

SQL Server Data Analytics with T-SQL and Python

Relational queries, data preparation and modelling awareness

FA-0743 · 3 days

Data & Analytics · Software Development

Introduction

Develop practical SQL Server analytics skills from an existing understanding of relational databases and SQL. Guided exercises cover database access, T-SQL queries, data preparation, stored procedures, functions and a small Python/pandas analysis.

The course introduces statistical and machine-learning approaches using supplied examples. SQL Server 2019 is retained as historical feature context; tooling and lab platforms are selected for compatibility, and deployment exercises use a lab rather than certify production readiness.

Learning outcomes

- Explain relational concepts and SQL versus T-SQL.
- Connect to and inspect a compatible SQL Server lab, including container and remote-access considerations.
- Create databases, tables and views; query, filter, join and modify sample data.
- Use selected stored procedures and functions, and import/export data.
- Prepare and clean data and work with date/time, JSON and XML examples.
- Use basic Python/pandas for analysis and visualisation.
- Compare selected modelling approaches and distinguish Machine Learning Services from legacy SSAS data mining.

Prerequisites

- Basic understanding of SQL and relational databases; expert T-SQL knowledge is not required.
- Supported SQL tools such as SSMS or Visual Studio Code with MSSQL extension, plus suitable Python tools for the supplied exercise.
- Reliable internet and authorised access to the designated lab; compatible host/runtime and relevant remote/file-transfer tools where used.
- SQL Server Linux container exercises use a supported x86-64 Linux host and a version-compatible image/platform.

Training outline

1. Day 1 – Database Environment and Query Foundations

Environment and SQL tools

- RDBMS and SQL Server concepts; SQL versus T-SQL.
- Production deployment considerations contrasted with a training lab.
- Containers versus virtual machines, including VirtualBox; remote access and a compatible Linux container demonstration.
- SSMS database/table inspection, functions, stored procedures, basic permissions, import and export.
- Use supported VS Code MSSQL tooling in place of retired Azure Data Studio.

T-SQL query practice

- SELECT, WHERE, LIKE, ORDER BY, IN and BETWEEN.
- INSERT, UPDATE, DELETE and ALTER on sample data.
- Aggregates, GROUP BY, subqueries and joins; create a simple view.
- Data cleaning and checking query results.

2. Day 2 – Reusable SQL and Python Analysis

- Stored procedures and functions, with a practical assessment.
- Date/time values and selected JSON/XML examples.
- Python data types, conditions, loops, functions and pandas using prepared exercises.
- Import/export and transformations for analysis; basic statistics and selected visualisations.
- Translate a small analytics question into SQL and Python steps.

3. Day 3 — Data Mining and Machine-Learning Overview

- Data-mining concepts, algorithms and their data requirements.
- Compare association, clustering, decision trees, linear/logistic regression and naïve Bayes at introductory level.
- Explore a selected prepared model and appropriate independent evaluation.
- Introduce neural networks and sequence clustering conceptually; identify the legacy SQL Server Analysis Services context.
- SSAS data mining was discontinued in SQL Server 2022; do not treat those historical algorithms as a current built-in database-engine feature.
- Demonstrate Python analytics with SQL data, or Machine Learning Services in an appropriately preconfigured compatible environment; in-database execution needs separate feature/runtime configuration.
- Review limitations and the completed SQL/analytics exercises.