

TERADATA ADVANCED SQL

Lecture/Lab

ILT 25966

4 Days

COURSE DESCRIPTION

Designed for senior programmers and data analysts, this course focuses on advanced and analytic SQL features and techniques. Extensive hands-on labs help reinforce learning.

AUDIENCE

- ~ Application Developers
- ~ Data Analysts
- ~ Database Administrators
- ~ Architects/Designers

PREREQUISITES

To get the most out of this training, you should have the following knowledge or experience.

- ~ **Introduction to Teradata Database**
(ILT #25964 or WBT #26438)
- ~ **Teradata SQL**
(Instructor-led (#25965) or WBT (#54458))

COURSE OBJECTIVES

After successfully completing this course, you will be able to:

- ~ Use various forms of derived, volatile and global temporary tables
- ~ Work with the Window Aggregate and Extended Grouping functions
- ~ Use the ANSI Merge syntax to merge data from source to target
- ~ Write SQL using the RANK, QUANTILE and WIDTH_BUCKET analytic functions
- ~ Work with advanced features, such as recursive subqueries, scalar subqueries, and interval data types
- ~ Understand and use Date, Time and Timestamp

COURSE OUTLINE*

DAY 1	DAY 2	DAY 3	DAY 4
<ul style="list-style-type: none"> ~ Introduction ~ Creating Tables from Existing Tables ~ Global Temporary Tables ~ Window Aggregates 	<ul style="list-style-type: none"> ~ Window Aggregates ~ Rank ~ Extended Grouping Functions ~ QUANTILE and WIDTH_BUCKET ~ Correlated Subqueries 	<ul style="list-style-type: none"> ~ Scalar Subqueries ~ Recursive Queries ~ Date-Time Data Types ~ Interval Data Types and Manipulations 	<ul style="list-style-type: none"> ~ Timestamps and Timezones ~ Advanced Date and Time Formatting ~ Other Formatting Options ~ SQL Functions

* Timing and topics covered by day may vary

COURSE CONTENT

Module 0 – Introduction

- ~ Recommended Prerequisite Knowledge
- ~ Course Objectives
- ~ Course Modules

Module 1 - Creating Tables from Existing Tables

- ~ SQL Assistant Cloned Table
- ~ Create Table AS
- ~ Cloning Attributes
- ~ Changing Table Attributes
- ~ Using Subqueries to Customize Tables
- ~ Renaming Columns
- ~ Changing Column Attributes
- ~ Using Inner Joins in a Subquery
- ~ Using Other Joins in a Subquery
- ~ Using Expressions for Columns
- ~ Using CAST
- ~ Aliases Having Non-Standard Characters
- ~ Adding Unique and Primary Key Constraints
- ~ Adding Default Values
- ~ Populating Default Column Values
- ~ Copying Statistics
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 2 - Derived and Volatile Tables

- ~ Permanent Tables for Ad Hoc Queries
- ~ Pros and Cons for Ad Hoc Perm Tables
- ~ Temporary Table Choices
- ~ Derived Tables
- ~ “WITH” Derived Table Syntax Form
- ~ Derived Tables and Joins
- ~ Multiple “WITH” Derived Table Syntax Form
- ~ CREATE TABLE AS and Derived Tables
- ~ Volatile Table Syntax
- ~ Pros and Cons of Volatile Tables
- ~ Volatile Table Restrictions
- ~ HELP and SHOW (Volatile) TABLE
- ~ ON COMMIT DELETE ROWS
 - ~ Implicit Transactions
 - ~ Explicit Transactions
- ~ ON COMMIT PRESERVE ROWS
- ~ Limitations
- ~ Volatile Tables from Derived Tables
- ~ Use with Views and Macros
- ~ Another View and Macro Strategy
- ~ Volatile Table Quiz
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 3 - Global Temporary Tables

- ~ What Are They?
- ~ Creating Global Temporary Tables
- ~ Materializing Global Temporary Tables
- ~ Space Allocation
- ~ Getting HELP Table Manipulations
- ~ Secondary Indexes on Base Tables
- ~ Secondary Indexes on Instances
- ~ Dropping Indexes on Base Tables
- ~ Dropping Indexes on Instances
- ~ Collecting Statistics on Base Tables
- ~ Collecting Statistics on Instances
- ~ Dropping Statistics on Base Tables
- ~ Dropping Statistics on Instances
- ~ Using CREATE TABLE AS
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 4 - Window Aggregates - Part 1

- ~ Window Aggregate Functions
- ~ The GROUP COUNT Window
- ~ Relating the Result to the Syntax
- ~ GROUP COUNT and Null
- ~ GROUP COUNT(*)
- ~ Group SUM and AVG Window
- ~ Group MIN and MAX Window
- ~ Group AVG and QUALIFY
- ~ Qualifying a Non-Projected Column
- ~ GROUP COUNT and PARTITION
- ~ GROUP COUNT, PARTITION, and Null
- ~ GROUP COUNT and Null Partitions
- ~ GROUP SUM and Partition
- ~ GROUP SUM and Reordering
- ~ GROUP SUM Reorder Explanation
- ~ SQL ORDER BY to Preserve Order
- ~ Window ORDER BY to Preserve Order
- ~ Qualifying on a Windowed Non-Aggregated
- ~ Multiple Column Partitions
- ~ Partitioning on Literals
- ~ WHERE vs. QUALIFY
- ~ Order of Group SUM and Aggregation
- ~ Projecting Multiple Window Aggregates
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 5 - Window Aggregates - Part 2

- ~ What's in this Module?
- ~ What's ANSI Standard and What's Not?
- ~ Cumulative Sum
- ~ Cumulative Sum with Partitioning
- ~ Cumulative MIN
- ~ Cumulative Count
- ~ Moving Sum
- ~ Moving AVG – Not in Range
- ~ Moving Difference
- ~ Moving Difference and QUALIFY
- ~ MDIFF
- ~ Moving Difference and Partition
- ~ Remaining Window
- ~ Remaining Window and Partition
- ~ Moving Window and Following
- ~ RESET WHEN
- ~ PRECEDING vs. FOLLOWING
- ~ PRECEDING Using "0" and CURRENT
- ~ FOLLOWING Using "0" and CURRENT
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 6 - RANK

- ~ Ranking Values
- ~ QUALIFY with No Tied Values
- ~ QUALIFY with Tied Ending Values
- ~ Qualifying Without Rank Projection
- ~ Bottom Values by ASC Rank
- ~ Bottom Values by DESC Rank
- ~ RANK and PARTITION
- ~ Group Sum on Partitioned Rank
- ~ ROW_NUMBER
- ~ ROW_NUMBER vs. RANK
- ~ ROW_NUMBER and PARTITION
- ~ ROW_NUMBER and RESET WHEN
- ~ TD14.10 RANK Functionality
- ~ RANK Examples
- ~ PERCENT_RANK
- ~ TD14.10 PERCENTILE_CONT
- ~ TD14.10 PERCENTILE_DISC
- ~ TD14.10 MEDIAN
- ~ TD14.10 CUME_DIST
- ~ TD14.10 CUME_DIST Result
- ~ TD14.10 FIRST_VALUE and LAST_VALUE
- ~ FIRST_VALUE and RESPECT NULLS
- ~ RESPECT NULLS vs. IGNORE NULLS
- ~ Summary
- ~ Review Questions

- ~ Lab Exercises

Module 7 - Extended Grouping Functions

- ~ Extended Grouping Functions Overview
- ~ Aggregation Review
- ~ ROLLUP
- ~ Two-Level Rollup
- ~ Switching Rollup Column Order
- ~ Other than Sums
- ~ Using Positional References
- ~ Three-Level Rollup
- ~ Null Group vs. Total
- ~ The GROUPING Function
- ~ Two-Columns into One Level
- ~ CUBE vs. ROLLUP
- ~ CUBE Result
- ~ CUBE and GROUPING Function
- ~ Three-Level Cube
- ~ Combining Groupings in a Cube
- ~ Combining Groupings in a Rollup
- ~ Aggregating Outside a Rollup
- ~ The GROUPING SETS Function
- ~ Adding Grand Totals
- ~ Combining Grouping Sets
- ~ Different Method for Same Result
- ~ Grouping Sets for Cubes
- ~ GROUPING SETS within a Group
- ~ The Multiplier Effect
- ~ Multiple Grouping Sets
- ~ Three Approaches
- ~ Unnecessary Methods
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 8 - QUANTILE and WIDTH_BUCKET

- ~ QUANTILE Overview
- ~ QUANTILE and QUALIFY
- ~ QUANTILE with no Projected Value
- ~ Aggregation and QUANTILE
- ~ OLAP vs. Window Aggregates
- ~ QUANTILE and GROUP BY
- ~ Varying a QUANTILE
- ~ Ordering a QUANTILE
- ~ PERCENT_RANK vs. Percentile
- ~ WIDTH_BUCKET
- ~ WIDTH_BUCKET and Histograms
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 9 - Correlated Subqueries

- ~ Subquery Review
- ~ Correlated Subquery Terminology
- ~ Correlated Subquery Processing
- ~ Correlated Subqueries and Aggregation
- ~ A Complex Example
- ~ NOT IN vs. NOT EXISTS
- ~ NOT IN Review
- ~ NOT EXISTS vs. NOT IN Logic
- ~ Multiple Correlations
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 10 - Scalar Subqueries

- ~ Subqueries
- ~ Left-Side of Operator
- ~ CSSQ in a Projection
- ~ NCSSQ and IN-List Processing
- ~ CSSQ that Returns No Rows
- ~ NCSSQ and CASE
- ~ NCSSQ and Arithmetic Expressions
- ~ CSSQ and Update
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 11 - Recursive Queries

- ~ Recursive Query Description
- ~ Building Tables for Recursive Processing
- ~ Creating a “One Stopover” Table
- ~ Querying Two Levels of Recursion
- ~ Creating a “Two-Stopover” Table
- ~ Querying Three Levels of Recursion
- ~ Recursive Query Logic
- ~ Recursive Query Example
- ~ Analyzing the Depth
- ~ Two-City Recursion
- ~ Fixing a Two-City Chain Recursion
- ~ Greater Than Two-City Recursion
- ~ Fixing a Greater Than Two-City Recursion
- ~ Creating Recursive Views
- ~ Using Recursive Views
- ~ A Problem with This View?
- ~ Recursive Queries and Parameterized Macros
- ~ WITH Derived Table Usage
- ~ Non-Recursive WITH
- ~ Cross Referencing Multiple WITH Lists
- ~ Limitations and Restrictions
- ~ Summary
- ~ Review Questions

- ~ Lab Exercises

Module 12 - Date-Time Data Types

- ~ Default Date Formatting
- ~ Setting Date Formatting Defaults
- ~ Session-Level Formatting
- ~ ODBC Considerations
- ~ Integer Date and Default Formatting
- ~ ANSI Date and Default Formatting
- ~ Using FORMAT
- ~ Using an Explicit Format
- ~ The “Century-Break” Setting
- ~ INTEGERDATE Century Break Examples
- ~ ANSIDATE Century Break Examples
- ~ ANSI Time
- ~ Inserting Unformatted Time Literals
- ~ ANSI Timestamp
- ~ Setting Time Zone Defaults
- ~ Extracting Information from Timestamps
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 13 - Interval Data Types and Manipulations

- ~ Interval Data Types
- ~ Year-Month – Day-Time Intervals
- ~ Interval Data Types and Date Arithmetic
- ~ Date Literals and Intervals
- ~ Interval Calculations
- ~ Complex Interval Calculations
- ~ Deriving Days between Dates
- ~ Deriving Intervals between Dates
- ~ Deriving Years between Dates
- ~ Interval-to-Interval Conversions
- ~ Extracting from Date Expressions
- ~ Simple Day-Time Intervals
- ~ Complex Day-Time Intervals
- ~ Combining Day-Time Intervals
- ~ Interval and Time Literals
- ~ Time Subtraction
- ~ Day-Time Interval Castings
- ~ More Interval Castings
- ~ Interval Calculations
- ~ Extracting from Time Expressions
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 14 - Timestamps and Time zones

- ~ Timestamp Review
- ~ Time and Timestamp Literals
- ~ Timestamp-Interval Arithmetic
- ~ Timestamp Subtraction
- ~ Timestamp Castings
- ~ Time Zones
- ~ Data Types with Time Zones
- ~ A Tale of Three Cities
- ~ Los Angeles Adds a Row
- ~ Normalizing Timestamps
- ~ Hong Kong Adds a Row
- ~ The View from L.A.
- ~ The View from London
- ~ Extracting from Timestamp Expressions
- ~ OVERLAPS Function
- ~ Overlapping Data Type Options
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 15 - Advanced Date and Time Formatting

- ~ Year, Month, Day Options
- ~ Day of Week Options
- ~ Hours, Minutes, and Seconds Options
- ~ The 12-Hour Clock (AM-PM)
- ~ Time Precision Formatting
- ~ Time Zone Placement
- ~ Timestamp Formatting
- ~ Formatting and Qualification
- ~ Getting Dates from Strings
- ~ LIKE and Formatting
- ~ ODBC and JDBC Methods for FORMAT
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 16 - Other Formatting Options

- ~ FORMAT
- ~ Basic Formatting Options
- ~ Basic Numeric Formats
- ~ Character Formats
- ~ Group Separator and Radix
- ~ Decimal Fractions and Zero Suppress
- ~ Fixed Currency Symbol – Local
- ~ Dual Currency Symbol – Local

- ~ Floating Currency Symbols – Local
- ~ ISO Currency Abbreviations
- ~ Currency Names
- ~ Signed Amounts
- ~ Summary
- ~ Review Questions
- ~ Lab Exercise

Module 17 - SQL Functions

- ~ Module Description
- ~ LAST_DAY
- ~ NEXT_DAY
- ~ TRUNC
- ~ Using TRUNC with Dates
- ~ ROUND
- ~ Using ROUND with Dates
- ~ REGEXP_SUBSTR
- ~ REGEXP_REPLACE
- ~ REGEXP_INSTR
- ~ REGEXP_SIMILAR
- ~ LTRIM
- ~ RTRIM
- ~ LPAD
- ~ RPAD
- ~ NGRAM
- ~ NVP
- ~ OREPLACE
- ~ OTRANSLATE
- ~ INITCAP
- ~ INSTR
- ~ NVL
- ~ CEILING and FLOOR
- ~ DECODE
- ~ GREATEST
- ~ LEAST
- ~ TO_NUMBER
- ~ TO_CHAR
- ~ TO_CHAR (DateTime)
- ~ TO_CHAR (DateTime Example)
- ~ TO_DATE
- ~ TO_TIMESTAMP
- ~ Other Conversion Functions
- ~ LEAD and LAG Ordered Analytic Functions
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises