

# Performance Tuning and Optimizing SQL Databases 2022



## Training recipients

The primary audience for this course is individuals who administer and maintain SQL Server databases and are responsible for optimal performance of SQL Server instances that they manage. These individuals also write queries against data and need to ensure optimal execution performance of the workloads.

The secondary audiences for this course are individuals who develop applications that deliver content from SQL Server databases.



## Benefits

After completing this course, students will be able to:

- Describe the high level architectural overview of SQL Server and its various components.
- Describe the SQL Server execution model, waits and queues.
- Describe core I/O concepts, Storage Area Networks and performance testing.
- Describe architectural concepts and best practices related to data files for user databases and TempDB.
- Describe architectural concepts and best practices related to Concurrency, Transactions, Isolation Levels and Locking.
- Describe architectural concepts of the Optimizer and how to identify and fix query plan issues.
- Describe architectural concepts, troubleshooting scenarios and best practices related to Plan Cache.
- Describe architectural concepts, troubleshooting strategy and usage scenarios for Extended Events.
- Explain data collection strategy and techniques to analyze collected data.
- Understand techniques to identify and diagnose bottlenecks to improve overall performance.



## Training program

1. SQL Server Architecture, Scheduling, and Waits
  - **SQL Server Components** and **SQL OS**
  - Windows Scheduling vs SQL Scheduling
  - Waits and Queues
2. SQL Server I/O
  - Core Concepts
  - Storage Solutions
  - I/O Setup and Testing
3. Database Structures
  - Database Structure Internals
  - Data File Internals
  - **TempDB** Internals
4. SQL Server Memory
  - Windows Memory
  - SQL Server Memory
  - In-Memory **OLTP**
5. SQL Server Concurrency
  - Concurrency and Transactions
  - Locking Internals
6. Statistics and Index Internals
  - **Statistics Internals** and Cardinality Estimation
  - Index Internals
  - Columnstore Indexes
7. Query Execution and Query Plan Analysis
  - Query execution and optimizer internals
  - Query execution plans
  - Analyzing query execution plans
  - Adaptive query processing
8. Plan Caching and Recompilation
  - Plan cache internals
  - Troubleshooting plan cache issues
  - Automatic tuning
  - Query store
9. Extended Events
  - Extended events core concepts
  - Working with extended events
10. Monitoring, Tracing, and Baselineing
  - Monitoring and tracing

- Baselining and benchmarking



### Expected preparation of the participant

In addition to their professional experience, students who attend this training should already have the following technical knowledge:

- Basic knowledge of the Microsoft Windows operating system and its core functionality.
- Working knowledge of database administration and maintenance
- Working knowledge of Transact-SQL.

To increase the comfort of work and training's effectiveness we suggest using an additional monitor. The lack of additional monitor does not exclude participation in the training, however, it significantly influences the comfort of work during classes.

You can find information and requirements of participation in Distance Learning trainings at:

<https://www.altkomakademia.pl/en/how-it-works/about-courses/>



### Training Includes

- manual in electronic form available on the platform: <https://www.altkomakademia.pl/>
- access to Altkom Akademia's student portal



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### Language

- **Training:** English
- **Materials:** English