SQL Course Contents

Course Duration : One Month

1. Introduction to SQL

- What is SQL?
- History and evolution
- RDBMS vs. NoSQL overview
- SQL syntax basics
- Common SQL dialects: MySQL, PostgreSQL, SQL Server, Oracle

---

2. Database Fundamentals

- What is a database?
- Tables, rows, columns
- Data types (INT, VARCHAR, DATE, etc.)
- Primary keys and foreign keys
- Relational database design (Normalization basics)

---

3. Basic SQL Operations

- SELECT statement
- WHERE clause
- ORDER BY
- LIMIT / TOP
- Aliasing with AS

---

4. Filtering and Conditional Logic

- AND, OR, NOT

- IN, BETWEEN, LIKE, IS NULL
- CASE statements

---

5. Sorting and Aggregation

- Aggregate functions: COUNT, SUM, AVG, MIN, MAX
- GROUP BY and HAVING

---

6. Joins and Relationships

- INNER JOIN
- LEFT JOIN, RIGHT JOIN, FULL OUTER JOIN
- Self joins
- Cross joins
- Using aliases with joins

---

7. Subqueries and Nested Queries

- Scalar subqueries
- Correlated subqueries
- EXISTS, IN, ANY, ALL

---

8. Data Manipulation Language (DML)

- INSERT INTO
- UPDATE
- DELETE
- MERGE (if applicable)

---

9. Data Definition Language (DDL)

- CREATE TABLE
- ALTER TABLE
- DROP TABLE
- Constraints: NOT NULL, UNIQUE, DEFAULT, CHECK

---

10. Indexing and Performance

- Creating and using indexes
- Understanding query execution plans
- Optimizing SQL queries

---

11. Advanced SQL Topics

- Window functions: ROW_NUMBER(), RANK(), LEAD(), LAG()
- Common Table Expressions (CTEs)
- Recursive queries
- Pivot and unpivot

---

12. Transactions and Concurrency

- ACID properties
- BEGIN, COMMIT, ROLLBACK
- Locking and isolation levels

---

13. Views and Stored Procedures

- Creating and using views
- Stored procedures and functions

- Triggers

---

14. SQL in Practice

- Real-world data sets (e.g., employee, e-commerce)
- Building reports and dashboards
- Introduction to BI tools (optional: Power BI, Tableau, etc.)
- SQL in Data Science workflows

---

15. Final Project & Assessment

- Capstone project (build queries from a real-world database)
- Query optimization exercises
- Interview-style questions