# **Basic to Advanced SQL**

#### **Course Description:**

Unlock the full potential of MS SQL Server with this intensive 5-day training course designed to elevate your querying skills from basic to advanced levels. This course offers a comprehensive exploration of SQL querying techniques and best practices, empowering you to efficiently retrieve, manipulate, and manage data within MS SQL Server.

Duration: 5 Days

Level: Basic to Advanced

Target Audience: SQL Server Users, Database Administrators, Data Analysts

## **Content Coverage :**

#### Module 1: Introduction to MS SQL Server

- Overview of MS SQL Server
- SQL Server Editions and Versions
- SQL Server Management Studio (SSMS) Basics
- Connecting to a Database

#### **Module 2: SQL Fundamentals**

- Basic SQL Syntax
- Data Types
- Data Manipulation Language (DML):
  - o INSERT
  - UPDATE

- DELETE
- Exercises:
  - o Basic SQL Queries
  - Simple Data Manipulation

#### Module 3: Basic Queries and Data Retrieval

- SELECT Statement
- Filtering Data with WHERE Clause
- Sorting Data with ORDER BY
- DISTINCT for Filtering Unique Results
- Limiting Results with TOP
- Exercises:
  - Filtering and Sorting Data
  - Using DISTINCT and TOP

#### Module 4: Working with Variables

- Introduction to SQL Variables
- Declaring and Setting Variables
- Using Variables in Queries
- Scope of Variables
- Table Variables
- Exercises:
  - Using Variables in SQL Queries
  - Table Variable Implementation

#### Module 5: Aggregate Functions and Grouping

- Aggregate Functions:
  - COUNT, SUM, AVG, MIN, MAX
- GROUP BY Clause

- HAVING Clause for Filtered Aggregates
- Exercises:
  - Aggregate Functions and Grouping Queries

#### Module 6: Joining Tables

- INNER JOIN
- LEFT JOIN
- RIGHT JOIN
- FULL OUTER JOIN
- CROSS JOIN
- SELF JOIN
- Exercises:
  - Join Operations
  - Combining Data from Multiple Tables

#### **Module 7: Subqueries and Derived Tables**

- Scalar Subqueries
- Correlated Subqueries
- EXISTS and NOT EXISTS
- Derived Tables
- Exercises:
  - Writing Subqueries
  - Using Derived Tables for Complex Queries

#### Module 8: Views

- Introduction to Views
- Creating and Managing Views
- Updating Data Through Views
- Indexed Views for Performance

- Exercises:
  - Creating Views
  - Working with Indexed Views

#### Module 9: Common Table Expressions (CTEs)

- Introduction to CTEs
- Recursive CTEs
- Exercises:
  - Using CTEs for Simplifying Queries
  - Recursive CTEs for Hierarchical Data

#### Module 10: Dynamic SQL

- Introduction to Dynamic SQL
- Constructing and Executing Dynamic SQL
- SQL Injection Prevention in Dynamic Queries
- Dynamic SQL in Stored Procedures
- Exercises:
  - Writing Dynamic SQL Queries
  - Securing Dynamic SQL

#### Module 11: Stored Procedures

- Introduction to Stored Procedures
- Creating and Executing Stored Procedures
- Input and Output Parameters
- Dynamic SQL in Stored Procedures
- Error Handling in Stored Procedures
- Exercises:
  - Creating Stored Procedures
  - o Dynamic SQL in Procedures

#### Module 12: User-Defined Functions (UDFs)

- Introduction to UDFs
- Scalar Functions vs. Table-Valued Functions
- Creating and Using UDFs
- Best Practices and Limitations
- Exercises:
  - Writing Scalar and Table-Valued Functions
  - UDFs in Complex Queries

#### **Module 13: Window Functions and Set Operations**

- Window Functions:
  - ROW\_NUMBER, RANK, DENSE\_RANK, NTILE
  - LEAD and LAG
- Set Operations:
  - UNION, UNION ALL
  - INTERSECT
  - EXCEPT
- Exercises:
  - Applying Window Functions
  - Using Set Operations

#### Module 14: Triggers

- Introduction to Triggers
- Types of Triggers (AFTER, INSTEAD OF)
- Writing and Testing Triggers
- Managing Nested and Recursive Triggers
- Exercises:
  - Writing Triggers for Auditing

• Using Triggers for Data Validation

### Module 15: Advanced Error Handling and Transactions

- TRY...CATCH for Error Handling
- Transactions and Rollbacks
- THROW vs RAISERROR
- Nested Transactions
- Exercises:
  - Error Handling in SQL
  - Working with Transactions for Data Integrity