# Database Management System Syllabus

## 1. Introduction to Databases

- Definition and characteristics of databases
- Advantages over traditional file systems
- Database users and their roles
- Database environment and architecture
- Role of Database Administrator (DBA)

## 2. Data Models and Architecture

- Schemas and instances
- DBMS architecture
- Three-level architecture (ANSI-SPARC)
- Data independence

## 3. Entity-Relationship (E-R) Modeling

- Entities, attributes, and relationships
- E-R diagrams and design
- Mapping E-R models to relational schemas

## 4. Relational Model

- Structure of relational databases
- Relational algebra and calculus
- Integrity constraints and keys

## 5. Structured Query Language (SQL)

- Data Definition Language (DDL)
- Data Manipulation Language (DML)
- Data Control Language (DCL)
- Joins, subqueries, and views

## 6. Normalization

- Functional dependencies
- Normal forms (1NF to 3NF, BCNF)
- Decomposition and lossless join

**7. Transaction Management**

- ACID properties
- Transaction states and concurrency control
- Deadlock and recovery techniques

**8. Indexing and Hashing**

- Types of indexing (single-level, multi-level)
- Hashing techniques and collision resolution

**9. File Organization**

- Sequential, indexed, and hashed file organizations
- File access methods

**10. Database Security and Authorization**

- Authentication and access control
- Security models and policies