KOENIG step forward

Microsoft Solutions Partner
Microsoft Cloud Training Services

KOENIG SOLUTIONS · COURSE OUTLINE

Microsoft SQL Server 2025: Enterprise Database Administration

Learn to install, secure, back up and automate SQL Server 2025 environments, from architecture to migration and modern data features.

5 Days	26	89	22
40 HOURS	MODULES	TOPICS	HANDS-ON LABS

COURSE OVERVIEW

Empower your database team with practical expertise in SQL Server 2025 administration, security, migration, and automation. This intensive 40-hour program is designed for enterprise DBAs, data platform engineers, and IT professionals responsible for managing critical on-premises and cloud SQL Server environments. Participants will gain hands-on experience with core administration tasks, including installation, configuration, backup and recovery, storage and file management, and operational monitoring. Advanced modules cover modern SQL Server 2025 capabilities such as JSON data types, REST integrations, vector data. The program also emphasizes enterprise-ready automation and migration strategies, leveraging SQL Server PowerShell, SSMA, and Visual Studio Code with MSSQL extension, ensuring repeatable, secure, and efficient workflows. Through practical labs simulating real-world enterprise scenarios, attendees will be equipped to manage, secure, and optimize SQL Server environments, improve operational excellence, and drive business continuity.

WHO THIS COURSE IS FOR

- **Database Administrators**
- **Data Platform Engineers**
- **IT Professionals**
- **Enterprise DBAs**
- **Systems Administrators**

LEARNING OBJECTIVES

- Explain SQL Server 2025 instance architecture and memory model
- Plan hardware, storage and tempdb configuration for enterprise workloads
- Configure authentication, authorization and role-based access control
- Implement auditing and encryption to protect data at rest
- Apply backup, restore and point-in-time recovery strategies
- Monitor storage growth, tempdb contention and job health
- Plan upgrade paths and compatibility testing for SQL Server 2025
- Automate DBA tasks using PowerShell, SSMA and VS Code

COURSE SYLLABUS

26 Modules, 89 Topics

DAY 1 Core DB Architecture, Installation & Environment Setup

01

Lab

Introduction & DBA Fundamentals

TOPICS

- **Lesson 1.1:** Role of DBA & SQL Server 2025 overview
- **Lesson 1.2:** SQL Server 2025 Instance Architecture & Services
- **Lesson 1.3:** SQL Server Memory & Process Model

02

Lab

Hardware & Storage Planning

TOPICS

- **Lesson 2.1:** CPU, Memory & Storage sizing best practices
- **Lesson 2.2:** RAID, IOPS, Tempdb planning
- **Lesson 2.3:** Auto-growth, Instant File Initialization

03

Lab

Installation & Configuration

TOPICS

- **Lesson 3.1:** SQL Server 2025 Installation Workflow
- **Lesson 3.2:** Service Accounts & Instance Configuration
- **Lesson 3.3:** Post-installation Checklist & Validation

04

Lab

Authentication & Access Control

TOPICS

- **Lesson 4.1:** Authenticating Connections to SQL Server
- **Lesson 4.2:** Authorizing Logins to Connect to Databases
- **Lesson 4.3:** Authorization Across Servers
- **Lesson 4.4:** Partially Contained Databases

Business Problem & Its Solutions

TOPICS

- Failed installation due to permissions/port conflicts
- Memory allocation issues at startup
- Tempdb bottlenecks from incorrect sizing
- Collation mismatches causing errors

DAY 2 Security, Identity, Roles & Auditing

05 Lab

Security Fundamentals

TOPICS

- **Lesson 5.1:** SQL Server Security Architecture
- **Lesson 5.2:** Managed Identities & Credential Management
- **Lesson 5.3:** Password Policy Enforcement & Secure Config
- **Lesson 5.4:** Enhanced Password Protection

06 Lab

Role-Based Access Control

TOPICS

- **Lesson 6.1:** SQL Server Login & Database User
- **Lesson 6.2:** Server Roles Overview
- **Lesson 6.2:** Fixed Database Roles
- **Lesson 6.3:** User-Defined Database Roles

07 Lab

Auditing & Encryption

TOPICS

- **Lesson 7.1:** Options for Auditing Data Access
- **Lesson 7.2:** Implementing SQL Server Audit
- **Lesson 7.3:** Managing Audit Data
- **Lesson 7.4:** Protecting Data with Encryption (TDE, Backup, Column-level)

08

Governance & Compliance

TOPICS

- **Lesson 8.1:** Least Privilege Design
- **Lesson 8.2:** Audit Retention & Compliance Framework
- **Lesson 8.3:** Security Baselines & Documentation

Business Problem & Its Solutions

TOPICS

- Unauthorized access due to misconfigured roles
- Failed audit logs
- Encryption key mismanagement causing restore failures
- Permissions drift across servers

DAY 3 **Backup, Restore & Recovery**

09 Lab

Backup Architecture

TOPICS

- **Lesson 9.1:** Full, Differential & Log Backups
- **Lesson 9.2:** Encrypted Backups & Compression
- **Lesson 9.3:** File/Filegroup-level Backups
- ZSTD compression algorithm introduced in SQL Server 2025

10 Lab

Restore & Recovery Operations

TOPICS

- **Lesson 10.1:** Restore Sequences & Validation
- **Lesson 10.2:** Point-in-Time Recovery
- **Lesson 10.3:** Page & Piecemeal Restore

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Lab

Backup Strategy Governance

TOPICS

- **Lesson 11.1:** Scheduling & Automation
- **Lesson 11.2:** Storage Allocation & Repository Management
- **Lesson 11.3:** Monitoring & Reporting

12

Lab

Server-Level Operational Continuity

TOPICS

- **Lesson 12.1:** System DB Recovery (master, msdb, model)
- **Lesson 12.2:** Document Recovery Procedures

Business Problem & Its Solutions

TOPICS

- Failed backup jobs due to permissions or disk space
- Restore failures caused by missing log backups
- Corrupted backup files or incomplete recovery

DAY 4

Storage, File Management & Administrative Operations

13

Lab

Database Storage & File Architecture

TOPICS

- **Lesson 13.1:** Data & Log Files
- **Lesson 13.2:** Filegroups & Storage Tiering
- **Lesson 13.3:** VLF Management & Auto-growth

14

Lab

Tempdb Administration

TOPICS

- **Lesson 14.1:** Multi-file Configuration & Initialization
- **Lesson 14.2:** Preventing Allocation Bottlenecks

15

Lab

Maintenance Automation

TOPICS

- **Lesson 15.1:** DBCC CHECKDB & Consistency Checks
- **Lesson 15.2:** Statistics Lifecycle Management
- **Lesson 15.3:** Index Maintenance (Admin Perspective)
- **Lesson 15.4:** SQL Server Agent Jobs & Multi-server Admin

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Lab

Operational Monitoring

TOPICS

- **Lesson 16.1:** Health Checks & System Monitoring
- **Lesson 16.2:** Storage Growth & File Monitoring
- **Lesson 16.3:** Backup & Log Usage Monitoring

Business Problem & Its Solutions

TOPICS

Log file growth exceeding disk space · Tempdb contention blocking sessions · Missed or failed maintenance jobs · Filegroup fragmentation affecting operations

DAY 5

Upgrades, Modern Features, Governance & Automation

17

Lab

Patch Management & Upgrades

TOPICS

- **Lesson 17.1:** Upgrade Planning & Patch Strategy
- **Lesson 17.2:** In-place / Side-by-side Upgrade Methods
- **Lesson 17.3:** Compatibility Levels & Testing

18

Lab

Governance, Documentation & Data Lifecycle

TOPICS

- **Lesson 18.1:** Policy-Based Management
- **Lesson 18.2:** Data Retention & Archival
- **Lesson 18.3:** Access Governance & Documentation Templates

19

Lab

SQL Server 2025 Modern Data Capabilities

TOPICS

- **Lesson 19.1:** JSON Data Type & Indexing
- **Lesson 19.2:** REST API Calls via T-SQL
- **Lesson 19.3:** RegEx T-SQL Functions
- **Lesson 19.4:** Vector Data Administration

20

Lab

Automation, Scripting & Runbook Design

TOPICS

- **Lesson 20.1:** Introduction to SQL Server PowerShell cmdlets & T-SQL Automation
- **Lesson 20.2:** Job Orchestration & Scheduling
- **Lesson 20.3:** Automating routine DBA tasks (backups, monitoring, maintenance)

Business Problem & Its Solutions

TOPICS

- Upgrade failures due to compatibility issues
- Mismanaged automation jobs causing downtime
- Governance lapses leading to compliance issues
- Security misconfigurations on new SQL Server 2025 features

21

3 Labs

Modern SQL Server 2025 Migration & Automation Tools

LESSON 21.1: MSSQL EXTENSION FOR VISUAL STUDIO CODE

- Overview of VS Code as a lightweight SQL editor
- T-SQL script development with IntelliSense
- SQL Database Projects for version-controlled schema

LESSON 21.2: SQL SERVER MIGRATION ASSISTANT (SSMA)

- **Schema and data migration workflow:** Assessment to Conversion to Migration to Validation
- Post-migration validation and troubleshooting

HANDS-ON LABS

Practise What You Learn

#	MODULE	ACTIVITY
01	**Introduction & DBA Fundamentals**	**Lab 1:** Explore SQL Server components and system databases
02	**Hardware & Storage Planning**	**Lab 2:** Plan and configure storage for sample database
03	**Installation & Configuration**	**Lab 3:** Install SQL Server 2025 on a test VM
04	**Authentication & Access Control**	**Lab 4:** Configure users and authentication
05	**Security Fundamentals**	**Lab 5:** Configure security policies on a test instance
06	**Role-Based Access Control**	**Lab 6:** Assign server and database roles to users
07	**Auditing & Encryption**	**Lab 7:** Configure auditing and encryption
09	**Backup Architecture**	**Lab 9:** Implement backup strategy on a test database
10	**Restore & Recovery Operations**	**Lab 10:** Perform backup restore scenarios
11	**Backup Strategy Governance**	**Lab 11:** Configure automated backup jobs
12	**Server-Level Operational Continuity**	**Lab 12:** Simulate recovery of system DBs
13	**Database Storage & File Architecture**	**Lab 13:** Configure filegroups and data files
14	**Tempdb Administration**	**Lab 14:** Configure tempdb for optimal admin setup
15	**Maintenance Automation**	**Lab 15:** Configure automated maintenance jobs
16	**Operational Monitoring**	**Lab 16:** Monitor server health & storage trends
17	**Patch Management & Upgrades**	**Lab 17:** Apply cumulative update or upgrade a test SQL Server instance
18	**Governance, Documentation & Data Lifecycle**	**Lab 18:** Document DBA policies and runbooks
19	**SQL Server 2025 Modern Data Capabilities**	**Lab 19:** Configure JSON column, run REST query, and manage vector data
20	**Automation, Scripting & Runbook Design**	**Lab 20:** Automate routine DBA operations

#	MODULE	ACTIVITY
21	**Modern SQL Server 2025 Migration & Automation Tools**	■ **Lab 21:** End-to-End Migration & Automation Exercise: Connect to SQL Server using VS Code MSSQL extension ■ **Lab 21:** End-to-End Migration & Automation Exercise: Perform schema conversion and data migration with SSMA ■ **Lab 21:** End-to-End Migration & Automation Exercise: Validate migrated database and check schema consistency

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.

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