MCSA SQL Server

This Training Program prepares and enables learners to Pass Microsoft "MCSA: SQL Server exams"

MCSA: SQL Server / Exam 70-461 (Querying Microsoft SQL Server 2012/2014).

MCSA: SQL Server / Exam 70-462 (Administering Microsoft SQL Server 2012/2014 Databases).

MCSA: SQL Server / Exam 70-463 (Implementing a Data Warehouse with Microsoft SQL Server 2012/2014).

Database Administrators, Database Developers, and Business Intelligence professionals, individuals who administer and maintain SQL Server databases and database professionals who need to fulfil a Business Intelligence Developer role.

About this course
This course is designed for customers who are interested in learning SQL Server 2012 or SQL Server 2014. It covers the new features in SQL Server 2014, but also the important capabilities across the SQL Server data platform, and how to create a data warehouse with Microsoft SQL Server 2014

Course Outline:

MCSA SQL Server: Querying Microsoft SQL Server 2012/2014

Module 1: Introduction to Microsoft SQL Server 2014

This module introduces the SQL Server platform and major tools. It discusses editions, versions, tools used to query, documentation sources, and the logical structure of databases.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio

Lab : Working with SQL Server 2014 Tools

After completing this module, you will be able to:

- Describe the architecture and editions of SQL Server 2012.
- Work with SQL Server Management Studio.

Module 2: Introduction to T-SQL Querying

This module introduces Transact SQL as the primary querying language of SQL Server. It discusses the basic structure of T-SQL queries, the logical flow of a SELECT statement, and introduces concepts such as predicates and set-based operations.

Lessons

- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements

Lab : Introduction to Transact-SQL Querying

After completing this module, you will be able to:

- Describe the elements of T-SQL and their role in writing queries
- Describe the use of sets in SQL Server
- Describe the use of predicate logic in SQL Server
- Describe the logical order of operations in SELECT statements

Module 3: Writing SELECT Queries

This module introduces the fundamentals of the SELECT statement, focusing on queries against a single table.

Lessons

- Writing Simple SELECT Statements
- Eliminate Duplicates with DISTINCT
- Using Column and Table Aliases
- Write Simple CASE Expressions

Lab : Writing Basic SELECT Statements

After completing this module, you will be able to:

- Write simple SELECT statements.
- Eliminate duplicates using the DISTINCT clause.
- Use column and table aliases.
- Write simple CASE expressions.

Module 4: Querying Multiple Tables

This module explains how to write queries which combine data from multiple sources in SQL Server. The module introduces the use of JOINs in T-SQL queries as a mechanism for retrieving data from multiple tables.

Lessons

- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins

Lab : Querying Multiple Tables

After completing this module, you will be able to:

- Describe how multiple tables may be queried in a SELECT statement using joins.
- Write queries that use inner joins.
- Write queries that use outer joins.
- Write queries that use self-joins and cross joins.

Module 5: Sorting and Filtering Data

This module explains how to enhance queries to limit the rows they return, and to control the order in which the rows are displayed. The module also discusses how to resolve missing and unknown results.

Lessons

- Sorting Data
- Filtering Data with Predicates
- Filtering with the TOP and OFFSET-FETCH
- Working with Unknown Values

Lab : Sorting and Filtering Data

After completing this module, you will be able to:

- Filter data with predicates in the WHERE clause.
- Sort data using ORDER BY.
- Filter data in the SELECT clause with TOP.
- Filter data with OFFSET and FETCH.

Module 6: Working with SQL Server 2014 Data Types

This module explains the data types SQL Server uses to store data. It introduces the many types of numeric and special-use data types. It also explains conversions between data types, and the importance of type precedence.

Lessons

- Introducing SQL Server 2014 Data Types
- Working with Character Data
- Working with Date and Time Data

Lab : Working with SQL Server 2014 Data Types

After completing this module, you will be able to:

- Describe numeric data types, type precedence and type conversions.
- Write queries using character data types.
- Write queries using date and time data types.

Module 7: Using DML to Modify Data

This module describes the use of Transact-SQL Data Manipulation Language to perform inserts, updates, and deletes to your data.

Lessons

- Inserting Data
- Modifying and Deleting Data

Lab : Using DML to Modify Data

After completing this module, you will be able to:

- Insert new data into your tables.
- Update and delete existing records in your tables.

Module 8: Using Built-In Functions

This module introduces the use of functions that are built in to SQL Server Denali, and will discuss some common usages including data type conversion, testing for logical results and nullability.

Lessons

- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL

Lab : Using Built-In Functions

After completing this module, you will be able to:

- Write queries with built-in scalar functions.
- Use conversion functions.
- Use logical functions.
- Use functions that work with NULL.

Module 9: Grouping and Aggregating Data

This module introduces methods for grouping data within a query, aggregating the grouped data and filtering groups with HAVING. The module is designed to help the student grasp why a SELECT clause has restrictions placed upon column naming in the GROUP BY clause as well as which columns may be listed in the SELECT clause.

Lessons

- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING

Lab : Grouping and Aggregating Data

After completing this module, you will be able to:

- Write queries which summarize data using built-in aggregate functions.

- Use the GROUP BY clause to arrange rows into groups.
- Use the HAVING clause to filter out groups based on a search condition.

Module 10: Using Subqueries

This module will introduce the use of subqueries in various parts of a SELECT statement. It will include the use of scalar and multi-result subqueries, and the use of the IN and EXISTS operators.

Lessons

- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries

Lab : Using Subqueries

After completing this module, you will be able to:

- Describe the uses of queries which are nested within other queries.
- Write self-contained subqueries which return scalar or multi-valued results.
- Write correlated subqueries which return scalar or multi-valued results.
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.

Module 11: Using Table Expressions

This module introduces T-SQL expressions which return a valid relational table, typically for further use in the query. The module discusses views, derived tables, common table expressions and inline table-valued functions.

Lessons

- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions

Lab : Using Table Expressions

After completing this module, you will be able to:

- Write queries which use derived tables.
- Write queries which use common table expressions.
- Create simple views and write queries against them.
- Create simple inline table-valued functions and write queries against them.

Module 12: Using Set Operators

This module introduces the set operators UNION, INTERSECT, and EXCEPT to compare rows between two input sets

Lessons

- Writing Queries with the UNION Operator
- Using EXCEPT and INTERSECT
- Using APPLY

Lab : Using Set Operators

After completing this module, you will be able to:

- Write queries which combine data using the UNION operator
- Write queries which compare sets using the INTERSECT and EXCEPT operators
- Write queries which manipulate rows in a table by using APPLY with the results of a derived table or function

Module 13: Using Window Ranking, Offset, and Aggregate Functions

This module introduces window functions including ranking, aggregate and offset functions. Much of this functionality is new to SQL Server 2012. It will cover the use of T-SQL functions such as ROW_NUMBER, RANK, DENSE_RANK, NTILE, LAG, LEAD, FIRST_VALUE and LAST_VALUE to perform calculations against a set, or window, of rows.

Lessons

- Creating Windows with OVER
- Exploring Window Functions

Lab : Using Window Ranking, Offset and Aggregate Functions

After completing this module, you will be able to:

- Describe the benefits to using window functions.
- Restrict window functions to rows defined in an OVER clause, including partitions and frames.
- Write queries which use window functions to operate on a window of rows and return ranking, aggregation and offset comparison results.

Module 14: Pivoting and Grouping Sets

This module discusses techniques for pivoting data in T-SQL as well to introduce the fundamentals of the GROUPING SETS clause. It will also cover the use of GROUP BY ROLLUP and GROUP BY CUBE syntax in SQL Server.

Lessons

- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets

Lab : Pivoting and Grouping Sets

After completing this module, you will be able to:

- Write queries which pivot and unpivot result sets.
- Write queries which specify multiple groupings with grouping sets.

Module 15: Querying data with Stored Procedures

This module introduces the use of existing stored procedures in a T-SQL querying environment. It discusses the use of EXECUTE, how to pass input and output parameters to a procedure, and how to invoke system stored procedures.

Lessons

- Writing Queries with PIVOT and UNPIVOT
- Passing Parameters to Stored Procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Executing Stored Procedures

After completing this module, you will be able to:

- Return results by executing stored procedures.
- Pass parameters to procedures.
- Create simple stored procedures which encapsulate a SELECT statement.
- Construct and execute dynamic SQL with EXEC and sp_executesql.

Module 16: Programming with T-SQL

This module provides a basic introduction to T-SQL programming concepts and objects. It discusses batches, variables, control of flow elements such as loops and conditionals, how to create and execute dynamic SQL statements, and how to use synonyms.

Lessons

- T-SQL Programming Elements
- Controlling Program Flow

Lab : Programming with T-SQL

After completing this module, you will be able to:

- Describe the language elements of T-SQL used for simple programming tasks.
- Describe batches and how they are handled by SQL Server.
- Declare and assign variables and synonyms.
- Use IF and WHILE blocks to control program flow.

Module 17: Implementing Error Handling

This module introduces the use of error handlers in T-SQL code. It will introduce the difference between compile errors and run-time errors, and will cover how errors affect batches. The module will also cover how to control error handling using TRY/CATCH blocks, the use of the ERROR class of functions, and the use of the new THROW statement.

Lessons

- Using TRY / CATCH Blocks
- Working with Error Information

Lab : Implementing Error Handling

After completing this module, you will be able to:

- Describe SQL Server's behavior when errors occur in T-SQL code.
- Implement structured exception handling in T-SQL.
- Return information about errors from system objects.
- Raise user-defined errors and pass system errors in T-SQL code.

Module 18: Implementing Transactions

This module introduces the concepts of transaction management in SQL Server. It will provide a high-level overview of transaction properties, cover the basics of marking transactions with BEGIN, COMMIT and ROLLBACK.

Lessons

- Transactions and the Database Engine
- Controlling Transactions

Lab : Implementing Transactions

After completing this module, you will be able to:

- Describe transactions and the differences between batches and transactions.
- Describe batches and how they are handled by SQL Server.
- Create and manage transactions with transaction control language statements.
- Use SET XACT_ABORT to define SQL Server's handling of transactions outside TRY / CATCH blocks.
- Describe the effects of isolation levels on transactions.

Module 19: Appendix 1: Improving Query Performance

This module presents several key guidelines for writing well-performing queries, as well as ways to monitor the execution of your queries and their impact on Microsoft SQL Server

Lessons

- Factors in Query Performance
- Displaying Query Performance Data

Lab : Improving Query Performance

After completing this module, you will be able to:

- Describe components of well-performing queries.
- Display and interpret basic query performance data

Module 20: Appendix 2: Querying SQL Server Metadata

SQL Server provides access to structured metadata by using a variety of mechanisms, such as system catalog views, system functions, dynamic management objects, and system stored procedures. In this module, you will learn how to write queries to return system metadata using these mechanisms.

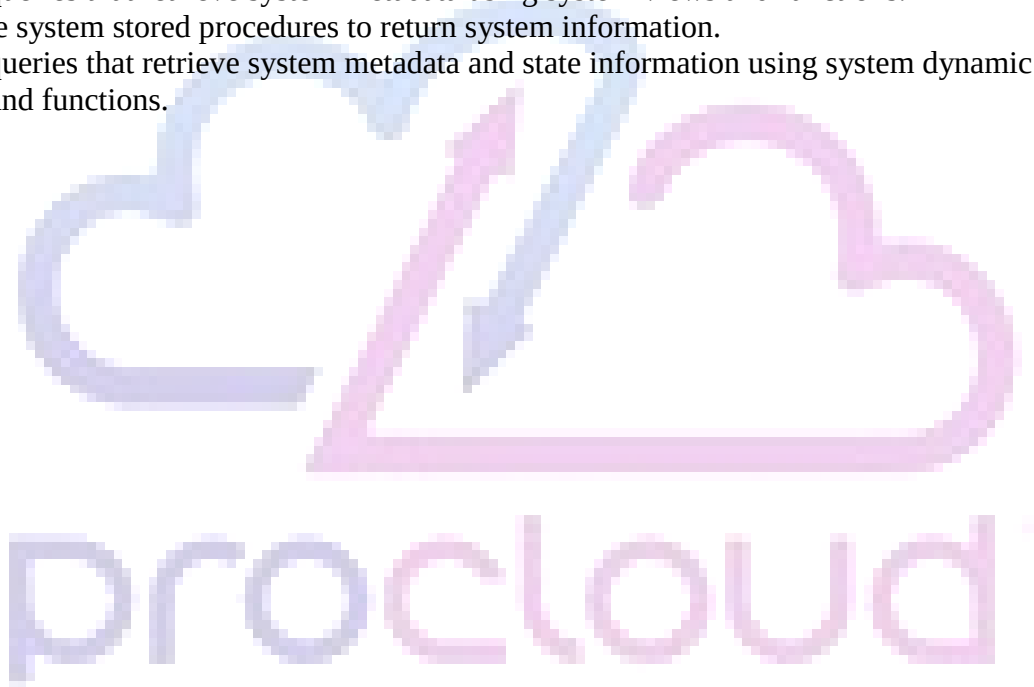
Lessons

- Querying System Catalog Views and Functions
- Executing System Stored Procedures
- Querying Dynamic Management Objects

Lab : Querying SQL Server Metadata

After completing this module, you will be able to:

- Write queries that retrieve system metadata using system views and functions.
- Execute system stored procedures to return system information.
- Write queries that retrieve system metadata and state information using system dynamic management views and functions.



MCSA SQL Server: Administering Microsoft SQL Server 2012/2014 Databases

Module 1: Introduction to SQL Server 2014 Database Administration

This module introduces the Microsoft SQL Server 2014 platform. It describes the components, editions, and versions of SQL Server 2014, and the tasks that a database administrator commonly performs for a SQL Server instance.

Lessons

- Database Administration Overview
- Introduction to the SQL Server Platform
- Database Management Tools and Techniques

Lab : Using SQL Server Administrative Tools

After completing this module, you will be able to:

- Describe the SQL Server platform.
- Describe common database administration tasks.
- Use SQL Server administration tools.

Module 2: Installing and Configuring SQL Server 2014

This module explains how to assess resource requirements for SQL Server 2014 and how to install it..

Lessons

- Planning SQL Server Installation
- Installing SQL Server 2014
- Post-Installation Configuration

Lab : Installing SQL Server 2014

After completing this module, you will be able to:

- Plan a SQL Server 2014 installation.
- Install SQL Server 2014.
- Perform post-installation configuration tasks.

Module 3: Working with Databases and Storage

This module describes how data is stored in databases, how to create databases, how to manage database files, and how to move them. Other tasks related to storage, include managing the tempdb database and using fast storage devices to extend the SQL Server buffer pool cache, are also discussed.

Lessons

- Introduction to Data Storage with SQL Server
- Managing Storage for System Databases
- Managing Storage for User Databases
- Moving Database Files
- Configuring the Buffer Pool Extension

Lab : Managing Database Storage

After completing this module, you will be able to:

- Describe how SQL Server stores data.
- Manage storage for system databases.
- Manage storage for user databases.
- Move database files.
- Configure the buffer pool extension.

Module 4: Planning and Implementing a Backup Strategy

In this module, you will consider how to create a backup strategy that is aligned with organizational needs, and learn how to perform the backup operations required by that strategy.

Lessons

- Understanding SQL Server Recovery Models
- Planning a Backup Strategy
- Backing up Databases and Transaction Logs
- Using Backup Options
- Ensuring Backup Reliability

Lab : Backing Up SQL Server Databases

After completing this module, you will be able to:

- Describe how database transaction logs function, and how they affect database recovery.
- Plan a backup strategy for a SQL Server database.
- Back up databases and transactions logs.
- Perform copy-only, compressed, and encrypted backups.
- Maximize backup reliability.

Module 5: Restoring SQL Server 2014 Databases

In this module, you will see how to restore user and system databases and how to implement point-in-time recovery.

Lessons

- Understanding the Restore Process
- Restoring Databases
- Advanced Restore Scenarios
- Working with Point-in-Time Recovery

Lab : Restoring SQL Server Databases

After completing this module, you will be able to:

- Explain the restore process.
- Restore databases.
- Perform advanced restore operations.
- Perform a point-in-time recovery.

Module 6: Importing and Exporting Data

In this module, you will briefly explore tools and techniques so that you can import and export data to and from SQL Server.

Lessons

- Introduction to Transferring Data
- Importing and Exporting Table Data
- Copying or Moving a Database

Lab : Importing and Exporting Data

After completing this module, you will be able to:

- Describe tools and techniques for transferring data.
- Import and export data.
- Copy or move a database.

Module 7: Monitoring SQL Server 2014

This module explains how to use three of the most commonly used tools: Activity Monitor, dynamic management views and functions (DMVs and DMFs), and Performance Monitor.

Lessons

- Introduction to Monitoring SQL Server
- Dynamic Management Views and Functions
- Performance Monitor

Lab : Monitoring SQL Server 2014

After completing this module, you will be able to:

- Describe considerations for monitoring SQL Server and use Activity Monitor.
- Use dynamic management views and functions to monitor SQL Server.
- Use Performance Monitor to monitor SQL Server.

Module 8: Tracing SQL Server Activity

This module describes how to use SQL Server Profiler and SQL Trace stored procedures to capture information about SQL Server, and how to use that information to troubleshoot and optimize SQL Server workloads.

Lessons

- Tracing SQL Server Workload Activity
- Using Traces

Lab : Tracing SQL Server Workload Activity

After completing this module, you will be able to:

- Trace activity in SQL Server
- Use captured traces to test, troubleshoot, and optimize database performance.

Module 9: Managing SQL Server Security

In this module, you will be learn about the core concepts on which the SQL Server security architecture is based, and how to manage security at the server and database levels.

Lessons

- Introduction to SQL Server Security
- Managing Server-Level Security
- Managing Database-Level Principals
- Managing Database Permissions

Lab : Managing SQL Server Security

After completing this module, you will be able to:

- Describe core security concepts in the SQL Server security architecture.
- Manage server-level security.
- Manage database-level security principals.
- Manage database permissions.

Module 10: Auditing Data Access and Encrypting Data

This module describes the available options for auditing in SQL Server, how to use and manage the SQL Server audit feature, and how to implement encryption.
Lessons

- Auditing Data Access in SQL Server
- Implementing SQL Server Audit
- Implementing SQL Server Audit

Lab : Auditing Data Access and Encrypting Data

After completing this module, you will be able to:

- Describe options for auditing data access.
- Implement SQL Server audit.
- Manage SQL Server audit.
- Implement Transparent Data Encryption.

Module 11: Performing Ongoing Database Maintenance

This module describes common database maintenance tasks that a DBA must perform, and demonstrates how to automate these tasks using maintenance plans.

Lessons

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

Lab : Performing Ongoing Database Maintenance

After completing this module, you will be able to:

- Ensure database integrity by using DBCC CHECKDB.
- Maintain indexes.
- Configure Database Maintenance Plans.

Module 12: Automating SQL Server 2014 Management

This module describes how to use SQL Server Agent to automate jobs, how to configure security contexts for jobs, and how to implement multi-server jobs.

Lessons

- Automating SQL Server Management
- Implementing SQL Server Agent Jobs
- Managing SQL Server Agent Jobs
- Managing Job Step Security Contexts
- Managing Jobs on Multiple Servers

Lab : Automating SQL Server Management

After completing this module, you will be able to:

- Describe methods for automating SQL Server management.
- Create jobs, job step types, and schedules.
- Manage SQL Server Agent jobs.
- Configure job security contexts.
- Configure master and target servers.

Module 13: Monitoring SQL Server 2014 by Using Alerts and Notifications

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

Lessons

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

Lab : Monitoring SQL Server by Using Alerts and Notifications

After completing this module, you will be able to:

- Configure Database Mail.
- Monitor SQL Server errors.
- Configure operators, alerts, and notifications

MCSA SQL Server: Implementing a Data Warehouse with Microsoft SQL Server 2012/2014

Module 1: Introduction to Data Warehousing

This module provides an introduction to the key components of a data warehousing solution and the high-level considerations you must take into account when you embark on a data warehousing project.Lessons

- Overview of Data Warehousing
- Considerations for a Data Warehouse Solution

Lab : Exploring a Data Warehousing Solution

After completing this module, you will be able to:

- Describe the key elements of a data warehousing solution
- Describe the key considerations for a data warehousing project

Module 2: Data Warehouse Hardware Considerations

This module discusses considerations for selecting hardware and distributing SQL Server facilities across servers.

Lessons

- Considerations for building a Data Warehouse
- Data Warehouse Reference Architectures and Appliances

Lab : Planning Data Warehouse Infrastructure

After completing this module, you will be able to:

- Describe key considerations for BI infrastructure.
- Plan data warehouse infrastructure.

Module 3: Designing and Implementing a Data Warehouse

This module describes the key considerations for the logical design of a data warehouse, and then discusses best practices for its physical implementation.

Lessons

- Logical Design for a Data Warehouse
- Physical design for a data warehouse

Lab : Implementing a Data Warehouse Schema

After completing this module, you will be able to:

- Describe a process for designing a dimensional model for a data warehouse
- Design dimension tables for a data warehouse
- Design fact tables for a data warehouse
- Design and implement effective physical data structures for a data warehouse

Module 4: Creating an ETL Solution with SSIS

This module discusses considerations for implementing an ETL process, and then focuses on Microsoft SQL Server Integration Services (SSIS) as a platform for building ETL solutions.

Lessons

- Introduction to ETL with SSIS
- Exploring Data Sources
- Implementing Data Flow

Lab : Implementing Data Flow in an SSIS Package

After completing this module, you will be able to:

- Describe the key features of SSIS.
- Explore source data for an ETL solution.
- Implement a data flow by using SSIS

Module 5: Implementing Control Flow in an SSIS Package

This module describes how to implement ETL solutions that combine multiple tasks and workflow logic.

Lessons

- Introduction to Control Flow
- Creating Dynamic Packages
- Using Containers
- Managing Consistency

Lab : Implementing Control Flow in an SSIS Package

Lab : Using Transactions and Checkpoints

After completing this module, you will be able to:

- Implement control flow with tasks and precedence constraints
- Create dynamic packages that include variables and parameters
- Use containers in a package control flow
- Enforce consistency with transactions and checkpoints

Module 6: Debugging and Troubleshooting SSIS Packages

This module describes how you can debug packages to find the cause of errors that occur during execution. It then discusses the logging functionality built into SSIS that you can use to log events for troubleshooting purposes. Finally, the module describes common approaches for handling errors in control flow and data flow.

Lessons

- Debugging an SSIS Package
- Logging SSIS Package Events
- Handling Errors in an SSIS Package

Lab : Debugging and Troubleshooting an SSIS Package

After completing this module, you will be able to:

- Debug an SSIS package
- Implement logging for an SSIS package
- Handle errors in an SSIS package

Module 7: Implementing an Incremental ETL Process

This module describes the techniques you can use to implement an incremental data warehouse refresh process.
Lessons

- Introduction to Incremental ETL
- Extracting Modified Data
- Loading Modified data

Lab : Extracting Modified Data

Lab : Loading Incremental Changes

After completing this module, you will be able to:

- Plan data extraction
- Extract modified data

Module 8: Enforcing Data Quality

This module introduces Microsoft SQL Server Data Quality Services (DQS), and describes how you can use it to cleanse and de duplicate data.

Lessons

- Introduction to Data Quality
- Using Data Quality Services to Cleanse Data
- Using Data Quality Services to Match data

Lab : Cleansing Data

Lab : De-duplicating data

After completing this module, you will be able to:

- Describe how Data Quality Services can help you manage data quality
- Use Data Quality Services to cleanse your data
- Use Data Quality Services to match data

Module 9: Using Master Data Services

Master Data Services provides a way for organizations to standardize data and improve the quality, consistency, and reliability of the data that guides key business decisions. This module introduces Master Data Services and explains the benefits of using it.

Lessons

- Master Data Services Concepts
- Implementing a Master Data Services Model
- Managing Master Data
- Creating a Master Data Hub

Lab : Implementing Master Data Services

After completing this module, you will be able to:

- Describe key Master Data Services concepts
- Implement a Master Data Services model
- Use Master Data Services tools to manage master data
- Use Master Data Services tools to create a master data hub

Module 10: Extending SQL Server Integration Services

This module describes the techniques you can use to extend SSIS. The module is not designed to be a comprehensive guide to developing custom SSIS solutions, but to provide an awareness of the fundamental steps required to use custom components and scripts in an ETL process that is based on SSIS.

Lessons

- Using Scripts in SSIS
- Using Custom Components in SSIS

Lab : Using Custom Components and Scripts

After completing this module, you will be able to:

- Include custom scripts in an SSIS package
- Describe how custom components can be used to extend SSIS

Module 11: Deploying and Configuring SSIS Packages

In this module, students will learn how to deploy packages and their dependencies to a server, and how to manage and monitor the execution of deployed packages.

Lessons

- Overview of SSIS Deployment
- Deploying SSIS Projects
- Planning SSIS Package Execution

Lab : Deploying and Configuring SSIS Packages

After completing this module, you will be able to:

- Describe considerations for SSIS deployment.
- Deploy SSIS projects.
- Plan SSIS package execution.

Module 12: Consuming Data in a Data Warehouse

This module introduces business intelligence (BI) solutions and describes how you can use a data warehouse as the basis for enterprise and self-service BI.

Lessons

- Introduction to Business Intelligence
- Introduction to Reporting
- An Introduction to Data Analysis

Lab : Using Business Intelligence Tools

After completing this module, you will be able to:

- Describe BI and common BI scenarios
- Describe how a data warehouse can be used in enterprise BI scenarios
- Describe how a data warehouse can be used in self-service BI scenarios