Developing with Microsoft SQL Server 2025

Course Description

This 5-day training program provides a structured journey into SQL Server, covering database fundamentals, SQL operations, built-in functions, advanced querying techniques, and intermediate administration concepts. Participants will gain practical skills in writing queries, managing data, optimizing performance, and working with procedural objects.

Duration : 5 Days (40 Hours)

Pre-requisites

- Basic computer literacy
- Familiarity with data concepts (tables, rows, columns)
- Exposure to any programming language (preferred but not mandatory)

Learning Objectives

By the end of this course, participants will be able to:

- Understand SQL Server architecture and database fundamentals
- Write efficient queries using operators, clauses, and functions
- Implement keys, relationships, and indexing strategies
- Apply conditional logic, dynamic SQL, and window functions
- Analyze execution plans and optimize performance
- Create and manage stored procedures, views, and functions

Content Coverage

Day 1: Foundations of SQL Server & Databases

Module 1: Introduction to File and Storage

- File types in SQL Server (MDF, NDF, LDF)
- Data storage mechanisms
- Page and extent architecture
- Transaction log basics
- Filegroups and allocation

Module 2: DBMS and RDBMS Concepts

- Difference between DBMS and RDBMS
- SQL Server as an RDBMS
- Relational model fundamentals
- Normalization basics
- Advantages of RDBMS

Module 3: Keys, Facts, Dimensions, and Types of Dimensions

- Primary and foreign keys
- Candidate and composite keys
- Facts and dimensions in data modeling
- Types of dimensions (conformed, slowly changing, junk)
- Role-playing dimensions

Day 2: SQL Language Essentials

Module 4: Indexes and Relationships

- Clustered vs non-clustered indexes
- Unique and filtered indexes
- Referential integrity
- One-to-one, one-to-many, many-to-many relationships
- Index maintenance basics

Module 5: SQL Language Components (DDL, DML, DCL, TCL)

- Data Definition Language (CREATE, ALTER, DROP)
- Data Manipulation Language (INSERT, UPDATE, DELETE)
- Data Control Language (GRANT, REVOKE)
- Transaction Control Language (COMMIT, ROLLBACK, SAVEPOINT)
- Practical examples

Module 6: Operators in SQL

- Arithmetic operators (+, -, *, /)
- Assignment operators (=)

- Bitwise operators (&, |, ^)
- Comparison operators (=, <>, >, <, >=, <=)
- Logical operators (AND, OR, NOT)

Day 3: Querying & Data Retrieval

Module 7: Clauses in SQL

- SELECT and DISTINCT
- WHERE clause filtering
- GROUP BY and HAVING
- ORDER BY sorting
- Combining clauses effectively

Module 8: Aliasing and Conditional Statements

- Column and table aliasing
- CASE WHEN usage
- IF ELSE logic in SQL
- Practical scenarios with conditional queries
- Nested conditions

Module 9: Dynamic SQL

- Introduction to dynamic SQL
- EXEC vs sp_executesql
- Parameterized queries
- Security considerations (SQL injection)
- Use cases in applications

Day 4: Functions & Advanced Querying

Module 10: Built-in Functions – String

- UPPER, LOWER
- LTRIM, RTRIM
- CHARINDEX, CONCAT

- SUBSTRING, REPLACE
- LEN function

Module 11: Built-in Functions – Date & Time

- CURRENT_DATE and CURRENT_TIME
- DATENAME, DATEDIFF, DATEADD
- Date formats and conversions
- Practical date calculations
- Handling time zones

Module 12: Built-in Functions – Mathematical & Advanced

- ROUND, CEIL, FLOOR
- CAST and CONVERT
- COALESCE and ISNULL
- NULLIF function
- Practical applications

Day 5: Intermediate SQL Concepts & Administration

Module 13: Wildcard Operators & Window Functions

- Wildcards (% and _)
- Pattern matching with LIKE
- Introduction to window functions
- ROW_NUMBER, RANK, DENSE_RANK
- LEAD and LAG functions

Module 14: Joins, CTEs, and Views

- INNER, OUTER, CROSS joins
- Common Table Expressions (CTEs)
- Recursive CTEs
- Creating and managing views
- Indexed views

Module 15: Execution & Procedural Objects

- Execution order of SQL statements
- Reading execution plans
- SQL Profiler basics
- Creating stored procedures
- User-defined functions (scalar and table-valued)