



# Querying and developing Microsoft SQL Server

## **Course Description**

The Querying and Developing SQL course is designed to provide participants with practical and in-depth knowledge of SQL, focusing on efficient data retrieval, manipulation, and analysis within relational databases. The course develops strong querying skills and a solid understanding of database structures and logic.

Throughout the course, participants will learn the fundamentals of SQL, including T-SQL querying, writing SELECT statements, and working with various data types. The course then progresses to more advanced topics such as querying multiple tables, sorting and filtering data, modifying data, and using built-in SQL functions.

Additional topics include grouping and aggregating data, working with subqueries, table expressions, and set operators. Emphasis is placed on writing optimized queries, developing logical thinking, and applying SQL solutions to real-world business and technical scenarios.

The course combines theoretical explanations with hands-on practice, enabling participants to confidently work with databases and complex SQL queries.

## **Prerequisites:**

Good English language proficiency – required.

## **Course Modules**

### **Module 1: Introduction to Microsoft SQL Server**

This module introduces the SQL Server platform and major tools. It discusses editions, versions, tools used to query, documentation sources, and the logical structure of databases.

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio

### **Module 2: Introduction to T-SQL Querying**

This module introduces Transact SQL as the primary querying language of SQL Server. Discusses the basic structure of T-SQL queries, the logical flow of a SELECT statement, and introduces concepts such as predicates and set-based operations.

- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements

### **Module 3: Writing SELECT Queries**

This module introduces the fundamentals of the SELECT statement, focusing on queries against a single table.

- Writing Simple SELECT Statements
- Eliminating Duplicates with DISTINCT
- Using Column and Table Aliases
- Writing Simple CASE Expressions

## Module 4: Querying Multiple Tables

This module explains how to write queries which combine data from multiple sources in SQL Server. The module introduces the use of JOINS in T-SQL queries as a mechanism for retrieving data from multiple tables.

- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins

## Module 5: Sorting and Filtering Data

This module explains how to enhance queries to limit the rows they return, and to control the order in which the rows are displayed. The module also discusses how to resolve missing and unknown results.

- Sorting Data
- Filtering Data with a WHERE Clause
- Filtering with the TOP and OFFSET-FETCH Options
- Working with Unknown and Missing Values

## Module 6: Working with SQL Server Data Types

This module explains the data types of SQL Server uses to store data. It introduces many types of numerical and special-use data types. It also explains conversions between data types, and the importance of type precedence.

- Introducing SQL Server Data Types
- Working with Character Data
- Working with Date and Time Data

## Module 7: Using DML to Modify Data

This module describes the use of Transact-SQL Data Manipulation Language to perform inserts, updates, and deletes to your data.

- Inserting Data
- Modifying and Deleting Data

## **Module 8: Using Built-In Functions**

This module introduces the use of functions that are built into SQL Server Denali, and discusses some common usages including data type conversion, testing for logical results and nullability.

- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL

## **Module 9: Grouping and Aggregating Data**

This module introduces methods for grouping data within a query, aggregating the grouped data and filtering groups with HAVING. The module is designed to help the student grasp why a SELECT clause has restrictions placed upon column naming in the GROUP BY clause as well as which columns may be listed in the SELECT clause.

- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING

## **Module 10: Using Subqueries**

This module will introduce the use of subqueries in various parts of a SELECT statement. It will include the use of scalar and multi-result subqueries, and the use of the IN and EXISTS operators.

- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries

## **Module 11: Using Table Expressions**

This module introduces T-SQL expressions which return a valid relational table, typically for further use in the query. The module discusses views, derived tables, common table expressions and inline table-valued functions.

- Using Derived Tables
- Using Common Table Expressions
- Using Views
- Using Inline Table-Valued Functions