

**Google BigQuery SQL**

**Course Number:** SQL-702
**Duration:** 3 days

**Overview**

This live, instructor-led Google BigQuery SQL training course teaches attendees basic and advanced SQL for querying the Google BigQuery cloud data warehouse.

**Prerequisites**

No prior experience is presumed.

**Materials**

All Google BigQuery SQL training students receive comprehensive courseware.

**Software Needed on Each Student PC**

Internet access via Chrome is required to access the remote environment used for this training.

**Objectives**

* Basic SQL functions
* The WHERE clause
* Distinct and Group By
* Aggregation
* Joins
* Date and time functions
* Format functions
* Analytics and window functions
* Temporary tables
* Subqueries
* Strings
* Data interrogating
* Views
* Set operators
* Table creation
* Data Manipulation Language (DML)
* Math functions
* Statistical aggregate functions

**Outline**

* Introduction
* The Fundamentals of SQL
	+ SELECT \* Returns All Columns from the Table
	+ SELECT Specific Columns in a Table
	+ Commas in the Front or Back?
	+ ORDER BY
	+ Nulls
	+ Major Sort vs. Minor Sort
	+ Multiple Sort Keys using Names vs. Numbers
	+ You can ORDER BY using a Mix of names and Numbers
	+ Sorts are Alphabetical, NOT Logical
	+ Using A Valued CASE Statement to Sort Logically
	+ Using A Searched CASE Statement to Sort Logically
	+ How to ALIAS a Column Name
	+ How to Get Capital Letters in a Report Header
	+ Using Spaces in an ALIAS Clauses Errors
	+ Using an Alias in the WHERE and ORDER BY Clause
	+ A Missing Comma can become an Alias by Mistake
	+ Limit and Offset
	+ Comments
	+ Move Data to the Google BigQuery Effortlessly
* The WHERE Clause
	+ The WHERE Clause limits Returning Rows
	+ Single-Quotes or Double-Quotes Are Used for Character Data
	+ Reminder: Using Spaces in an ALIAS Clauses Errors
	+ Using a Column ALIAS in the WHERE Clause
	+ Numbers Do Not Need Single Quotes
	+ Searching for null Values Using Equality Returns Nothing
	+ Use IS NULL to Check for Null Values
	+ Use IS NOT NULL for Interrogating NULL Values
	+ Using Greater Than Or Equal To (>=)
	+ AND in the WHERE Clause
	+ Troubleshooting
		- Troubleshooting AND
		- OR in the WHERE Clause
		- Troubleshooting OR
		- Why OR Must Utilize the Column Name Each Time
		- Troubleshooting Character Data
		- Troubleshooting Character Data Continued
	+ What is the Order of Precedence?
	+ Using Parentheses to change the Order of Precedence
	+ Using an IN List in Place of OR
	+ The BETWEEN STatement
	+ LIKE
* Distinct Vs. Group By
	+ The Distinct Command
	+ Distinct vs. GROUP BY
* Aggregation
	+ There are Five Aggregates
	+ Casting a Data Type
	+ Troubleshooting Aggregates
	+ GROUP BY when Aggregates and Normal Columns Mix
	+ GROUP BY Delivers One Row Per Group
	+ GROUP BY dept\_no or GROUP BY 1 the same thing
	+ Limiting Rows and Improving Performance with WHERE
	+ WHERE Clause in Aggregation limits unneeded Calculations
	+ Keyword HAVING tests Aggregates after they are Totaled
* Joining Tables
	+ NexusCore Servers - Control Network and Data Movement
	+ A Two-Table Join Using Traditional Syntax
	+ A two-table join using Non-ANSI Syntax with Table Alias
	+ You Can Fully Qualify All Columns
	+ A two-table join using ANSI Syntax
	+ Both Queries have the same Results and Performance
	+ Left Outer Join
	+ Left Outer Join Results
	+ Right Outer Join
	+ Right Outer Join Example and Results
	+ Full Outer Join
	+ Full Outer Join Results
	+ Which Tables are Left, and Which are the Right?
	+ INNER JOIN with Additional AND Clause
	+ ANSI INNER JOIN with Additional AND Clause
	+ ANSI INNER JOIN with Additional WHERE Clause
	+ OUTER JOIN with Additional WHERE Clause
	+ OUTER JOIN with Additional AND Clause
	+ The DREADED Product Join
	+ The DREADED Product Join Results
	+ Cartesian Product Join with Traditional Syntax
	+ Cartesian Product Join with ANSI Syntax
	+ The CROSS JOIN
	+ The Self  Join
	+ The Self  Join with ANSI Syntax
	+ An Associative Table is a Bridge that Joins Two Tables
	+ The Five-Table Join – Logical Insurance Model
* Date and Time
	+ The Google BigQuery Tree of Nexus
	+ Current\_Date
	+ Current\_Date and Current\_Timestamp
	+ Add or Subtract From a Date
	+ Add or Subtract Days From a Date
	+ DATE
	+ TIME
	+ Support Elements for DATE Formatting
	+ The EXTRACT Command
	+ EXTRACT from DATES and TIME
	+ Extract Options
	+ Extract Time and Timestamp
	+ STRING Timestamp
	+ Another Datediff Example
	+ DATE\_TRUNC
	+ TIME\_TRUNC
	+ TIMESTAMP\_TRUNC
	+ LAST\_DAY
	+ DATE\_ADD
	+ TIME\_ADD
	+ TIMESTAMP\_ADD
	+ DATE\_SUB
	+ TIME\_SUB
	+ TIMESTAMP\_SUB
	+ Clever Tricks for Month
	+ Determining if the Current\_Date is a Leap Year
	+ Determining if the Current\_Timestamp is a Leap Year
* Analytics
	+ The Nexus Super Join Builder builds SQL Automatically
	+ Row\_Number
	+ Find the Top Two Students Per class\_code
	+ RANK
	+ Cumulative Sum
	+ Reset with a PARTITION BY Statement
	+ Totals and Subtotals through Partition By
	+ Moving Sum
	+ Partition By Resets the Calculation
	+ Moving Average
	+ The Partition By Statement
	+ Partition By Resets an ANSI OLAP
	+ Moving Difference
	+ Finding a Value of a Column in the Next Row with MIN
	+ Finding a Next Row Value with MIN and PARTITION BY
	+ Finding The Next Date using MAX
	+ Finding Multiple Values of a Column in Upcoming Rows
	+ COUNT OVER
	+ MAX OVER and MIN OVER
	+ Different Windowing Options
	+ How Ntile Works
	+ Using Quantiles (Partitions of Four)
	+ NTILE With a Partition
	+ NTILE With a Partition and a Derived Table
	+ Using FIRST\_VALUE
	+ Last\_Value
	+ Using LEAD With an Offset of 2 and a PARTITION
	+ Using LAG
	+ CUME\_DIST
	+ CURRENT ROW AND UNBOUNDED FOLLOWING
	+ Different Windowing Options
	+ ANY\_VALUE
* Temporary Tables
	+ Move an Entire Database to Google BigQuery
	+ CREATING A Derived Table
	+ Naming the Derived Table
	+ CREATING A Derived Table using the WITH Command
	+ Derived Query Examples with Two Different Techniques
	+ Most Derived Tables Are Used To Join To Other Tables
	+ The Three Components of a Derived Table
	+ Visualize This Derived Table
	+ Our Join Example Using The WITH Syntax
	+ An Example of Two Derived Tables in a Single Query
	+ An Example of Two Derived Tables Using WITH
	+ Select Expressions
	+ Select Expression Using UNION ALL
	+ Another Select Expression Using UNION ALL
* Subqueries
	+ The Nexus Migrates Data To and From Every System
	+ An IN List is much like a Subquery
	+ An IN List Never has Duplicates – Just like a Subquery
	+ An IN List Ignores Duplicates
	+ The Subquery
	+ The Three Steps of How a Basic Subquery Works
	+ These are Equivalent Queries
	+ The Final Answer Set from the Subquery
	+ Should you use a Subquery or a Join?
	+ The Basics of a Correlated Subquery
	+ The Top Query always runs first in a Correlated Subquery
	+ Correlated Subquery Example vs. a Join with a Derived Table
	+ NOT IN Subquery Returns Nothing when Nulls are Present
	+ Fixing a NOT IN Subquery with Null Values
	+ Using a Correlated Exists
	+ How a Correlated Exists Matches Up
	+ The Correlated NOT Exists
* Strings
	+ Nexus Pivots Your Answer Sets
	+ UPPER and lower  Functions
	+ The Length Command Counts Characters
	+ The Char\_Length Command Counts Characters
	+ The TRIM Command trims both Leading and Trailing Spaces
	+ The RTRIM and LTRIM Command Trims Spaces
	+ Concatenation
	+ The SUBSTR and SUBSTRING Commands
	+ The STRPOS Command finds a Letters Position
	+ LPAD and RPAD
	+ The REPLACE Function
	+ The STARTS\_WITH Function
	+ The ENDS\_WITH Function
	+ Initcap Function
	+ Repeat Function
	+ SPLIT Function
	+ TRANSLATE Function
	+ The ASCII Function
	+ The UNICODE Function
	+ The Reverse String Function
	+ The RIGHT Function
	+ The LEFT and RIGHT Functions
	+ SOUNDEX Function to Find a Sound
	+ Java Script Object Notation (JSON)
	+ Regex
	+ The REPLACE Function
* Interrogating the Data
	+ Drag an Answer Set to Any System to Create a Table
	+ IFNULL
	+ The COALESCE Command
	+ COALESCE is Equivalent to this CASE Statement
	+ IF
	+ Valued Case vs. Searched Case
	+ Combining Searched Case and Valued Case
	+ A Trick for getting a Horizontal Case
	+ Put a Valued CASE in the ORDER BY
	+ Put a Searched CASE in the ORDER BY
* Views
	+ Join Excel with Production Tables
	+ The Fundamentals of Views
	+ Creating a Simple View to Restrict Sensitive Columns
	+ Creating a Simple View to Restrict Rows
	+ Creating a View to Join Tables Together
	+ Basic Rules for Views
	+ How to Modify a View
	+ The Exception to the ORDER BY Rule inside a View
	+ Derived Columns in a View Should Contain a Column Alias
	+ The Standard Way Most Aliasing is Done
* Set Operators
	+ When the Desktop and the Server Work as One
	+ Set Operators
	+ Rule 1: Equal Number of Columns in both SELECT Lists
	+ Rule 2: Top Query is Responsible for all Aliasing
	+ Rule 3: Bottom Query does the ORDER BY Statement
	+ Intersect Challenge
	+ Using UNION ALL and Literals
	+ Great Trick:  Place your Set Operator in a Derived Table
	+ A Great Example of how EXCEPT works
	+ Changing the Order of Precedence with Parentheses
* Creating Tables
	+ Google BigQuery Data Types (1 of 3)
	+ Google BigQuery Data Types (2 of 3)
	+ Google BigQuery Data Types (3 of 3)
	+ Creating a Basic Table
	+ IF NOT EXISTS
	+ CREATE OR REPLACE
	+ Float64 vs. Numeric
	+ Partitioned Table Options
	+ Date Partitioned Table
	+ Timestamp Partitioned Table by Hour
	+ Timestamp Partitioned Table by Day
	+ Timestamp Partitioned Table by Month
	+ Timestamp Partitioned Table by Year
	+ Timestamp Partitioned Table by Integer
	+ Table Clustering
* Data Manipulation Language (DML)
	+ INSERT Syntax # 1
	+ INSERT Syntax # 2
	+ INSERT Example with Multiple Rows
	+ Inserting Null Values into a Table
	+ INSERT/SELECT Command
	+ INSERT/SELECT to Build a Data Mart
	+ UPDATE Examples
	+ Deleting Rows in a Table
* Statistical Aggregate Functions
	+ The Stats Table
	+ The STDDEV\_POP Function
	+ STDDEV
	+ The STDDEV\_SAMP Function
	+ The VAR\_POP Function
	+ The VAR\_SAMP Function
	+ Variance
	+ The CORR Function
	+ The COVAR\_POP Function
	+ The COVAR\_SAMP Function
	+ ARRAY\_AGG
	+ ARRAY\_AGG Examples
	+ More ARRAY\_AGG Examples
	+ APPROX\_COUNT\_DISTINCT
* Mathematical Functions
	+ Example Mathematical Functions
	+ Numeric Manipulation Functions
	+ ABS
	+ ACOS
	+ ASIN
	+ Ceiling
	+ Floor
	+ COS
	+ DIV
	+ EXP
	+ LN
	+ LOG
	+ MOD
	+ POWER
	+ ROUND
	+ SIGN
	+ SIN
	+ SQRT
	+ TRUNC
* Conclusion