



## Administering Microsoft SQL Server 2012 Databases Course 10775 36 Contact Hours

### Course Overview

instructor-led course provides students with the knowledge and skills to maintain a Microsoft SQL Server 2012 database. The course focuses on teaching individuals how to use SQL Server 2012 product features and tools related to maintaining a database. Also this course helps you prepare for the Exam 70-462

All the labs for this course can be performed using the provided virtual machines. However, if you have a Microsoft Windows Azure account and the classroom virtual machines connect to the internet you may be able to connect to your Azure server and database from the classroom. Many of the labs in this course are enabled for you to perform the lab while connected to your own Azure database in the cloud. Your instructor should be able to provide a current list of Azure enabled labs. To acquire a trial Windows Azure account click here .

Below are the some of the new features of SQL Server that has been discussed in this course

#### -Discussion around servicing SQL Server (Service Packs, Cumulative Updates, Hotfixes)

Understanding the relationship between the different levels of updates to the SQL Server product is very important for those working with it. The course now covers details on how hotfixes, cumulative updates and service packs are related and when to apply each type of update.

#### -SQL Server use of automated update

SQL Server can now utilize Windows Update for servicing. The course shows how to enable automated updates and when the use of these updates should and should not be used.

#### -Partial database containment

A significant challenge when migrating databases between servers is the management of objects such as logins that are not contained within the database. The course now discusses the partial containment options that are provided by SQL Server 2012. In particular, authentication-related changes are discussed.

#### -Users with passwords (contained users)

The course shows how SQL Server 2012 allows users to be authenticated at the database level, rather than at the server level. This is an important first step in for database containment.



#### -User-defined server roles

In earlier versions of SQL Server, user-defined roles could be created at the database level but not at the server level. In SQL Server 2012, user-defined roles can also be defined at the server level. This can help to increase the security of systems. Having the ability to configure more fine-grained permissions lets logins be assigned only the permissions that they need to do their work.

#### -In-place upgrades of data-tier applications

In earlier versions of SQL Server, an upgrade of a data-tier application involved migrating all the data within a database to a new database. In SQL Server 2012 this is no longer needed and the course shows how data-tier applications can be upgraded much more quickly, and using less system resources.

#### -Appendix with intro to AlwaysOn, High Availability and Replication concepts

Students who will be attempting the certification exam that is relevant to this course require knowledge of high availability and replication. In earlier versions of this course, none of these details were covered. In this version of the course, an appendix that covers the core concepts for high availability (including SQL Server 2012 AlwaysOn technologies) and replication is provided.

#### Audience Profile

The primary audience for this course is individuals who administer and maintain SQL Server databases. These individuals perform database administration and maintenance as their primary area of responsibility, or work in environments where databases play a key role in their primary job. The secondary audiences for this course are individuals who develop applications that deliver content from SQL Server databases.

#### At Course Completion

After completing this course, students will be able to:

- Plan and install SQL Server.
- Describes the system databases, the physical structure of databases and the most common configuration options related to them.
- Explain the concept of the transaction log and SQL Server recovery models and implement different backup strategies available with SQL Server.
- Create SQL Server Backups.
- Restore SQL Server databases.
- Use the import/export wizards and explain how they relate to SSIS.
- Work with SQL Server security models, logins and users.
- Work with fixed server roles, user-defined server roles, fixed database roles and user-defined database roles.
- Work with permissions and the assignment of permissions.
- Work with SQL Server Audit



- Work with SQL Server Agent, jobs and job history.
- Implement SQL Server agent security, proxy accounts and credentials.
- Configure database mail, alerts and notifications.
- Create database maintenance plans.
- Work with SQL Profiler and SQL Trace stored procedures.
- Introduce DMVs and the configuration of data collection.
- Work with Central Management Servers and Multi-Server queries, Virtualization of SQL Server and Data-Tier Applications.
- Troubleshoot SQL Server databases .

#### Prerequisites

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 Transact-SQL.
- Working knowledge of relational databases.
- Some experience with database design.

Students who attend this training can meet the prerequisites by attending the following courses, or obtaining equivalent knowledge and skills:

10774•A: Writing T-SQL Queries for Microsoft SQL Server 2012

#### Course Outline

##### Module 1: Introduction to SQL Server 2012 and its Toolset

This module introduces the entire SQL Server platform and its major tools. It covers editions, versions, basics of network listeners, and concepts of services and service accounts.

##### Lessons

- Introduction to the SQL Server Platform
- Working with SQL Server Tools
- Configuring SQL Server Services

##### Lab : Introduction to SQL Server and its Toolset

- Verifying SQL Server Component Installation
- Altering Service Accounts for New Instance
- Enabling Named Pipes Protocol for Both Instances
- Creating an Alias for AdvDev
- Ensuring SQL Browser is Disabled and Configure a Fixed TCP/IP Port (Only if time permits)

After completing this module, students will be able to:

- Describe the SQL Server Platform.



- Work with SQL Server Tools.
- Configure SQL Server Services.

## Module 2: Preparing Systems for SQL Server 2012

This module covers planning for an installation related to SQL Server I/O requirements, 32 bit vs 64 bit, memory configuration options and I/O subsystem pre-installation checks using SQLIOSim and SQLIO.

### Lessons

- Overview of SQL Server Architecture
  - Planning Server Resource Requirements
  - Pre-installation Testing for SQL Server
- Lab : Preparing Systems for SQL Server
- Adjust memory configuration
  - Pre-installation Stress Testing
  - Check Specific I/O Operations

After completing this module, students will be able to:

- Describe the SQL Server architecture.
- Plan for server resource requirements.
- Conduct pre-installation stress testing for SQL Server.

## Module 3: Installing and Configuring SQL Server 2012

This module details installing and configuring SQL Server.

### Lessons

- Preparing to Install SQL Server
  - Installing SQL Server
  - Upgrading and Automating Installation
- Lab : Installing and Configuring SQL Server
- Review installation requirements
  - Install the SQL Server instance
  - Perform Post-installation Setup and Checks
  - Configure Server Memory

After completing this module, students will be able to:

- Prepare to install SQL Server.
- Install SQL Server.
- Upgrade and automate the installation of SQL Server.

## Module 4: Working with Databases

This module describes how data is stored in databases, how to create databases, and how to move databases either within a server or between servers.

### Lessons



- Overview of SQL Server Databases
- Working with Files and Filegroups
- Moving Database Files

Lab : Working with Databases

- Adjust tempdb configuration
- Create the RateTracking database
- Attach the OldProspects database
- Add multiple files to tempdb

After completing this module, students will be able to:

- Describe the role and structure of SQL Server databases.
- Work with files and filegroups.
- Move database files within servers and between servers.

#### Module 5: Understanding SQL Server 2012 Recovery Models

This module describes the concept of the transaction log and SQL Server recovery models. It introduces the different backup strategies available with SQL Server.

Lessons

- Backup Strategies
- Understanding SQL Server Transaction Logging
- Planning a SQL Server Backup Strategy

Lab : Understanding SQL Server Recovery Models

- Plan a backup strategy
- Configure Recovery Models
- Review recovery models and strategy

After completing this module, students will be able to:

- Describe the critical concepts surrounding backup strategies.
- Explain the transaction logging capabilities within the SQL Server database engine.
- Plan a SQL Server backup strategy.

#### Module 6: Backup of SQL Server 2012 Databases

This module describes SQL Server Backup and the backup types.

Lessons

- Backing up Databases and Transaction Logs
- Managing Database Backups
- Working with Backup Options

Lab : Backup of SQL Server Databases

- Investigate backup compression
- Transaction log backup
- Differential backup



- Copy-only backup

- Partial backup

After completing this module, students will be able to:

- Back up databases and transaction logs.

- Manage database backups.

- Work with more advanced backup options.

### Module 7: Restoring SQL Server 2012 Databases

This module describes the restoration of databases.

Lessons

- Understanding the Restore Process

- Restoring Databases

- Working with Point-in-time recovery

- Restoring System Databases and Individual Files

Lab : Restoring SQL Server 2012 Databases

- Determine a restore strategy

- Restore the database

- Using STANDBY mode

After completing this module, students will be able to:

- Understand the restore process.

- Restore databases.

- Work with Point-in-time Recovery.

- Restore system databases and individual files.

### Module 8: Importing and Exporting Data

This module covers the use of the import/export wizards and explains how they relate to SSIS. Also introduces BCP.

Lessons

- Transferring Data To/From SQL Server

- Importing & Exporting Table Data

- Inserting Data in Bulk

Lab : Importing and Exporting Data

- Import the Excel spreadsheet

- Import the CSV file

- Create and test an extraction package

- Compare loading performance

After completing this module, students will be able to:

- Transfer data to and from SQL Server.

- Import and export table data.



- Insert data in bulk and optimize the bulk insert process.

## Module 9: Authenticating and Authorizing Users

This module covers SQL Server security models, logins and users.

Lessons

- Authenticating Connections to SQL Server
- Authorizing Logins to Access Databases
- Authorization Across Servers

Lab : Authenticating and Authorizing Users

- Create Logins
- Correct an Application Login Issue
- Create Database Users
- Correct Access to Restored

After completing this module, students will be able to:

- Describe how SQL Server authenticates connections.
- Describe how logins are authorized to access databases.
- Explain the requirements for authorization across servers.

## Module 10: Assigning Server and Database Roles

This module covers fixed server roles, user-defined server roles, fixed database roles and user-defined database roles.

Lessons

- Working with Server Roles
- Working with Fixed Database Roles
- Creating User-defined Database Roles

Lab : Assigning Server and Database Roles

- Assign Server Roles
- Assign Fixed Database Roles
- Create and Assign User-defined Database Roles
- Check Role Assignments

After completing this module, students will be able to:

- Work with server roles.
- Work with fixed database roles.
- Create user-defined database roles.

## Module 11: Authorizing Users to Access Resources

This module covers permissions and the assignment of permissions.

Lessons

- Authorizing User Access to Objects



- Authorizing Users to Execute Code
- Configuring Permissions at the Schema Level

Lab : Authorizing Users to Access Resources

- Assign Schema-level Permissions
- Assign Object-level Permissions
- Test Permissions

After completing this module, students will be able to:

- Authorize user access to objects.
- Authorize users to execute code.
- Configure permissions at the schema level.

#### Module 12: Auditing SQL Server Environments

This module covers SQL Server Audit.

Lessons

- Options for Auditing Data Access in SQL
- Implementing SQL Server Audit
- Managing SQL Server Audit

Lab : Auditing SQL Server Environments

- Determine audit configuration and create audit
- Create server audit specifications
- Create database audit specifications
- Test audit functionality

After completing this module, students will be able to:

- Describe the options for auditing data access in SQL Server.
- Implement SQL Server Audit.
- Manage SQL Server Audit.

#### Module 13: Automating SQL Server 2012 Management

This module covers SQL Server Agent, jobs and job history.

Lessons

- Automating SQL Server Management
- Working with SQL Server Agent
- Managing SQL Server Agent Jobs

Lab : Automating SQL Server Management

- Create a Data Extraction Job
- Schedule the Data Extraction Job
- Troubleshoot a Failing Job

After completing this module, students will be able to:

- Automate SQL Server Management.





- Work with SQL Server Agent.
- Manage SQL Server Agent jobs.

#### Module 14: Configuring Security for SQL Server Agent

This module covers SQL Server agent security, proxy accounts and credentials.

Lessons

- Understanding SQL Server Agent Security
- Configuring Credentials
- Configuring Proxy Accounts

Lab : Configuring Security for SQL Server Agent

- Troubleshoot job execution failure
- Resolve the security issue
- Perform further troubleshooting

After completing this module, students will be able to:

- Explain SQL Server Agent security.
- Configure credentials.
- Configure Proxy accounts.

#### Module 15: Monitoring SQL Server 2012 with Alerts and Notifications

This module covers the configuration of database mail, alerts and notifications.

Lessons

- Configuration of Database Mail
- Monitoring SQL Server Errors
- Configuring Operators, Alerts and Notifications

Lab : Monitoring SQL Agent Jobs with Alerts and Notifications

- Configure Database Mail
- Implement Notifications
- Implement Alerts

After completing this module, students will be able to:

- Configure database mail.
- Monitor SQL Server errors.
- Configure operators, alerts and notifications.

#### Module 16: Performing Ongoing Database Maintenance

This module covers database maintenance plans.

Lessons

- Ensuring Database Integrity
- Maintaining Indexes
- Automating Routine Database Maintenance



#### Lab : Performing Ongoing Database Maintenance

- Check database integrity using DBCC CHECKDB
- Correct index fragmentation
- Create a database maintenance plan
- Investigate table lock performance

After completing this module, students will be able to:

- Ensure database integrity.
- Maintain indexes.
- Automate routine database maintenance.

#### Module 17: Tracing Access to SQL Server 2012

This module covers SQL Profiler and SQL Trace stored procedures.

Lessons

- Capturing Activity using SQL Server Profiler
- Improving Performance with the Database Engine Tuning Advisor
- Working with Tracing Options

#### Lab : Tracing Access to SQL Server 2012

- Capture a trace using SQL Server Profiler
- Analyze a trace using Database Engine Tuning Advisor
- Configure SQL Trace

After completing this module, students will be able to:

- Capture activity using SQL Server Profiler and Extended Events Profiler.
- Improve performance with the Database Engine Tuning Advisor.
- Work with tracing options.

#### Module 18: Monitoring SQL Server 2012

This module introduces DMVs and the configuration of data collection.

Lessons

- Monitoring Activity
- Capturing and Managing Performance Data
- Analyzing Collected Performance Data

#### Lab : Monitoring SQL Server 2012

- Investigating DMVs
- Configure Management Data Warehouse
- Configure Instances for Data Collection
- Work with Data Collector Reports

After completing this module, students will be able to:

- Monitor current activity.
- Capture and manage performance data.



- Analyze collected performance data.

### Module 19: Managing Multiple Servers

This module covers Central Management Servers and Multi-Server queries, Virtualization of SQL Server and Data-Tier Applications.

#### Lessons

- Working with Multiple Servers
- Virtualizing SQL Server
- Deploying and Upgrading Data-Tier Applications

#### Lab : Managing Multiple Servers

- Configure CMS and execute multi-server queries
- Deploy a data-tier application
- Register and extract a data-tier application
- Upgrade a data-tier application

After completing this module, students will be able to:

- Work with multiple servers.
- Describe options for virtualizing SQL Server.
- Deploy and upgrade Data-Tier Applications.

### Module 20: Troubleshooting Common SQL Server 2012 Administrative Issues

This module covers common issues that require troubleshooting and gives guidance on where to start looking for solutions.

#### Lessons

- SQL Server Troubleshooting Methodology
- Resolving Service-related Issues
- Resolving Concurrency Issues
- Resolving Login and Connectivity Issues

#### Lab : Troubleshooting Common Issues

- Troubleshoot and resolve SQL Server administrative issues

After completing this module, students will be able to:

- Explain SQL Server troubleshooting methodology.
- Resolve service-related issues.
- Resolve concurrency issues.
- Resolve login and connectivity issues.