KOENIG SOLUTIONS · COURSE OUTLINE

Advanced Microsoft SQL Server – Performance, Tuning & Scripting

Learn to write advanced T-SQL, tune performance, automate administration, and secure high-availability SQL Server environments.

5 Days	5	25
DURATION	MODULES	TOPICS

COURSE OVERVIEW

This advanced-level training program is designed for experienced SQL Server professionals who want to deepen their mastery of database design, optimization, and administration. Building on core SQL Server knowledge, participants will explore advanced concepts that enable them to design complex queries, enhance performance, manage large-scale data environments, and implement enterprise-level security and high availability solutions. Through a blend of expert-led instruction and hands-on labs, learners will gain practical experience in tackling real-world database challenges using industry-standard tools and methodologies. The course emphasizes not only technical expertise but also strategic thinking required to maintain scalable, resilient, and secure SQL Server infrastructures. Participants will perform guided exercises using SQL Server Management Studio (SSMS), SQL Server Profiler, and PowerShell to apply performance tuning techniques, analyze workload patterns, automate administrative tasks, and implement robust security measures. By the end of the course, they will be equipped to confidently design and optimize enterprise-grade SQL Server environments following best practices used by leading database professionals worldwide.

WHO THIS COURSE IS FOR

- **Database Developers and Administrators (DBAs)**
- **Data Engineers and BI Specialists**
- **SQL Server Professionals managing production environments**
- **DevOps engineers working with SQL backends**
- **Anyone preparing for advanced SQL certification**

LEARNING OBJECTIVES

What You Will Learn

- Master advanced T-SQL querying techniques and window functions
- Analyze execution plans and identify performance bottlenecks
- Tune indexes, statistics, and query design for large datasets
- Implement stored procedures, functions, and error handling
- Secure SQL Server environments with roles and encryption
- Set up replication, log shipping, and availability groups
- Automate maintenance tasks using SQL Agent and PowerShell

COURSE SYLLABUS

5 Modules, 25 Topics

01

Advanced T-SQL Programming

TOPICS

- Advanced SELECT queries and subqueries
- Common table expressions (CTEs) and recursive queries
- **Window functions:** ROW_NUMBER, RANK, LEAD/LAG
- Dynamic SQL and execution context
- Error handling and TRY…CATCH blocks

02

Performance Tuning and Optimization

TOPICS

- Query tuning principles and best practices
- Reading and interpreting execution plans
- **Index types:** clustered, non-clustered, filtered, columnstore
- Statistics and cardinality estimators
- Using SQL Profiler and Extended Events

03

Programmability and Automation

TOPICS

- Stored procedures, user-defined functions (scalar/table-valued)
- Triggers (AFTER, INSTEAD OF) and transaction handling
- SQL Server Agent jobs, alerts, and operators
- Automating backups, index maintenance, and ETL tasks
- PowerShell scripting for SQL Server management

04

Security and Access Control

TOPICS

- SQL Server authentication vs Windows authentication
- Roles, permissions, schemas, and securables
- Transparent Data Encryption (TDE) and Always Encrypted
- Row-level security and data masking
- Auditing and compliance strategies

05

High Availability and Disaster Recovery

TOPICS

- **Backup and restore strategies:** full, differential, transaction log
- Log shipping and database mirroring
- **Replication types:** snapshot, transactional, merge
- Always On Availability Groups (basic & advanced)
- **Final project:** optimize a real-world workload and document results

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training | Live Online Classes (ILO) | Fly-Me-A-Trainer (FMAT) | Flexi (Self-Paced) | 1-on-1 Training

Ready to Get Started?

Talk to a learning advisor about schedules, group training and customised delivery.

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