

# Course Outline | Microsoft SQL Server 2014 System Administration

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5 day(s)

## Overview

This 5 day course is intended for students who need to learn the skills necessary to maintain a Microsoft SQL Server 2014 system infrastructure. Being comprehensive and hands-on, it is aimed at quickly getting students familiar with the Microsoft SQL Server 2014 administration concepts, tools and utilities. Attendees will gain insight into the infrastructure and architecture of SQL Server, enabling individuals to fully understand the product with which they are dealing. Configuration of server instances and databases is given extensive treatment, as is the pivotal role of database transaction logs. Index creation and maintenance is also given in-depth analysis to facilitate better understanding of related performance issues arising from their use, and how to rectify problems that can often occur. Thorough coverage is given to managing SQL Server security, including both at the server and database level. The focus then shifts to examining how best to move and protect data, such as when importing or exporting it between heterogeneous data sources, backing it up to external media, and restoring data from a backup. Many tasks involved in the day to day administration of a SQL Server instance can be performed automatically, making an administrators life potentially simpler, and such is the subject matter in the module dealing with SQL Server Automation. Coverage of SQL Server high availability options is also provided, enabling students to better identify what choices are available and best suited to given scenarios. Finally, comprehensive treatment is given to the monitoring and troubleshooting of SQL Server performance and related issues.

This course is fully customisable and can be tailored to include only the material required.

## Objectives

Upon successful completion of this course, students will be able to:

- Install and Configure a SQL Server 2014 Instance
- Create, Configure and Manage Databases
- Implement and Manage Indexes
- Create and Manage Table and Index Partitions
- Understand and Implement SQL Server 2014 Security
- Understand Data Transfer Utilities
- Backup and Restore Databases
- Implement Database Snapshots
- Automate Tasks in SQL Server 2014
- Understand the Concepts of Maintaining High Availability
- Implement Replication
- Monitor and Troubleshoot SQL Server 2014

## Prerequisites

Students should be familiar with working in a Microsoft Windows Server operating system environment. Delegates should also have an understanding of the fundamental design of relational databases including, but not restricted to, the purpose of primary and foreign keys, entity relationships, and data normalization. A working knowledge of the SQL language (such as might be gained from attending the 2 day "SQL Server 2014 Introduction to Querying" course) will also be assumed.

## Course Outline

### 1. Installing SQL Server 2012

- Preparing for an Installation
- Installing SQL Server 2012
- Upgrading an Instance to SQL Server 2014

### 2. Configuring and Managing SQL Server Instances

- Configuring Instance-Level Settings
- Configuring Database Mail
- Installing Additional SQL Server Instances

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- Managing Software Updates

## 3. Configuring and Managing Databases

- Designing the Storage for New Databases
- Managing Files and Filegroups
- Configuring Databases
- Shrinking and Growing Databases
- Contained Databases
- Data Compression
- Encrypting Databases (TDE)
- Managing Log Files
- Using Database Console Commands

## 4. Creating and Managing Indexes

- SQL Server Index Architecture
- Designing Indexes for Efficient Data Retrieval
- Index Creation Options
- Creating and Modifying Indexes
- Tracking Missing Indexes
- Reviewing Unused Indexes
- Managing Index Fragmentation
- Understanding and Managing Statistics

## 5. Partitioning Indexes and Tables

- Partition Functions
- Partition Schemes
- Partitioning Tables and Indexes
- Query Data in Partitions
- Managing Partitions

## 6. SQL Server 2014 Security

- Managing Logins and Server Roles
- Credentials
- Managing Users and Database Roles
- Contained Users
- Application Roles
- Understanding Securables
- Assigning and Managing Permissions
- Using Schemas
- Troubleshooting SQL Server Security
- Using Security Catalog Views
- Auditing SQL Server Instances
- Policy-Based Management

## 7. Transferring Data

- Overview of Copying and Exporting Data
- Using BCP to Import and Export Data
- BULK INSERT
- OPENROWSET(BULK
- SELECT INTO
- Using the SQL Server Import and Export Wizard
- Introducing SQL Server Integration Services (SSIS)
- Copying Databases to Other Servers
- Migrating SQL Logins

## 8. Backups and Recovery

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- Understanding Database Recovery Models
- Understanding Backup Types
- Backup Options
- Backup to URL
- Encrypted Backups
- Performing Database and Log Backups
- Backing Up System Databases
- Viewing Backup History
- Restoring Database and Log Backups
- Performing File Restores
- Performing Page Restores
- Restoring System Databases

## 9. Database Snapshots

- How Database Snapshots Work
- Benefits of Database Snapshots
- Implementing Database Snapshots
- Revert a Database to a Database Snapshot

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## 10. SQL Server Automation

- Overview of SQL Server Automation
- The SQL Server Agent Service
- Configuring Credentials and Proxy Accounts
- Implementing Jobs
- Implementing Operators and Notifications
- Implementing Alerts
- Managing Multiple Servers
- Maintenance Plans

## 11. SQL Server High Availability

- Overview of SQL Server High Availability Options
- Implementing Database Mirroring
- Implementing Log Shippin
- Introducing Clustering on SQL Server 2014
- Introducing AlwaysOn Availability Groups

## 12. Introduction to Replication

- Replication Architecture
- Replication Types
- Snapshot Replication
- Transactional Replication
- Peer-to-Peer Transactional Replication
- Merge Replication
- The Replication Monitor
- Managing Replication

## 13. Monitoring and Troubleshooting SQL Server

- Introduction to Monitoring SQL Server
- Using DMVs and DMFs

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- Activity Monitor
- Performance Monitor
- SQL Server Profiler
- Extended Events
- DDL and Logon Triggers
- Using the Database Engine Tuning Advisor
- Using Resource Governor
- The Data Collector and Management Data Warehouse
- Monitoring Disk Usage
- Monitoring Memory Usage
- Monitoring CPU Usage
- Understanding Transactions
- Understanding SQL Server Lock Management
- Monitoring Concurrency Issues
- Detecting and Correcting Deadlocks
- Diagnosing Bottlenecks