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Mastering SQL with Microsoft SQL Server

From Fundamentals to Advanced Querying for Real-World Data Workflows in 3 days

FA-0424 · 3 days

DevOps, Cloud & Infrastructure · Data & Analytics

Introduction

Structured Query Language (SQL) is the foundation of how data is accessed, managed, and analyzed in almost every business today. Whether you're building reports, supporting applications, or extracting insights from large datasets, SQL remains the universal language that bridges people and data.

This three-day course focuses on **Microsoft SQL Server**, one of the most widely used database systems in enterprise environments, and takes you from learning what databases are to writing powerful queries that solve real problems. The curriculum is built around practical scenarios, industry best practices, and performance-oriented techniques, not just syntax.

By the end of the course, you'll be confidently writing efficient queries, understanding how to structure data, and working with advanced SQL features that modern data professionals rely on every day.

Learning outcomes

After completing this course, learners will be able to:

- Understand core database concepts and how relational databases work
- Write basic to advanced SQL queries in Microsoft SQL Server
- Join, filter, aggregate, and manipulate data with confidence
- Use stored procedures, functions, and views
- Optimize queries for performance
- Understand indexes and execution plans

- Apply SQL skills to solve real business data tasks

Prerequisites

- Basic computer literacy (installing software, navigating menus, file system, data structures, network basics)
- No prior SQL or database experience required
- MS SQL Studio or VS Code with MS-SQL Plugin installed
- Access to open IP and port 1433

Training outline

1. Foundations of Relational Databases

- What is a database?
- Tables, rows, columns
- Primary keys and relationships
- Introduction to Microsoft SQL Server
- SQL Server Management Studio (SSMS) overview
- Connecting to databases
- Creating your first database and table

2. Basic Data Retrieval

- SELECT statement fundamentals
- Selecting single and multiple columns
- Using WHERE for filtering
- Logical operators (AND, OR, NOT)
- Sorting results with ORDER BY
- Limiting results (TOP)

3. Working with Data Types and Expressions

- Understanding SQL data types (int, varchar, datetime, etc.)
- Implicit vs explicit conversion
- Using functions for data formatting
- NULL handling and ISNULL/COALESCE

4. Advanced Filtering and Set Operations

- BETWEEN, IN, LIKE
- DISTINCT
- UNION and UNION ALL
- INTERSECT, EXCEPT

5. Joins and Relationships

- INNER JOIN
- OUTER JOINS (LEFT, RIGHT)
- FULL OUTER JOIN
- CROSS JOIN
- Self-joins
- Joining multiple tables

6. Aggregates and Grouping

- COUNT, SUM, AVG, MIN, MAX
- GROUP BY and HAVING
- Windowed aggregates (ROW_NUMBER, RANK, PARTITION BY)

7. Modifying Data

- INSERT statements
- BULK INSERT options
- UPDATE statements
- DELETE statements
- Transactions (BEGIN, COMMIT, ROLLBACK)

8. Subqueries and Derived Tables

- Scalar subqueries
- Subqueries in WHERE and FROM
- Correlated subqueries
- Inline Views

9. Views, Indexes, and Schema Objects

- Creating and using Views
- Indexed views
- Creating Indexes
- Clustered vs non-clustered
- When to use indexes

10. Stored Procedures and Functions

- Creating Stored Procedures
- Input and output parameters
- Error handling in procedures
- User-defined functions (scalar and table-valued)
- Best practices

11. Performance Tuning Basics

- Reading Execution Plans
- Identifying slow queries
- Statistics and optimization
- Index maintenance basics

12. Advanced Query Techniques

- CTEs (Common Table Expressions)
- Recursive queries
- Pivot and Unpivot
- Temporary tables vs table variables

13. Security and Permissions

- User roles and security
- Granting and revoking access
- Principles of secure SQL design

14. Practical Scenarios and Projects

- Real business reporting queries
- Building reusable query templates
- Data reconciliation and validation strategies
- Debugging complex queries

Over three days, you'll progress from the first SELECT statement to advanced query techniques and performance tuning — all tailored to the demands of real database work in Microsoft SQL Server. This course prepares you not for academic exams but for the challenges you'll face in data engineering, analytics, application support, and business intelligence roles.

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