

# Advanced T-SQL Querying, Programming and Tuning for SQL Server (SQTSQL)

ID SQTSQL Price 2,850.— €(excl. tax) Duration 5 days

## Course Objectives

In this course you will learn the details and capabilities of T-SQL in the following areas: Logical Query Processing; Query Tuning (Internals and Index Tuning, including Columnstore Indexes, Query Store, New Cardinality Estimator, Temporary Tables, Sets vs. Cursors, Query Tuning with Query Revisions); Subqueries and Table Expressions (Derived Tables, CTEs, Views, Inline Table-Valued Functions), Recursive Queries, APPLY Operator, Joins and Set Operators; Aggregating, Pivoting and Windowing (including Aggregate, Ranking and Offset Window Functions), Custom Aggregates and STRING\_AGG; TOP and OFFSET-FETCH; Data Modification; Working with Date and Time (including System-Versioned Temporal Tables); Programmable Objects (Dynamic SQL, User Defined Functions, Stored Procedures, Triggers, Transactions and Concurrency, Exception Handling); In-Memory OLTP.

Along the course you will learn how to use T-SQL to solve practical problems such as: Relational Division, Missing and Existing Ranges (Gaps and Islands), Separating Elements, Pivoting and Unpivoting, Ranking and Offset, Running Totals, Moving Averages, YTD, Custom Aggregations, TOP and OFFSET-FETCH Problems, Paging, Top N Per Group, Median, Data De-Duplication, Handling Sequences, Merging Data, Treatment of Temporal Intervals (Intersection, Max Concurrent, Packing), Dynamic Search Condition (aka Dynamic Filtering), Migrating On-Disk to Memory Optimized Data, and more.

You will learn how to tune your queries, how to develop efficient routines including user defined functions, stored procedures and triggers, work in multi-user environments with transactions and isolation levels, and use dynamic SQL securely and efficiently.

The course provides a dedicated module focusing on query tuning. The module covers internals and index tuning, including coverage of Columnstore data, index access methods, cardinality estimations, query store, temporary tables, set vs. cursors, and query tuning using query revisions. Moreover, query tuning is in the

heart of this course and is incorporated in the different modules throughout the course. With each querying/programming task the discussions will revolve around logical aspects, set-based vs. iterative/procedural programming and optimization of the solutions.

The course workbook also contains a bonus self-study appendix on Graphs and Recursive queries. This appendix covers graphs, trees and hierarchies. It explains how to model and query such structures. It also covers the HIERARCHYID datatype, and the SQL Graph feature.

## Course Content

### Module 01: Logical Query Processing

- Logical Query Processing Order
- Logical Query Processing Example
- Phase Details

Quiz

### Module 02: Query Tuning

- Internals and Index Tuning

Quiz

- New Cardinality Estimator
- Temporary Tables
- Sets vs. Cursors
- Query Tuning with Query Revisions

### Module 03 – Multi-Table Queries

- Subqueries and Table Expressions
- APPLY Operator
- Joins
- Set Operators

LAB 03

### Module 04: Grouping, Pivoting and Windowing

- Window Functions
- Pivoting and Unpivoting Data
- Custom Aggregations
- STRING\_AGG
- Grouping Sets (bonus self-study unit)

#### LAB 04

##### Module 05: TOP and OFFSET-FETCH

- TOP
- OFFSET-FETCH
- Top N Per Group

#### LAB 05

##### Module 06: Data Modification

- Inserting Data
- Sequences
- Deleting Data
- Updating Data
- Merging Data
- The OUTPUT Clause

#### LAB 06

##### Module 07 – Working with Date and Time

- Date and Time Datatypes
- Date and Time Functions
- Date and Time Challenges
- System-Versioned Temporal Tables
- Date and Time Querying Problems

#### LAB 07

##### Module 08: Programmable Objects

- Dynamic SQL
- User Defined Functions
- Stored Procedures
- Triggers
- Transactions and Concurrency
- Exception Handling

#### LAB 08

##### Module 09: In-Memory OLTP

- Intro to In-Memory OLTP
- Architecture

- Memory Optimized Tables and Indexes
- Natively Compiled Procedures
- Transaction Semantics

#### LAB 09

##### Appendix A: Graphs and Recursive Queries (Bonus Self-Study Material)

- Graphs, Described
- Materialized Paths
- Custom
- Using the HIERARCHYID datatype
- Nested Sets
- Nested Iterations
- Loops
- Recursive Queries
- SQL Graph

#### LAB A

# About Fast Lane



Fast Lane is a global, award-winning specialist in technology and business training as well as consulting services for digital transformation. As the only global partner of the three cloud hyperscalers- Microsoft, AWS and Google- and partner of 30 other leading IT vendors, Fast Lane offers qualification solutions and professional services that can be scaled as needed. More than 4,000 experienced Fast Lane professionals train and advise customers in organizations of all sizes in 90 countries worldwide in the areas of cloud, artificial intelligence, cyber security, software development, wireless and mobility, modern workplace, as well as management and leadership skills, IT and project management.

## Fast Lane Services

- ✓ High End Technology Training
- ✓ Business & Soft Skill Training
- ✓ Consulting Services
- ✓ Managed Training Services
- ✓ Digital Learning Solutions
- ✓ Content Development
- ✓ Remote Labs
- ✓ Talent Programs
- ✓ Event Management Services

## Training Methods

- ✓ Classroom Training
- ✓ Instructor-Led Online Training
- ✓ FLEX Classroom – Classroom & Online Hybrid
- ✓ Onsite & Customized Training
- ✓ E-Learning
- ✓ Blended & Hybrid Learning
- ✓ Mobile Learning

## Technologies & Solutions

- ✓ Digital Transformation
- ✓ Artificial Intelligence
- ✓ Cloud
- ✓ Networking
- ✓ Cyber Security
- ✓ Wireless & Mobility
- ✓ Modern Workplace
- ✓ Data Center



**Worldwide Presence**  
with high-end training centers  
around the globe



**Multiple Awards**  
from vendors such as AWS,  
Microsoft, Cisco, Google, NetApp,  
VMware



**Experienced SMEs**  
with over 19.000 combined  
certifications

### Germany

**Fast Lane Institute for Knowledge  
Transfer GmbH**  
Tel. +49 40 25334610  
[info@flane.de](mailto:info@flane.de) / [www.flane.de](http://www.flane.de)

### Austria

**ITLS GmbH**  
(Partner of Fast Lane)  
Tel. +43 1 6000 8800  
[info@itls.at](mailto:info@itls.at) / [www.itls.at](http://www.itls.at)

### Switzerland

**Fast Lane Institute for Knowledge  
Transfer (Switzerland) AG**  
Tel. +41 44 8325080  
[info@flane.ch](mailto:info@flane.ch) / [www.flane.ch](http://www.flane.ch)