
Querying Data with Transact-SQL

Duration: 5 Days **Course Code: M20761** **Version: B** **Delivery Method: Company Event**

Overview:

This course is designed to introduce students to Transact-SQL. It is designed in such a way that the first three days can be taught as a course to students requiring the knowledge for other courses in the SQL Server curriculum. Days 4 & 5 teach the remaining skills required to take exam 70-761.

Company Events

These events can be delivered exclusively for your company at our locations or yours, specifically for your delegates and your needs. The Company Events can be tailored or standard course deliveries.

Target Audience:

The main purpose of the course is to give students a good understanding of the Transact-SQL language which is used by all SQL Server-related disciplines; namely, Database Administration, Database Development and Business Intelligence. As such, the primary target audience for this course is: Database Administrators, Database Developers and BI professionals.

Objectives:

- After completing this course, students will be able to:
 - Describe key capabilities and components of SQL Server 2016.
 - Describe T-SQL, sets, and predicate logic.
 - Write a single table SELECT statement.
 - Write a multi-table SELECT statement.
 - Write SELECT statements with filtering and sorting.
 - Describe how SQL Server uses data types.
 - Write DML statements.
 - Write queries that use built-in functions.
 - Write queries that aggregate data.
 - Write subqueries.
 - Create and implement views and table-valued functions.
 - Use set operators to combine query results.
 - Write queries that use window ranking, offset, and aggregate functions.
 - Transform data by implementing pivot, unpivot, rollup and cube.
 - Create and implement stored procedures.
 - Add programming constructs such as variables, conditions, and loops to T-SQL code.
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Prerequisites:

- Basic knowledge of the Microsoft Windows operating system and its core functionality.
 - Working knowledge of relational databases.
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Content:

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
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Working with SQL Server 2016 Tools

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
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- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Working with SQL Server 2016 Data Types

- Writing Queries that Return Date and Time Data
- Writing Queries that use Date and Time Functions
- Writing Queries That Return Character Data
- Writing Queries That Return Character

Module 12: Using Set Operators

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

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
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- Working with Character Data
- Working with Date and Time Data
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- Using Conversion Functions
- Using Logical Functions
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- Using Aggregate Functions
- Using the GROUP BY Clause
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- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Using Set Operators

- Writing Queries That Use UNION Set Operators and UNION ALL

- Working with SQL Server Management Studio
- Creating and Organizing T-SQL Scripts
- Using Books Online

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause
- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.
- Explore many of the data types SQL Server uses to store data and how data types are converted between types

Functions

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause
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- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.
- Explore many of the data types SQL Server uses to store data and how data types are converted between types

- Writing Queries That Use CROSS APPLY and OUTER APPLY Operators
- Writing Queries That Use the EXCEPT and INTERSECT Operators

After completing this module, students will be able to:

- Write queries that use UNION to combine input sets.
- Write queries that use UNION ALL to combine input sets
- Write queries that use the EXCEPT operator to return only rows in one set but not another.
- Write queries that use the INTERSECT operator to return only rows that are present in both sets
- Write queries using the CROSS APPLY operator.
- Write queries using the OUTER APPLY operator
- Describe the T-SQL components used to define windows, and the relationships between them.
- Write queries that use the OVER clause, with partitioning, ordering, and framing to define windows
- Write queries that use window aggregate functions.
- Write queries that use window ranking functions.
- Write queries that use window offset functions
- Describe how pivoting data can be used in T-SQL queries.
- Write queries that pivot data from rows to columns using the PIVOT operator.
- Write queries that unpivot data from columns back to rows using the UNPIVOT operator.
- Write queries using the GROUPING SETS subclause.
- Write queries that use ROLLUP AND CUBE.
- Write queries that use the GROUPING_ID function.
- Describe how Microsoft SQL Server treats collections of statements as batches.
- Create and submit batches of T-SQL code for execution by SQL Server.
- Describe how SQL Server stores temporary objects as variables.
- Write code that declares and assigns variables.
- Create and invoke synonyms
- Describe the control-of-flow elements in T-SQL.
- Write T-SQL code using IF...ELSE blocks.
- Write T-SQL code that uses WHILE.

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

This module describes the benefits to using

- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 2: Introduction to T-SQL Querying

This module describes 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.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets

- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 7: Using DML to Modify Data

This module describes how to create DML queries, and why you would want to.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of

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

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Using Windows Ranking, Offset, and Aggregate Functions

- Writing Queries that use Ranking Functions
- Writing Queries that use Offset Functions

- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Introduction to T-SQL Querying

- Executing Basic SELECT Statements
- Executing Queries that Filter Data using Predicates
- Executing Queries That Sort Data Using ORDER BY

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing

- Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Using DML to Modify Data

- Inserting Data
- Updating and Deleting Data

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL

- Writing Queries that use Window Aggregate Functions

After completing this module, students will be able to:

- Write queries that use UNION to combine input sets.
- Write queries that use UNION ALL to combine input sets
- Write queries that use the EXCEPT operator to return only rows in one set but not another.
- Write queries that use the INTERSECT operator to return only rows that are present in both sets
- Write queries using the CROSS APPLY operator.
- Write queries using the OUTER APPLY operator
- Describe the T-SQL components used to define windows, and the relationships between them.
- Write queries that use the OVER clause, with partitioning, ordering, and framing to define windows
- Write queries that use window aggregate functions.
- Write queries that use window ranking functions.
- Write queries that use window offset functions
- Describe how pivoting data can be used in T-SQL queries.
- Write queries that pivot data from rows to columns using the PIVOT operator.
- Write queries that unpivot data from columns back to rows using the UNPIVOT operator.
- Write queries using the GROUPING SETS subclause.
- Write queries that use ROLLUP AND CUBE.
- Write queries that use the GROUPING_ID function.
- Describe how Microsoft SQL Server treats collections of statements as batches.
- Create and submit batches of T-SQL code for execution by SQL Server.
- Describe how SQL Server stores temporary objects as variables.
- Write code that declares and assigns variables.
- Create and invoke synonyms
- Describe the control-of-flow elements in T-SQL.
- Write T-SQL code using IF...ELSE blocks.
- Write T-SQL code that uses WHILE.

Module 14: Pivoting and Grouping Sets

This module describes write queries that pivot and unpivot result sets. Write queries that specify multiple groupings with grouping sets

SELECT statements.

- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause
- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.
- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that

language and which elements will be useful in writing queries.

- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
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- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
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- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
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- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
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- Writing Queries with the UNION operator
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- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Pivoting and Grouping Sets

- Writing Queries that use the PIVOT Operator
- Writing Queries that use the UNPIVOT Operator
- Writing Queries that use the GROUPING SETS CUBE and ROLLUP Subclauses

After completing this module, students will be able to:

- Write queries that use UNION to combine

evaluate an expression and return a scalar result.

- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

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
- T-SQL Programming Elements
- Controlling Program Flow

Lab : Writing Basic SELECT Statements

- Writing Simple SELECT Statements
- Eliminating Duplicates Using DISTINCT
- Using Column and Table Aliases
- Using a Simple CASE Expression

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing

- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 8: Using Built-In Functions

This module introduces some of the many built in functions in SQL Server 2016.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL

input sets.

- Write queries that use UNION ALL to combine input sets
- Write queries that use the EXCEPT operator to return only rows in one set but not another.
- Write queries that use the INTERSECT operator to return only rows that are present in both sets
- Write queries using the CROSS APPLY operator.
- Write queries using the OUTER APPLY operator
- Describe the T-SQL components used to define windows, and the relationships between them.
- Write queries that use the OVER clause, with partitioning, ordering, and framing to define windows
- Write queries that use window aggregate functions.
- Write queries that use window ranking functions.
- Write queries that use window offset functions
- Describe how pivoting data can be used in T-SQL queries.
- Write queries that pivot data from rows to columns using the PIVOT operator.
- Write queries that unpivot data from columns back to rows using the UNPIVOT operator.
- Write queries using the GROUPING SETS subclause.
- Write queries that use ROLLUP AND CUBE.
- Write queries that use the GROUPING_ID function.
- Describe how Microsoft SQL Server treats collections of statements as batches.
- Create and submit batches of T-SQL code for execution by SQL Server.
- Describe how SQL Server stores temporary objects as variables.
- Write code that declares and assigns variables.
- Create and invoke synonyms
- Describe the control-of-flow elements in T-SQL.
- Write T-SQL code using IF...ELSE blocks.
- Write T-SQL code that uses WHILE.

Module 15: Executing Stored Procedures

This module describes how to return results by executing stored procedures. Pass parameters to procedures. Create simple stored procedures that encapsulate a SELECT statement. Construct and execute dynamic SQL with EXEC and sp_executesql.

Lessons

- The Basic Architecture of SQL Server

SELECT statements.

- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause
- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.
- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that

- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Using Built-In Functions

- Writing Queries That Use Conversion Functions
- Writing Queries that use Logical Functions
- Writing Queries that Test for Nullability

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as

- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Executing Stored Procedures

- Using the EXECUTE statement to Invoke Stored Procedures
- Passing Parameters to Stored procedures
- Executing System Stored Procedures

After completing this module, students will be able to:

- Describe stored procedures and their use.
- Write T-SQL statements that execute stored procedures to return data.
- Write EXECUTE statements that pass input parameters to stored procedures.
- Write T-SQL batches that prepare output parameters and execute stored

evaluate an expression and return a scalar result.

- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 4: Querying Multiple Tables

This module describes how to write queries that combine data from multiple sources in Microsoft SQL Server 2016.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions

enhancements that will add functionality and readability to your queries

- Describe how to eliminate duplicates using the DISTINCT clause
- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.
- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS

procedures.

- Use the CREATE PROCEDURE statement to write a stored procedure.
- Create a stored procedure that accepts input parameters.
- Describe how T-SQL can be dynamically constructed.
- Write queries that use dynamic SQL.

Module 16: Programming with T-SQL

This module describes how to enhance your T-SQL code with programming elements.

Lessons

- Writing Simple SELECT Statements
- Eliminating Duplicates with DISTINCT
- Using Column and Table Aliases
- Writing Simple CASE Expressions
- T-SQL Programming Elements
- Controlling Program Flow

Lab : Programming with T-SQL

- Declaring Variables and Delimiting Batches
- Using Control-Of-Flow Elements
- Using Variables in a Dynamic SQL Statement
- Using Synonyms

After completing this module, students will be able to:

- Write queries that use UNION to combine input sets.
- Write queries that use UNION ALL to combine input sets
- Write queries that use the EXCEPT operator to return only rows in one set but not another.
- Write queries that use the INTERSECT operator to return only rows that are present in both sets
- Write queries using the CROSS APPLY operator.
- Write queries using the OUTER APPLY operator
- Describe the T-SQL components used to define windows, and the relationships between them.
- Write queries that use the OVER clause, with partitioning, ordering, and framing to define windows
- Write queries that use window aggregate functions.
- Write queries that use window ranking functions.
- Write queries that use window offset functions
- Describe how pivoting data can be used in T-SQL queries.
- Write queries that pivot data from rows to

- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Querying Multiple Tables

- Writing Queries that use Inner Joins
- Writing Queries that use Multiple-Table Inner Joins
- Writing Queries that use Self-Joins
- Writing Queries that use Outer Joins
- Writing Queries that use Cross Joins

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause

- predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 9: Grouping and Aggregating Data

This module describes how to use aggregate functions.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions

columns using the PIVOT operator.

- Write queries that unpivot data from columns back to rows using the UNPIVOT operator.
- Write queries using the GROUPING SETS subclause.
- Write queries that use ROLLUP AND CUBE.
- Write queries that use the GROUPING_ID function.
- Describe how Microsoft SQL Server treats collections of statements as batches.
- Create and submit batches of T-SQL code for execution by SQL Server.
- Describe how SQL Server stores temporary objects as variables.
- Write code that declares and assigns variables.
- Create and invoke synonyms
- Describe the control-of-flow elements in T-SQL.
- Write T-SQL code using IF...ELSE blocks.
- Write T-SQL code that uses WHILE.

Additional Reading

To help you prepare for this class, review the following resources:

- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.
- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.

- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Grouping and Aggregating Data

- Writing Queries That Use the GROUP BY Clause
- Writing Queries that Use Aggregate Functions
- Writing Queries that Use Distinct Aggregate Functions
- Writing Queries that Filter Groups with the HAVING Clause

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause
- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause

- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 5: Sorting and Filtering Data

This module describes how to implement sorting and filtering.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

- to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.
- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Lab : Sorting and Filtering Data

- Writing Queries that Filter Data using a WHERE Clause
- Writing Queries that Sort Data Using an ORDER BY Clause
- Writing Queries that Filter Data Using the TOP Option

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause
- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values,

Module 10: Using Subqueries

This module describes several types of subquery and how and when to use them.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Using Subqueries

- Writing Queries That Use Self-Contained Subqueries

and how to test for NULL in your queries.

- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 6: Working with SQL Server 2016 Data Types

This module introduces the data types SQL Server uses to store data.

- Writing Queries That Use Scalar and Multi-Result Subqueries
- Writing Queries That Use Correlated Subqueries and an EXISTS Clause

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
- Describe the on-premise and cloud-based editions and versions of SQL Server.
- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
- Describe the role of T-SQL in writing SELECT statements.
- Describe the elements of the T-SQL language and which elements will be useful in writing queries.
- Describe the concepts of the set theory, one of the mathematical underpinnings of relational databases, and to help you apply it to how you think about querying SQL Server
- Describe predicate logic and examine its application to querying SQL Server.
- Explain the elements of a SELECT statement, delineate the order in which the elements are evaluated, and then apply this understanding to a practical approach to writing queries.
- Describe the structure and format of the SELECT statement, as well as enhancements that will add functionality and readability to your queries
- Describe how to eliminate duplicates using the DISTINCT clause
- Describe the use of column and table aliases
- Understand and use CASE expressions
- Explain the fundamentals of joins in SQL Server 2016
- Write inner join queries
- Write queries that use outer joins
- Use additional join types
- Explain how to add an ORDER BY clause to your queries to control the order of rows displayed in your query's output
- Explain how to construct WHERE clauses to filter out rows that do not match the predicate.
- Explain how to limit ranges of rows in the SELECT clause using a TOP option.
- Explain how to limit ranges of rows using the OFFSET-FETCH option of an ORDER BY clause.
- Explain how three-valued logic accounts for unknown and missing values, how SQL Server uses NULL to mark missing values, and how to test for NULL in your queries.

- Explore many of the data types SQL Server uses to store data and how data types are converted between types
- Explain the SQL Server character-based data types, how character comparisons work, and some common functions you may find useful in your queries
- Describe data types that are used to store temporal data, how to enter dates and times so they will be properly parsed by SQL Server, and how to manipulate dates and times with built-in functions.
- Use INSERT and SELECT INTO statements
- Use UPDATE, MERGE, DELETE, and TRUNCATE.
- Describe the types of functions provided by SQL Server, and then focus on working with scalar functions
- Explain how to explicitly convert data between types using several SQL Server functions
- Describe how to use logical functions that evaluate an expression and return a scalar result.
- Describe additional functions for working with NULL
- Describe the built-in aggregate function in SQL Server and write queries using it.
- Write queries that separate rows using the GROUP BY clause.
- Write queries that use the HAVING clause to filter groups.
- Describe where subqueries may be used in a SELECT statement.
- Write queries that use correlated subqueries in a SELECT statement
- Write queries that use EXISTS predicates in a WHERE clause to test for the existence of qualifying rows
- Use the EXISTS predicate to efficiently check for the existence of rows in a subquery.
- Write queries that return results from views.
- Use the CREATE FUNCTION statement to create simple inline TVFs.
- Write queries that create and retrieve results from derived tables.
- Write queries that create CTEs and return results from the table expression.

Module 11: Using Table Expressions

Previously in this course, you learned about using subqueries as an expression that returned results to an outer calling query. Like subqueries, table expressions are query expressions, but table expressions extend this idea by allowing you to name them and to work with their results as you would work with data in any valid relational table. Microsoft SQL Server 2016 supports four types of table expressions: derived tables, common table expression (CTEs), views, and inline

table-valued functions (TVFs). In this module, you will learn to work with these forms of table expressions and learn how to use them to help create a modular approach to writing queries.

Lessons

- The Basic Architecture of SQL Server
- SQL Server Editions and Versions
- Getting Started with SQL Server Management Studio
- Introducing T-SQL
- Understanding Sets
- Understanding Predicate Logic
- Understanding the Logical Order of Operations in SELECT statements
- Understanding Joins
- Querying with Inner Joins
- Querying with Outer Joins
- Querying with Cross Joins and Self Joins
- Sorting Data
- Filtering Data with Predicates
- Filtering Data with TOP and OFFSET-FETCH
- Working with Unknown Values
- Introducing SQL Server 2016 Data Types
- Working with Character Data
- Working with Date and Time Data
- Inserting Data
- Modifying and Deleting Data
- Writing Queries with Built-In Functions
- Using Conversion Functions
- Using Logical Functions
- Using Functions to Work with NULL
- Using Aggregate Functions
- Using the GROUP BY Clause
- Filtering Groups with HAVING
- Writing Self-Contained Subqueries
- Writing Correlated Subqueries
- Using the EXISTS Predicate with Subqueries
- Using Views
- Using Inline Table-Valued Functions
- Using Derived Tables
- Using Common Table Expressions
- Writing Queries with the UNION operator
- Using EXCEPT and INTERSECT
- Using APPLY
- Creating Windows with OVER
- Exploring Window Functions
- Writing Queries with PIVOT and UNPIVOT
- Working with Grouping Sets
- Querying Data with Stored Procedures
- Passing Parameters to Stored procedures
- Creating Simple Stored Procedures
- Working with Dynamic SQL

Lab : Using Table Expressions

- Writing Queries That Use Views
- Writing Queries That Use Derived Tables
- Writing Queries That Use Common Table

Expressions (CTEs)

- Writing Queries That Use Inline Table-Valued Expressions

After completing this module, you will be able to:

- Describe relational databases and Transact-SQL queries.
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- Describe how to use SQL Server Management Studio (SSMS) to connect to an instance of SQL Server, explore the databases contained in the instance, and work with script files that contain T-SQL queries.
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Further Information:

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