DBMS (DATABASE MANAGEMENT SYSTEM) & SQL



3 Hours per Day | **Total Duration: 30 Hours (10 Days)**

01 Introduction to DBMS

- Database concepts and terminology
- DBMS meaning, features and advantages
- DBMS vs File System
- Types of databases
- DBMS architecture
- Database users and roles
- Introduction to RDBMS
- **Practical:** Creating a sample database

02 Relational Database & Data Modeling

- Tables, records and fields
- Primary Key and Foreign Key
- Relationships between tables
- One-to-One, One-to-Many, Many-to-Many
- ER Model and ER Diagrams
- Data types and constraints
- **Practical:** Designing a simple database model

03 Introduction to SQL

- SQL fundamentals and syntax
- DDL, DML, DQL, DCL and TCL
- CREATE, ALTER and DROP
- INSERT, UPDATE and DELETE
- SELECT statement
- WHERE, ORDER BY and DISTINCT
- **Practical:** Creating and manipulating tables

04 DAY 4 – SQL Queries & Operators

- Comparison and logical operators
- AND, OR, NOT, IN, BETWEEN
- LIKE and pattern matching
- NULL values
- Aliases
- LIMIT/TOP concepts
- **Practical:** Writing SQL queries

05 SQL Functions & Data Aggregation

- Aggregate functions
- COUNT, SUM, AVG, MIN, MAX
- String functions
- Date and time functions
- Numeric functions
- GROUP BY
- HAVING
- **Practical**: Data analysis using SQL functions

06 SQL Joins

- Understanding SQL Joins
- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL OUTER JOIN
- CROSS JOIN
- Self Join
- **Practical:** Combining data from multiple tables

07 Subqueries, Views & Advanced SQL

- Subqueries and nested queries
- Correlated subqueries
- EXISTS and NOT EXISTS
- Views
- CASE statements
- Common Table Expressions (CTEs)
- **Practical:** Advanced SQL query development

08 Database Design & Normalization

- Database design principles
- Data redundancy and anomalies
- Functional dependencies
- 1NF, 2NF and 3NF
- Introduction to BCNF
- Indexing concepts
- **Practical:** Normalizing a database

09 Transactions, Security & Database Administration

- Transactions and ACID properties
- COMMIT, ROLLBACK and SAVEPOINT
- Database security concepts
- Users, roles and permissions
- Backup and recovery
- Performance and indexing basics
- **Practical:** Transaction and access-control exercises

10 SQL Project & Real-World Application

- Database project planning
- Creating tables and relationships
- Data insertion and manipulation
- Complex SQL queries and joins
- Reports and data analysis
- Database optimization basics
- **Final Project:** Developing a complete database using DBMS & SQL

Important Note: Required free-trial software, demo versions, and necessary learning tools will be provided to the students for practical training and hands-on learning.