

## **DBMS Fundamentals & SQL Basics**

### **Course Outline:**

#### **Day 1 – Database Foundations**

- Introduction to Databases & RDBMS
- Basic RDBMS architecture (Instance, Database, Storage, Memory, Processes)
- Relational model: Tables, Rows, Columns, Keys
- ACID properties (Atomicity, Consistency, Isolation, Durability)
- Difference between SQL and RDBMS overview
- Difference between SQL and NoSQL databases (use cases & examples)

#### **Day 2 – SQL Basics (Core Concepts)**

- SQL Overview & Classification (DDL, DML, DCL, TCL)
- Difference between DML & DDL with examples
- Creating & managing database objects:
  - CREATE, ALTER, DROP (tables, views, indexes, constraints)
- Data Manipulation (INSERT, UPDATE, DELETE)
- SELECT basics (retrieving single & multiple rows, filtering with WHERE, ORDER BY)
- Hands-on practice with simple queries

#### **Day 3 – Advanced SQL (Queries & Joins)**

- Aggregate functions (COUNT, SUM, AVG, MIN, MAX)
- GROUP BY, HAVING
- Joins (INNER, LEFT, RIGHT, FULL)
- Subqueries (single-row, multi-row, correlated)
- Set operators (UNION, INTERSECT, MINUS)
- Practical exercises (query optimization scenarios)

## **Day 4 – Database Administration Basics**

- Backup & Recovery Mechanism Types of backups (full, incremental, logical, physical)
- Recovery approaches & scenarios
- Importance of backup strategy
- Database Client Access
- User & security management (role-based access, privileges, GRANT/REVOKE)
- How to access the database using clients (SQL\*Plus, SQL Developer)
- Troubleshooting connectivity issues (network, service names, authentication issues)
- Log file monitoring
- Remote Connectivity Issue.

## **Day 5 – Troubleshooting & Performance + SQL Practice**

- Common database issues & troubleshooting techniques
  - Slow queries
  - Locking/blocking issues
  - Space management
- Identifying bottlenecks (query plans, indexes, statistics)
- Optimization basics (indexes, execution plans, normalization vs denormalization)
- Wrap-up: Full hands-on SQL lab with a mini-project
  - Design schema
  - Populate data
  - Run queries (reports, joins, aggregations)
  - Optimize queries