

Microsoft SQL 2016 Database Development

**Bootcamp Title – MCSA: SQL 2016 Database Development (1 Cert)**
Number of Days – 5
Number of Exams – 2
Number of Certifications – 1
Cost - $4,495.00

Certifications:

MCSA: SQL 2016 Database Development

Exams:

**20761:** Querying with Transact-SQL

**20762:** Developing SQL Databases

Course Description:

The MCSA SQL 2016 Database Development certification boot camp is a 5-day comprehensive deep dive into the SQL Server covering topics such as planning, monitoring, and configuring. This instructor led face to face training camp will teach you the skills needed to support a SQL Server environment.

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| **Course Outline****Module 1: Introduction to Microsoft SQL Server 2016**This module introduces SQL Server, the versions of SQL Server, including cloud versions, and how to connect to SQL Server using SQL Server Management Studio.**Lessons*** The Basic Architecture of SQL Server
* SQL Server Editions and Versions
* Getting Started with SQL Server Management Studio

**Lab : Working with SQL Server 2016 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 the elements of T-SQL and their role in writing queries, describes the use of sets in SQL Server, describes the use of predicate logic in SQL Server, and describes the logical order of operations in SELECT statements.**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
* Eliminating Duplicates with DISTINCT
* Using Column and Table Aliases
* Writing 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 Options
* 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 2016 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 2016 Data Types
* Working with Character Data
* Working with Date and Time Data

**Lab : Working with SQL Server 2016 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 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 using UNION, EXCEPT, and INTERSECT operators.
* Use the APPLY operator.
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| **Course Outline****Module 1: Introduction to Database Development**This module is used to introduce the entire SQL Server platform and its major tools. It will cover editions, versions, basics of network listeners, and concepts of services and service accounts.**Lessons*** Introduction to the SQL Server Platform
* SQL Server Database Development Tasks

**Lab : SQL Server Database Development Tasks**After completing this module, you will be able to:* Describe the SQL Server platform.
* Use SQL Server administration tools.

**Module 2: Designing and Implementing Tables**This modules describes the design and implementation of tables. (Note: partitioned tables are not covered).**Lessons*** Designing Tables
* Data Types
* Working with Schemas
* Creating and Altering Tables

**Lab : Designing and Implementing Tables**After completing this module, you will be able to:* Design Tables
* Describe the various types of data
* Be able to work with schemas
* Be able to create and amend tables

**Module 3: Advanced Table Designs**This module describes more advanced table designs.**Lessons*** Partitioning data
* Compressing Data
* Temporal Tables

**Lab : Using Advanced Table Designs**After completing this module, you will be able to:* Describe how data can be partitioned
* Describe how data can be compressed.
* Describe Temporal tables

**Module 4: Ensuring Data Integrity through Constraints**This module describes the design and implementation of constraints.**Lessons*** Enforcing data Integrity
* Implementing Domain Integrity
* Implementing Entity and Referential Integrity

**Lab : Ensuring Data Integrity through Constraints**After completing this module, you will be able to:* Describe how to enforce data integrity
* Describe how to implement domain integrity
* Describe how to implement entity and referential integrity

**Module 5: Introduction to Indexes**This module describes the concept of an index and discusses selectivity, density and statistics. It covers appropriate data type choices and choices around composite index structures.**Lessons*** Core Indexing Concepts
* Data Types and Indexes
* Single Column and Composite Indexes

**Lab : Implementing Indexes**After completing this module, you will be able to:* Explain the need for indexes and describe the core concepts of index design
* Choose appropriate data types for indexes
* Design single column and composite indexes

**Module 6: Designing Optimized Index Strategies**This module includes covering indexes and the INCLUDE clause, hints, padding / fillfactor, statistics. It also execution plans and the DTE Lessons.**Lessons*** Covering Indexes
* Managing Indexes
* Execution Plans
* Using the DTE

**Lab : Designing Optimized Index Strategies**After completing this module, you will be able to:* Choose an appropriate table structure
* Implement clustered indexes and heaps

**Module 7: Columnstore Indexes**This module introduces Columnstore indexes.**Lessons*** Introduction to Columnstore indexes
* Creating Columnstore indexes
* Working Columnstore indexes

**Lab : Using Columnstore indexes**After completing this module, you will be able to:* Describe suitable scenarios for Columnstore indexes
* Create clustered and non-clustered Columnstore indexes
* Describe considerations for updating non-clustered Columnstore indexed tables

 **Module 8: Designing and Implementing Views**This module describes the design and implementation of views.**Lessons*** Introduction to views
* Creating and managing views
* Performance considerations for views

**Lab : Designing and Implementing Views**After completing this module, you will be able to:* Explain the concept of views
* Design, Create and Alter Views
* Create Partitioned Views

**Module 9: Designing and Implementing Stored Procedures**This module describes the design and implementation of stored procedures.**Lessons*** Introduction to Stored Procedures
* Working with Stored Procedures
* Implementing Parameterized Stored Procedures
* Controlling Execution Context

**Lab : Designing and Implementing Stored Procedures**After completing this module, you will be able to:* Design, Create and Alter Stored Procedures
* Control the Execution Context of Stored Procedures
* Implement Stored Procedures that use Parameters

**Module 10: Designing and Implementing User-Defined Functions**This module describes the design and implementation of functions, both scalar and table-valued. (Also discusses where they can lead to performance issues).**Lessons*** Overview of Functions
* Designing and Implementing Scalar Functions
* Designing and Implementing Table-Valued Functions
* Implementation Considerations for Functions
* Alternatives to Functions

**Lab : Designing and Implementing User-defined Functions**After completing this module, you will be able to:* Design, create and alter scalar functions
* Design, create and alter table-valued functions
* Describe the performance impacts of functions

**Module 11: Responding to Data Manipulation via Triggers**This module describes the design and implementation of triggers.**Lessons*** Designing DML Triggers
* Implementing DML Triggers
* Advanced Trigger Concepts

**Lab : Responding to Data Manipulation via Triggers**After completing this module, you will be able to:* Design DML triggers
* Implement DML triggers
* Work with Nested and Recursive Triggers

**Module 12: Using In-Memory Tables**This module covers the creation of in-memory tables and native stored procedures. Furthermore, advantages of in-memory tables are discussed, for example the removal of transaction blocking.**Lessons*** In-Memory tables
* Native Stored Procedures

**Lab : In Memory OLTP**After completing this module, you will be able to:* Implement in-memory tables
* Implement native stored procedures

**Module 13: Implementing Managed Code in SQL Server**This module describes the implementation of and target use-cases for SQL CLR integration.**Lessons*** Introduction to SQL CLR Integration
* Importing and Configuring Assemblies
* Implementing SQL CLR Integration

**Lab : Implementing Managed Code in SQL Server**After completing this module, you will be able to:* Describe SQL CLR Integration
* Detail appropriate use cases for SQL CLR Integration
* Implement SQL CLR code

**Module 14: Storing and Querying XML Data in SQL Server**This module covers the XML data type, schema collections, typed and un-typed columns and appropriate use cases for XML in SQL Server.**Lessons*** Introduction to XML and XML Schemas
* Storing XML Data and Schemas in SQL Server
* Implementing the XML Data Type
* Using the T-SQL FOR XML Statement
* Getting Started with xQuery

**Lab : Storing and Querying XML Data in SQL Server**After completing this module, you will be able to:* Explain the purpose and structure of XML and XML schemas
* Describe how XML data and schemas can be stored in SQL Server
* Implement the XML data type

**Module 15: Working with SQL Server Spatial Data**This module describes spatial data and how this data can be implemented within SQL Server.**Lessons*** Introduction to Spatial Data
* Working with SQL Server Spatial Data Types
* Using Spatial Data in Applications

**Lab : Working with SQL Server Spatial Data**After completing this module, you will be able to:* Describe how spatial data can be stored in SQL Server
* Use basic methods of the GEOMETRY and GEOGRAPHY data types
* Query databases containing spatial data

**Module 16: Storing and Querying Blobs and Text Documents in SQL Server**This module covers full text indexes and queries.**Lessons*** Considerations for BLOB Data
* Working with FileStream
* Using Full-Text Search

**Lab : Storing and Querying Blobs and Text Documents in SQL Server**After completing this module, you will be able to:* Describe the need for full-text indexing in SQL Server
* Implement a full-text index
* Perform basic full-text queries
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