

## Course duration

- 1 day

## Course Benefits

- Learn to gain a deeper knowledge and understanding of the Azure SQL Data Warehouse and how to write it.

## Course Outline

1. The Basics of Azure SQL
  1. Introduction
  2. Naming of Objects
  3. Setting Your Default Database
  4. SELECT \* (All Columns) in a Table
  5. Fully Qualifying a Database, Schema and Table
  6. SELECT Specific Columns in a Table
  7. Commas in the Front or Back?
  8. Place your Commas in front for better Debugging Capabilities
  9. Sort the Data with the ORDER BY Keyword
  10. ORDER BY Defaults to Ascending
  11. Use the Name or the Number in your ORDER BY Statement
  12. Two Examples of ORDER BY using Different Techniques
  13. Changing the ORDER BY to Descending Order
  14. NULL Values sort First in Ascending Mode (Default)
  15. NULL Values sort Last in Descending Mode (DESC)
  16. Major Sort vs. Minor Sorts
  17. Multiple Sort Keys using Names vs. Numbers
  18. Sorts are Alphabetical, NOT Logical
  19. Using A CASE Statement to Sort Logically
  20. An Order by That Uses an Expression
  21. How to ALIAS a Column Name
  22. Aliasing a Column Name with Spaces or Reserved Words
  23. A Missing Comma can by Mistake become an Alias
  24. Comments using Double Dashes are Single Line Comments
  25. Comments for Multi-Lines
  26. Comments for Multi-Lines as Double Dashes per Line
  27. A Great Technique for Comments to Look for SQL Errors
  28. sp\_help at the Database Level
  29. sp\_help at the Object Level
  30. Getting System Information

### 31. Getting Additional System Information

## 2. The Where Clause

1. The WHERE Clause limits Returning Rows
2. Double Quoted Aliases are for Reserved Words and Spaces
3. Using a Column ALIAS in a WHERE Clause
4. Using a Column ALIAS in an ORDER BY Clause
5. In What Order Does SQL Server Process A Query?
6. Character Data needs Single Quotes in the WHERE Clause
7. Character Data needs Single Quotes, but Numbers Don't
8. Declaring a Variable
9. Comparisons against a Null Value
10. NULL means UNKNOWN DATA so Equal (=) won't Work
11. Use IS NULL or IS NOT NULL when dealing with NULLs
12. NULL is UNKNOWN DATA so NOT Equal won't Work
13. Use IS NULL or IS NOT NULL when dealing with NULLs
14. Using Greater Than or Equal To (>=)
15. AND in the WHERE Clause
16. Troubleshooting AND
17. OR in the WHERE Clause
18. Troubleshooting Or
19. Troubleshooting Character Data
20. Using Different Columns in an AND Statement
21. LIKE command Underscore is Wildcard for one Character
22. LIKE command using a Range of Values
23. LIKE command using a NOT Range of Values
24. LIKE Command Works Differently on Char Vs Varchar
25. Troubleshooting LIKE Command on Character Data
26. Introducing the RTRIM Command
27. Numbers are Right Justified and Character Data is Left
28. An Example of Data with Left and Right Justification
29. A Visual of CHARACTER Data vs. VARCHAR Data
30. RTRIM command Removes Trailing spaces on CHAR Data
31. Using Like with an AND Clause to Find Multiple Letters
32. Using Like with an OR Clause to Find Either Letters
33. Declaring a Variable and using it with the LIKE Command
34. Escape Character in the LIKE Command changes Wildcards
35. Escape Characters Turn off Wildcards in the LIKE Command

## 3. Distinct, Group By and TOP

1. The Distinct Command
2. Distinct vs. GROUP BY
3. TOP Command
4. TOP Command is brilliant when ORDER BY is used!
5. TOP Command with Ties
6. TOP Command Using a Variable

## 4. Aggregation

1. The 3 Rules of Aggregation
2. There are Five Aggregates

3. Troubleshooting Aggregates
4. GROUP BY when Aggregates and Normal Columns Mix
5. GROUP BY delivers one row per Group
6. Count\_Big
7. Limiting Rows and Improving Performance with WHERE
8. WHERE Clause in Aggregation limits unneeded Calculations
9. Keyword HAVING tests Aggregates after they are totaled
10. Group by Grouping Sets
11. Group by Rollup
12. Answer Set for Group by Rollup Query
13. Creating a Cube
14. Answer Set for Cube Query
15. An Easy Example of Creating a Cube
16. Getting the Average Values per Column
17. Average Values per Column for all Columns in a Table
5. Join Functions
  1. Redistribution
  2. Big Table Small Table Join Strategy
  3. Duplication of the Smaller Table across All-Distributions
  4. If the Join Condition is the Distribution Key no Movement
  5. Matching Rows That Are On The Same Node Naturally
  6. What if the Join Condition Columns are Not Primary Indexes
  7. Strategy 1 of 4 – The Merge Join
  8. Strategy 2 of 4 – The Hash Join
  9. Strategy 4 of 4 – The Product Join
  10. A Two-Table Join Using Traditional Syntax
  11. A two-table join using Non-ANSI Syntax with Table Alias
  12. You Can Fully Qualify All Columns
  13. A two-table join using ANSI Syntax
  14. Both Queries have the same Results and Performance
  15. LEFT OUTER JOIN
  16. LEFT OUTER JOIN Results
  17. RIGHT OUTER JOIN
  18. RIGHT OUTER JOIN Example and Results
  19. FULL OUTER JOIN
  20. FULL OUTER JOIN Results
  21. Which Tables are the Left and which Tables are Right?
  22. INNER JOIN with Additional AND Clause
  23. ANSI INNER JOIN with Additional AND Clause
  24. ANSI INNER JOIN with Additional WHERE Clause
  25. OUTER JOIN with Additional WHERE Clause
  26. OUTER JOIN with Additional AND Clause
  27. OUTER JOIN with Additional AND Clause Results
  28. Evaluation Order for Outer Queries
  29. The DREADED Product Join
  30. The DREADED Product Join Results
  31. The Horrifying Cartesian product Join

32. The ANSI Cartesian Join will ERROR
33. The CROSS JOIN
34. The CROSS JOIN Answer Set
35. The Self Join
36. The Self Join with ANSI Syntax
37. How would you join these two tables?
38. An Associative Table is a Bridge that Joins Two Tables
39. The 5-Table Join – Logical Insurance Model
6. Date Function
  1. Current\_Timestamp
  2. Getdate
  3. Date and Time Keywords
  4. SYSDATETIMEOFFSET Provides the Timezone Offset
  5. SYSDATETIMEOFFSET Provides the Timezone Offset
  6. Using both CAST and CONVERT in Literal Values
  7. Using Both CAST and CONVERT in Literal Values
  8. Using both CAST and CONVERT in Literal Values
  9. The DATEADD Function
  10. The DATEDIFF Function
  11. DATEADD Function
  12. A Real World Example for DateAdd Using the Order Table
  13. DATEPART Function
  14. DATEPART Function Examples
  15. YEAR, MONTH, and DAY Functions
  16. A Better Technique for YEAR, MONTH, and DAY Functions
  17. DATENAME Function
  18. ISDATE Function
7. Temporary Tables
  1. Temporary Tables
  2. CREATING A Derived Table
  3. Naming the Derived Table
  4. Aliasing the Column Names in the Derived Table
  5. Multiple Ways to Alias the Columns in a Derived Table
  6. CREATING a Derived Table using the WITH Command
  7. The Same Derived Query shown Three Different Ways
  8. MULTIPLE Derived Tables using the WITH Command
  9. Column Alias Can Default For Normal Columns
  10. Most Derived Tables Are Used To Join To Other Tables
  11. A Join Example Showing Different Column Alias Styles
  12. The Three Components of a Derived Table
  13. Visualize This Derived Table
  14. Our Join Example With the WITH Syntax
  15. Clever Tricks on Aliasing Columns in a Derived Table
  16. A Derived Table lives only for the lifetime of a single query
  17. An Example of Two Derived Tables in a Single Query
  18. RECURSIVE Derived Table Hierarchy
  19. RECURSIVE Derived Table Query

20. RECURSIVE Derived Table Definition
21. WITH RECURSIVE Derived Table Seeding
22. WITH RECURSIVE Derived Table Looping
23. RECURSIVE Derived Table Looping in Slow Motion
24. RECURSIVE Derived Table Looping Continued
25. RECURSIVE Derived Table Looping Continued
26. Six rows are added in the third loop. RECURSIVE Derived Table Ends the Looping
27. RECURSIVE Derived Table Ends the Looping
28. RECURSIVE Derived Table Definition
29. RECURSIVE Derived Table Answer Set
30. What is TEMPDB?
31. Creating a Temporary Table
32. The Three Steps to Use a Private Temporary Table
33. Creating a Temporary Table with a Clustered Index
34. Creating a Columnstore Temporary Table from a CTAS
8. Sub-query Functions
  1. An IN List is much like a Subquery
  2. An IN List Never has Duplicates – Just like a Subquery
  3. An IN List Ignores Duplicates
  4. The Subquery
  5. The Three Steps of How a Basic Subquery Works
  6. These are Equivalent Queries
  7. The Final Answer Set from the Subquery
  8. Should you use a Subquery or a Join?
  9. The Basics of a Correlated Subquery
  10. The Top Query always runs first in a Correlated Subquery
  11. Correlated Subquery Example vs. a Join with a Derived Table
  12. How to handle a NOT IN with Potential NULL Values
  13. Using a Correlated Exists
  14. How a Correlated Exists matches up
  15. The Correlated NOT Exists
  16. The Correlated NOT Exists Answer Set
9. Window Functions OLAP
  1. The Row\_Number Command
  2. Using a Derived Table and Row\_Number
  3. Ordered Analytics OVER
  4. RANK and DENSE RANK
  5. RANK Defaults to Ascending Order
  6. Getting RANK to Sort in DESC Order
  7. RANK OVER and PARTITION BY
  8. Cumulative Sum
  9. The ANSI CSUM – Getting a Sequential Number
  10. Troubleshooting the ANSI OLAP on a GROUP BY
  11. Reset with a PARTITION BY Statement
  12. PARTITION BY only Resets a Single OLAP not ALL of them
  13. Sorting in DESC Order

14. Moving Average
15. Casting a Moving Average
16. Partition by Resets an ANSI OLAP
17. COUNT OVER for a Sequential Number
18. The MAX OVER Command
19. MAX OVER with PARTITION BY Reset
20. MAX OVER Without Rows Unbounded Preceding
21. The MIN OVER Command
22. How Ntile Works
23. Ntile
24. Ntile Continued
25. Ntile Percentile
26. Another Ntile Example
27. Using Quartiles (Partitions of Four)
28. NTILE Buckets
29. NTILE Using a Value of 10
30. NTILE with a Partition
31. Using LAG and LEAD
32. Using LEAD
33. Using LEAD With and Offset of 2
34. LEAD
35. LEAD With Partitioning
36. Using LAG
37. Using LAG with an Offset of 2
38. LAG
39. LAG with Partitioning
40. SUM (SUM (n))
10. Working with Strings
  1. The ASCII Function
  2. The CHAR Function
  3. The UNICODE Function
  4. The NCHAR Function
  5. The LEN Function
  6. The DATALENGTH Function
  7. Concatenation
  8. The RTRIM and LTRIM Command trims Spaces
  9. The SUBSTRING Command
  10. Using SUBSTRING to move Backwards
  11. How SUBSTRING Works with a Starting Position of -1
  12. How SUBSTRING Works with an Ending Position of 0
  13. Concatenation and SUBSTRING
  14. SUBSTRING and Different Aliasing
  15. The LEFT and RIGHT Functions
  16. Four Concatenations Together
  17. The DATALENGTH Function and RTRIM
  18. A Visual of the TRIM Command Using Concatenation
  19. CHARINDEX Function Finds a Letter(s) Position in a String

20. The CHARINDEX Command is brilliant with SUBSTRING
21. The CHARINDEX Command Using a Literal
22. PATINDEX Function
23. PATINDEX Function to Find a Character Pattern
24. SOUNDEX Function to Find a Sound
25. DIFFERENCE Function to Quantile a Sound
26. The REPLACE Function
27. LEN and REPLACE Functions for Number of Occurrences
28. REPLICATE Function
29. STUFF Function
30. STUFF without Deleting Function
31. UPPER and lower Functions
11. Interrogating the Data
  1. The NULLIF Command
  2. The COALESCE Command – Fill In the Answers
  3. The COALESCE Answer Set
  4. COALESCE is Equivalent to This CASE Statement
  5. The Basics of CAST (Convert and Store)
  6. Some Great CAST (Convert and Store) Examples
  7. Some Great CAST (Convert and Store) Examples
  8. A Rounding Example
  9. Using an ELSE in the Case Statement
  10. Using an ELSE as a Safety Net
  11. Rules For a Valued Case Statement
  12. Rules for a Searched Case Statement
  13. Valued Case Vs. A Searched Case
  14. Combining Searched Case and Valued Case
  15. A Trick for getting a Horizontal Case
  16. Nested Case
  17. Put a CASE in the ORDER BY
12. Table Create and Data Types
  1. Creating a Database
  2. Creating a Table that is a Heap
  3. Heap Page
  4. Extents
  5. Creating a Table That Has a Clustered Index
  6. Clustered Index Page
  7. When Do I Create a Clustered Index?
  8. B-Trees
  9. The Building of a B-Tree for a Clustered Index (1 of 3)
  10. The Building of a B-Tree for a Clustered Index (2 of 3)
  11. The Building of a B-Tree for a Clustered Index (3 of 3)
  12. The Row Offset Array is the Guidance System for Every Row
  13. The Row Offset Array Provides Two Search Options (1 of 2)
  14. The Row Offset Array Provides Two Search Options (2 of 2)
  15. The Row Offset Array Helps with Inserts
  16. What is a Uniquefier?

17. Adding an Index
18. When Do I Create a Non Clustered Index?
19. B-Tree for Non Clustered Index on a Clustered Table (1 of 2)
20. B-Tree for Non Clustered Index on a Clustered Table (2 of 2)
21. Adding a Non Clustered Index to A Heap
22. B-Tree for Non Clustered Index on a Heap Table (1 of 2)
23. B-Tree for a Non Clustered Index on a Heap Table (2 of 2)
24. Default Values
13. View Functions
  1. The Fundamentals of Views
  2. Creating a Simple View to Restrict Sensitive Columns
  3. Creating a Simple View to Restrict Rows
  4. Basic Rules for Views
  5. Two Exceptions to the ORDER BY Rule inside a View
  6. Views sometimes CREATED for Row Security
  7. Creating a View to Join Tables Together
  8. You Select From a View
  9. Another Way to Alias Columns in a View CREATE
  10. The Standard Way Most Aliasing is done
  11. What Happens When Both Aliasing Options Are Present
  12. Resolving Aliasing Problems in a View CREATE
  13. Aggregates on View Aggregates
  14. Altering a Table
  15. Altering a Table after a View has been created
  16. A View that Errors after an ALTER
  17. Troubleshooting a View
  18. Loading Data through a View
14. Data Manipulation Language (DML)
  1. INSERT Syntax # 1
  2. INSERT Example with Syntax 1
  3. INSERT Syntax #2
  4. INSERT Example with Syntax 2
  5. INSERT/SELECT Command
  6. INSERT/SELECT Example using All Columns (\*)
  7. INSERT/SELECT Example with Less Columns
  8. The UPDATE Command Basic Syntax
  9. Two UPDATE Examples
  10. Subquery UPDATE Command Syntax
  11. Example of Subquery UPDATE Command
  12. Join UPDATE Command Syntax
  13. Example of an UPDATE Join Command
  14. The DELETE Command Basic Syntax
  15. Two DELETE Examples to DELETE ALL Rows in a Table
  16. To DELETE or to TRUNCATE
  17. A DELETE Example Deleting only Some of the Rows
  18. Subquery and Join DELETE Command Syntax
  19. Example of Subquery DELETE Command



20. MERGE INTO
21. MERGE INTO
22. Set Operators Functions
23. Rules of Set Operators
24. INTERSECT Explained Logically
25. INTERSECT Explained Logically
26. UNION Explained Logically
27. UNION Explained Logically
28. UNION ALL Explained Logically
29. UNION ALL Explained Logically
30. EXCEPT Explained Logically
31. EXCEPT Explained Logically
32. Another EXCEPT Example
33. EXCEPT Explained Logically in Reverse Order
34. An Equal Amount of Columns in both SELECT List
35. Columns in the SELECT list should be from the same Domain
36. The Top Query handles all Aliases
37. The Bottom Query does the ORDER BY
38. Great Trick: Place your Set Operator in a Derived Table
39. UNION Vs UNION ALL
40. Using UNION ALL and Literals
41. A Great Example of how EXCEPT works
42. USING Multiple SET Operators in a Single Request
43. Changing the Order of Precedence with Parentheses
44. Building Grouping Sets Using UNION
45. Three Grouping Sets Using a UNION
46. Stored Procedure Functions
47. Creating a Stored Procedure
48. Executing a Stored Procedure
49. There are Three Ways to Execute a Stored Procedure
50. Creating a Stored Procedure with a CASE Statement
51. Our Answer Set
52. Dropping a Stored Procedure
53. Passing an Input Parameter to a Stored Procedure
54. Executing With Positional Parameter vs. Named Parameters
55. Passing an Output Parameter to a Stored Procedure
56. Changing a Stored Procedure with an ALTER
57. Answer Set for the Altered Stored Procedure
58. Using a Stored Procedure to Delete a Row
59. A Different Method to Delete a Row
60. Deleting a Row Using an Input Parameter
61. Using Loops in Stored Procedures
62. Stored Procedure Workshop
63. Looping with a WHILE Statement
64. Statistical Aggregate Functions
65. The Stats Table
66. The VAR and VARP Functions

- 67. A VAR Example
- 68. A VARP Example
- 69. The STDEV and STDEVP Functions
- 70. A STDEV Example
- 71. A STDEVP Example
- 72. Systems Views
- 73. System Views
- 74. sys.all\_columns
- 75. sys.all\_objects
- 76. sys.all\_sql\_modules
- 77. sys.all\_views
- 78. sys.columns
- 79. sys.data\_spaces
- 80. sys.database\_files
- 81. sys.database\_principals
- 82. sys.database\_role\_members
- 83. sys.databases
- 84. sys.filegroups
- 85. sys.identity\_columns
- 86. sys.objects
- 87. sys.partition\_range\_values
- 88. sys.schemas
- 89. sys.server\_role\_members
- 90. sys.sql\_logins

## Class Materials

Each student will receive a comprehensive set of materials, including course notes and all the class examples.