DATABASES INTERMEDIATE 4 DAYS

Microsoft SQL Server Administration

Four days of production SQL Server administration covering architecture, instance configuration, security and encryption, backup and restore, Agent automation, index and statistics maintenance, monitoring with DMVs and Extended Events, Query Store, tempdb and memory tuning, blocking and deadlocks, and upgrade paths. Delivered on SQL Server 2022 and 2025 with Azure SQL differences called out, and every module closes with a lab on a live instance.

Why SQL Server Administration Training?

Restores are practised, not assumed

Participants perform point-in-time and page level restores, including recovery from deliberate corruption.

Covers the Azure path

Managed Instance and Azure SQL Database operational differences are addressed throughout, not bolted on at the end.

Diagnosis over configuration folklore

Teams learn to read DMVs, Query Store and wait statistics instead of applying settings copied from a blog post.

Automation that reduces on-call load

Agent jobs, maintenance solutions and alerting are built during the course and leave as reusable scripts.

What you'll be able to do

- Explain SQL Server architecture, memory management and storage engine behaviour
- Install, configure and standardise instances for a defined workload
- Design database file and filegroup layouts appropriately
- Implement authentication, authorisation and least-privilege permission models
- Apply encryption and auditing to meet compliance requirements
- Choose recovery models and design a backup strategy against stated objectives
- Perform restores including point-in-time, filegroup and page level recovery
- Detect and respond to database corruption
- Automate maintenance using SQL Server Agent and established maintenance solutions
- Maintain indexes and statistics without harming production performance
- Monitor an instance using DMVs, Extended Events and Query Store
- Diagnose blocking, deadlocks and tempdb contention
- Plan and execute upgrades, patching and migrations to Azure SQL

Who this is for

- Database administrators supporting SQL Server
- Infrastructure and platform engineers who inherited SQL Server estates
- Developers responsible for their own SQL Server instances
- Cloud engineers running Azure SQL Database or Managed Instance

- Technical leads accountable for availability and recovery objectives

Curriculum

01 SQL Server Architecture and Editions

- SQLOS, schedulers, workers and the memory architecture
- Buffer pool, plan cache and memory grant behaviour
- Storage engine, pages, extents and allocation structures
- Edition differences and licensing constraints that affect design
- SQL Server on Windows, Linux and containers
- **Hands-on:** inspect memory, scheduler and cache state on a live instance

02 Installation, Instances and Configuration

- Installation options, service accounts and instance-level settings
- Configuring memory limits, MAXDOP and cost threshold for parallelism
- Instant file initialisation, lock pages in memory and startup flags
- Standardising a build across an estate with scripted configuration
- Post-install baseline checks worth automating
- **Hands-on:** build a standardised instance from a configuration script

03 Databases, Files and Filegroups

- Data files, log files and the consequences of autogrowth defaults
- Filegroup design for large databases and partial recovery
- Log file architecture, VLFs and log growth management
- Data and log placement across storage tiers
- Database properties, compatibility level and their effect on behaviour
- **Hands-on:** correct a badly configured database file layout online

04 Security, Logins and Permissions

- Windows and SQL authentication and the case for each
- Logins, users, orphaned users and contained databases
- Server roles, database roles and custom role design
- Schemas, ownership chaining and permission inheritance
- Least privilege for application, reporting and administrative access
- **Hands-on:** design and implement a permission model, then audit it

05 Encryption, Auditing and Compliance

- Transparent Data Encryption and key management
- Always Encrypted and column level protection
- Dynamic data masking and row level security
- SQL Server Audit configuration and evidence collection
- Mapping controls to ISO 27001, PCI DSS and regional data protection rules
- **Hands-on:** implement encryption and produce an audit evidence pack

06 Recovery Models and Backup Strategy

- Simple, full and bulk-logged recovery models and their consequences
- Full, differential and log backups and how they combine
- Backup compression, encryption, checksums and verification
- Backup to disk, network shares and Azure Blob Storage
- Designing a schedule against stated recovery point objectives
- **Hands-on:** design and implement a backup strategy for a defined objective

07 Restore, Recovery and Corruption

- Restore sequences, recovery states and standby restores
- Point-in-time restore using log backups and marked transactions
- Filegroup, piecemeal and page level restores
- DBCC CHECKDB, consistency checking cadence and interpreting output
- Corruption response: options, escalation and what never to run first
- **Hands-on:** corrupt a page deliberately, detect it and recover the database

08 Automation with SQL Server Agent

- Jobs, steps, schedules and proxies
- Operators, alerts and notification design
- Established community maintenance solutions and why to prefer them
- PowerShell and dbatools for estate-wide automation
- Job failure handling, logging and idempotency
- **Hands-on:** build an automated maintenance and alerting suite

09 Indexes and Statistics Maintenance

- Clustered and non-clustered index structure and key choice
- Included columns, filtered indexes and columnstore basics
- Fragmentation, page density and when rebuilding is actually worth it
- Online and resumable index operations
- Statistics, sampling, auto-update behaviour and manual intervention
- **Hands-on:** build an index maintenance strategy that respects a maintenance window

10 Monitoring with DMVs and Extended Events

- Wait statistics as the starting point for any performance question
- Key dynamic management views for sessions, requests and I/O
- Extended Events sessions, targets and low overhead capture
- Replacing Profiler workflows with Extended Events
- Baseline collection and trend analysis
- **Hands-on:** capture and analyse a workload with a custom Extended Events session

11 Query Store and Performance Triage

- Query Store configuration, capture modes and retention
- Identifying regressed queries and forcing a known good plan
- Automatic plan correction and its guard rails
- Reading actual execution plans for triage
- Parameter sniffing and mitigation options
- **Hands-on:** detect a plan regression and stabilise it without changing code

12 tempdb, Memory and Instance Tuning

- tempdb usage patterns and allocation contention
- File count, sizing and configuration guidance
- Memory grants, spills and resource semaphore waits
- Resource Governor for workload isolation
- Storage throughput, latency targets and I/O diagnostics
- **Hands-on:** resolve tempdb contention and prove the improvement

13 Locking, Blocking and Deadlocks

- Isolation levels, read committed snapshot and version store impact
- Lock modes, escalation and blocking chain analysis
- Capturing and reading deadlock graphs
- Long running transactions and implicit transaction problems
- Application patterns that cause avoidable contention
- **Hands-on:** diagnose a blocking incident and eliminate the root cause

14 High Availability Foundations

- Availability options compared: log shipping, replication, failover clustering and availability groups
- Matching each option to recovery time and recovery point objectives
- Log shipping configuration and monitoring
- Replication types and their appropriate use cases
- Where an availability group is the right answer and where it is overkill
- **Hands-on:** implement log shipping and test a controlled role change

15 Upgrades, Patching and Azure SQL

- Cumulative update strategy and patching cadence
- In-place upgrade versus side-by-side migration
- Compatibility level changes and cardinality estimator regressions
- Migration assessment tooling and pre-upgrade validation
- Azure SQL Database and Managed Instance operational differences
- Estate documentation, inventory and standards
- **Hands-on:** capstone upgrade with assessment, execution and rollback plan