Wound-Wait)
- Recovery techniques: Log-based, Shadow paging, Checkpoints

UNIT 7: QUERY PROCESSING & OPTIMIZATION (10%)

Important Topics for Exam:

- Phases of query processing
- Cost estimation in query execution
- File scans: Linear vs. Binary
- Query optimization: Equivalence rules, Cost-based approach
- Materialized view and pipelining

UNIT 8: SECURITY (5%)

- Data Security vs. Integrity
- Authentication & Authorization
- Encryption/Decryption basics
- Access control models: DAC, MAC, RBAC
- SQL Injection (definition & prevention)

UNIT 9: PL/SQL (5%)

- PL/SQL Block structure (DECLARE, BEGIN, EXCEPTION, END)
- Cursors: Types, syntax, and example
- Triggers: Definition and example
- Stored procedures and functions
- Creating and using Views