

TEACHING PLAN (BCA 3rd Sem)

(July, 2025 to November, 2025)

Name of the Teacher: Mr. Deepak Garg

Subject: Database Management System

Paper: 26BCA403DS02

Week	Topics
Week 1	Introduction to Databases: Definition of Data, Database, and DBMS; Overview of Database Applications; Advantages and Disadvantages of DBMS; Roles of Database Users and Administrators.
Week 2	Data Models: Introduction to Data Models, Types of Data Models (Hierarchical, Network, Relational, Object-oriented), Importance of Data Models in DBMS.
Week 3	Database Design: Keys – Primary, Candidate, Super, Foreign, Composite, Alternate, Unique, Surrogate; Constraints – Primary Key, Foreign Key, Unique Key, NOT NULL, CHECK; Entity-Relationship (ER) Model, Entities and Attributes.
Week 4	ER Diagrams, Key Constraints and Weak Entity Sets, Extended ER Features, Introduction to the Relational Model and Relational Schema. Test 1 on Unit I topics.
Week 5	Relational Algebra and Calculus: Introduction, Operations – Selection, Projection, Set Operations, Join, Division, Tuple and Domain Relational Calculus.
Week 6	Structured Query Language (SQL): SQL Basics – DDL and DML, Aggregate Functions (MIN, MAX, SUM, AVG, COUNT), Logical Operators (AND, OR, NOT), Predicates (LIKE, BETWEEN, ALIAS, DISTINCT).
Week 7	Clauses (GROUP BY, HAVING, ORDER BY, TOP/LIMIT); Types of Joins (Inner, Outer, Left, Right, Full, Equi Join).
Week 8	Advanced SQL: Analytical Queries, Hierarchical Queries, Recursive Queries, Views, Cursors, Stored Procedures and Functions, Packages, Triggers, Dynamic SQL. Assignment 1: SQL Queries and Relational Algebra Operations.
Week 9	Normalization and Database Design: Functional Dependencies, Armstrong's Axioms, Definition and Properties (Reflexivity, Augmentation, Transitivity).
Week 10	Types of Functional Dependencies, Normal Forms (1NF, 2NF, 3NF, BCNF), Denormalization.

	Test 2 on Unit II topics.
Week 11	Transaction Management: ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control.
Week 12	Performance of Locking, Transaction Support in SQL, Introduction to Crash Recovery, 2PL, Serializability, and Recoverability.
Week 13	Introduction to Lock Management, Dealing with Deadlocks. Assignment 2: Implementation of Transactions and Locking Mechanisms.
Week 14	Database Storage and Indexing: Data on External Storage, File Organizations and Indexing, Index Data Structures.
Week 15	Comparison of File Organizations, Indexes and Performance Tuning, Guidelines for Index Selection, Basic Examples of Index Selection.
Week 16	NoSQL Databases and Big Data: Introduction to NoSQL, Data Models (Document, Key-Value, Column Family, Graph), Features and Uses of NoSQL Document Databases, CAP Theorem, BASE vs ACID, CRUD Operations. Test covering Units III & IV.
Week 17	Revision of Unit I & II topics.
Week 18	Revision of Unit III & IV topics. Comprehensive Revision & Q/A Session.