

# Querying SQL Server Fundamentals

*Summary: Duration – 4 days - 16 hours (09:30-13:30 every day), Level - 200 (MS Scale), Delivery method - Virtual Instructor-led class or In-class*

This is an introductory course in the SQL Server relational databases and T-SQL Language. As such it is a good starting point for gaining proficiency and experience in T-SQL (Transact SQL) and a first step in the SQL Server learning path. The main goal of the training is to introduce the use of the SELECT statement for creating simple to complex queries in a SQL Server Database. The training is developed with focus on gathering of hands-on experience.

## AUDIENCE:

The primary audience of this class are professionals in a role of Data Analyst, Data Scientists as well as all those who need to explore data in a SQL Server relational database. The main purpose of the course is to give students a good start in Transact-SQL language which is used by all SQL Server-related roles; namely, Database Administration, Database Development and Business Intelligence Development. As such, the secondary target audience for this course are novice Database Administrators, Database Developers and BI professionals who have no or very limited experience with T-SQL.

## Prerequisites:

- Basic knowledge of the Microsoft Windows operating system and its core functionality
- Basic understanding of relational databases
- No previous experience with T-SQL is required

## AFTER THE TRAINING ATTENDEES WILL BE ABLE TO:

- Describe the main components of SQL Server client server architecture
- Understand and articulate the basics of the Relational Database Models
- Write a single table SELECT statement
- Understand the JOIN clause to query multiple tables and produce meaningful and rich reports
- Write SELECT statements containing filtering and sorting
- Understand the basic concepts for writing effective and well performing queries in terms of proper usage of the WHERE clause
- Produce aggregated reports using T-SQL aggregation functions and the GROUP BY clause
- Use CASE structure, SUBQUERIES and other approaches to create more complex queries

- Articulate and use WINDOWING clauses and functions

## TOPICS:

### DAY 1

#### Module 1: SQL Server Overview (09:30am - 13:30pm EEST)

This module introduces SQL Server Architecture, SQL Server Components, versions of SQL Server including cloud versions, and how to connect to SQL Server using SQL Server Management Studio. Next, the module introduces the basic concept of Relational Databases and Relational Database Models. Third part of the module, describes the T-SQL language elements

#### Lessons:

- ✓ Overview and Components
- ✓ Database structure
- ✓ Overview of Relational Databases
- ✓ Overview and syntax elements of T-SQL
- ✓ SQL Server Management Tool

#### Lab: SQL server Management Tools:

- ✓ Querying execution in SSMS
- ✓ Exploring SSMS
- ✓ Exploring a Database Schema

*In the end of every training day every student will receive LAB Exercises for homework. They can make the exercises whenever it is possible for them in the day ahead. If they have questions our instructor will answer in the Q&A session on the next training day.*

#### After completing this module, you will be able to:

- ✓ Describe and articulate the basic architecture of SQL Server
- ✓ Describe and articulate the basic hierarchy of SQL Server Components
- ✓ Describe the basic concepts of the relational databases
- ✓ Describe the elements of the T\_SQL language
- ✓ Describe and start using SQL Server Management Console for:
  - \*Connecting to SQL Server Instances
  - \*Browsing SQL Server Database components
  - \*Creating queries and exploring the results

## DAY 1

### Module 2: The SELECT Statement (09:30am - 13:30pm EEST)

This module is dedicated to the SELECT statement. It describes in detail the basic of its use starting from elements, order of processing of the clauses, working with columns, filtering the rows with WHERE clause, dealing with NULL values and using expressions.

#### Lessons:

- ✓ SELECT statement overview
- ✓ Retrieving Columns
- ✓ Retrieving Rows
- ✓ Working with NULL
- ✓ Sorting Data in resultset
- ✓ Using expressions

#### Lab: The SELECT Statement:

- ✓ Writing Basic SELECTS
- ✓ Working with CASE expression
- ✓ Writing a good code for filtering rows

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#### After completing this module, you will be able to:

- ✓ Describe the elements of the SELECT statement
- ✓ Understand and articulate the importance of the order of processing of the SELECT clauses
- ✓ Describe and articulates the ways to control the columns of the results sets and create calculated columns in it
- ✓ Describe the WHERE clause and the filtering of the rows of the result sets
- ✓ Articulate the considerations in working with NULL value, functions dedicated to work with NULL value and the impact of NULL in the logical expressions
- ✓ Understand and articulate the use of expressions and specifically the use of CASE expression

## DAY 2

Q&A Session for LAB Exercises (09:30am - 10:30am EEST)

Module 2: The SELECT Module (continuation)

Module 3: Grouping and summarizing data in the SELECT result set (10:30am - 13:30pm EEST)

This module introduces the fundamentals of using of the GROUP BY clause to produce result sets with aggregated data. All of the aggregating functions for calculating total amounts, average values, min and max values etc., require proper use of GROUP BY clause.

### Lessons:

- ✓ GROUP BY clause
- ✓ Aggregate functions
- ✓ Filtering grouping with HAVING clause
- ✓ GROUPING SETS

### Lab: Grouping and summarizing data in the SELECT result set

- ✓ Writing SELECT statement for grouping and summarizing data
- ✓ Evaluate Grouping SELECT statements for errors
- ✓ Writing SELECT statements for top N results
- ✓ Using functions for Average, Sum and maximum value

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### After completing this module, you will be able to:

- ✓ Understand and articulate how grouping in SELECT statements work
- ✓ Properly use GROUP BY clause to produce aggregated data in the result set
- ✓ Use aggregating functions to execute different calculations
- ✓ Understand and GROUPING SETS and their use

## DAY 3

Q&A Session for LAB Exercises (09:30am - 10:30am EEST)

Module 4: Querying Multiple Tables (10:30am - 13:30pm EEST)

This module describes how to Join tables to produce result sets against the data in multiple tables. It explains the INNER, LEFT, RIGHT, OUTER and CROSS joins between tables and how to use them. The module describes, as well, different ways of combining the results from multiple queries.

### Lessons:

- ✓ Understanding the concept of Joins
- ✓ Querying with Inner Joins
- ✓ Querying with Outer Joins
- ✓ Querying with Cross Joins and Self Joins
- ✓ Combining and Limiting Result Sets

### Lab: Querying Multiple Tables

- ✓ Writing Queries that use Inner Joins
- ✓ Writing Queries that use Multiple-Table Inner Joins
- ✓ Writing Queries that use Outer Joins
- ✓ Set operators

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### After completing this module, you will be able to:

- ✓ Understand and articulate the concept of joins in SQL Server
- ✓ Write inner join queries
- ✓ Write queries that use outer joins
- ✓ Use additional join types
- ✓ Do combining and limiting result sets from more than one query

## DAY 4

Q&A Session for LAB Exercises (09:30am - 10:30am EEST)

Module 5: Advanced techniques for querying data with SELECT statement (10:30am - 13:30pm EEST)

This module describes some advanced approach in querying data. These includes sub-querying and windowing functions. It explains the scenarios and specifics in using sub-queries then review, explains and give perspective of how and when to use the windowing functions for analysis of data.

### Lessons:

- ✓ Working with subqueries
- ✓ Ranking and windowing
- ✓ Windowing functions

### Lab: Sorting and Filtering Data

- ✓ Writing Subqueries
- ✓ Ranking and windowing

### After completing this module, you will be able to:

- ✓ Understand the use and write subqueries as part of a SELECT statements
- ✓ Understand limitation and apply the best practices in writing subqueries
- ✓ Understand and articulate the concepts of windowing the data from a table or joined tables
- ✓ Write queries with the different ranking functions
- ✓ Describe and use other winnowing functions

