

TERADATA ADVANCED SQL

Lecture

ILT 25965

4 Days

COURSE DESCRIPTION

Designed for the student with little or no SQL expertise, this course focuses on retrieving and manipulating data with the Teradata Structured Query Language (SQL). Both ANSI standard conventions and Teradata extensions to the language are covered. Extensive hands-on labs help reinforce the concepts learned.

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)

COURSE OBJECTIVES

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

- ~ Work with Teradata Studio Express for submitting queries to the Teradata Database
- ~ Write SELECT statements using SQL operators such as AND, OR, IN, NOT IN, BETWEEN and LIKE, POSITION, and SUBSTRING for data retrieval
- ~ Understand and able to work with Teradata data types
- ~ Write queries to produce totals and subtotals in reports using aggregation operators
- ~ Write SELECT statements using inner and outer joins
- ~ Write SELECT statements using correlated and non-correlated subqueries
- ~ Write SQL to modify the database, using the UPDATE, INSERT, and DELETE statements
- ~ Use analytic functions, including SAMPLE, RANDOM, and TOP N
- ~ Work with views, macros, and derived table

COURSE OUTLINE*

DAY 1	DAY 2	DAY 3	DAY 4
~ Introduction	~ Basic SQL Functions	~ Outer Join	~ SAMPLE and RANDOM
~ Teradata Studio Features	~ Subqueries	~ Aggregation	~ TOP N
~ Basic SELECT Clauses	~ Inner Join	~ Case	~ Views
~ Logical Operators	~ Set Operators	~ Permanent and Derived Tables	~ Macros
~ Data Types and Functionality			

* Timing and topics covered by day may vary

COURSE CONTENT

Module 0 - Introduction

- ~ Recommended Prerequisite Knowledge
- ~ Course Objectives
- ~ Course Description
- ~ Course Content
- ~ Review of Relational Concepts
- ~ Table with Rows and Columns
- ~ Teradata Object Naming Conventions

Module 1 - Teradata Studio Features

- ~ Optimize Effectiveness
- ~ Key Features
- ~ Modular Display
- ~ Teradata Studio Toolbar
- ~ Data Source Explorer View
- ~ Creating Connections
- ~ Creating Database Objects
- ~ Creating a SQL Statement (SQL Editor)
- ~ Project Explorer View
- ~ HELP TABLE Command
- ~ Other SQL HELP Commands
- ~ Setting a Default Database
- ~ The Teradata "SHOW" Command
- ~ Other SQL SHOW Commands
- ~ Session Information via SELECT
- ~ Session Information via HELP SESSION
- ~ SQL Editor
- ~ SQL Editor with Outline View
- ~ Using SQL Query Builder
- ~ Result Set Viewer
- ~ SQL History View
- ~ Teradata View
- ~ Shortcuts to Data Source Objects
- ~ Shortcuts to Typing Object Names
- ~ Commenting Lines of SQL
- ~ Logging on to Multiple Systems
- ~ Teradata Load Wizard
- ~ Choosing Studio or Studio Express
- ~ The Employee_Sales Database
- ~ The Emp_Views Database
- ~ Teradata Studio – New System
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 2 - Basic SELECT Clauses

- ~ SQL: Structured Query Language
- ~ Three SQL Classifications
- ~ A Simple SQL SELECT
- ~ Projecting All Columns and All Rows
- ~ Aliasing a Column Using AS

- ~ Aliasing Mistake?
- ~ Ordering Rows Using ORDER BY
- ~ Other Ordering Options
- ~ Projecting Literal Values
- ~ Using WHERE to Eliminate Rows
- ~ The ASCII Collating Sequence and Teradata Mode
- ~ The ASCII Collating Sequence and ANSI Mode
- ~ Basic Logical Operators
- ~ DISTINCT Option
- ~ Other Built-In Functions
- ~ Recommended Coding Conventions
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 3 - Logical Operators

- ~ Logical Operators Introduction
- ~ The "AND" Condition
- ~ The "OR" Condition
- ~ Mixing AND and OR
- ~ Parentheses and the Predicate
- ~ The IN Operator
- ~ The NOT IN Operator
- ~ Exclusive OR
- ~ The BETWEEN Operator
- ~ NULL
- ~ Conditional Expressions and NULL
- ~ What Gets Returned
- ~ NULL and the Business Question
- ~ NOT NULL and the Business Question
- ~ Negating Conditions and Operators
- ~ The IN Operator and NULL
- ~ The NOT IN Operator and NULL
- ~ "<>" With OR vs. "<>" With AND
- ~ NULL Literal in an IN-List
- ~ Including NULL to an IN-List
- ~ NULL Literal in a NOT IN-List
- ~ Three Versions of NOT IN
- ~ Incorrect Sequencing of the BETWEEN
- ~ Explaining the Incorrect Sequencing of BETWEEN
- ~ Unsatisfiable BETWEEN with AND Residual
- ~ Unsatisfiable BETWEEN with OR Residual
- ~ Precedence of Operators
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 4 - Data Types and Functionality

- ~ Data Types
- ~ Character Data Types
- ~ Character Functionality
- ~ BETWEEN Functionality with CHARACTER
- ~ Integer Data Types
- ~ Decimal Data Types
- ~ Float Data Type
- ~ Byte Data Types
- ~ Date Data Type
- ~ ARRAY Data Type
- ~ NUMBER Data Type
- ~ More Data Types
- ~ Arithmetic Operators
- ~ Arithmetic and Derived Values
- ~ Arithmetic Functions
- ~ DATE Arithmetic
- ~ Data Type Conversions Using CAST
- ~ Data Type Conversions and Rounding
- ~ Concatenating Data Types
- ~ Concatenated Example Results
- ~ FORMAT
- ~ Methods for FORMAT in ODBC and JDBC Tools
- ~ ODBC/JDBC Formatting Examples
- ~ FORMAT Exercise
- ~ Year, Month, and Day Formatting Options
- ~ Sequencing by Date Portions
- ~ User Defined Types (UDT)
- ~ UDT Transforms
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 5 - Basic SQL Functions

- ~ What are Functions?
- ~ UPPER & LOWER
- ~ UPPER & LOWER for Case Sensitivity
- ~ CHARACTER_LENGTH
- ~ TRIM
 - ~ Trimming Other Than Space
 - ~ Trimming Numbers
- ~ POSITION
 - ~ Other Examples Using POSITION
- ~ SUBSTRING
 - ~ SUBSTRING and Numbers
- ~ LIKE
 - ~ LIKE Examples Using “%”
 - ~ LIKE Examples Using “_”
 - ~ LIKE and ESCAPE
 - ~ LIKE (ANY – SOME – ALL)

- ~ NOT LIKE ANY
- ~ NOT LIKE ALL
- ~ CASESPECIFIC
- ~ EXTRACT
- ~ ADD_MONTHS
- ~ TYPE
- ~ DEFAULT
- ~ The Calendars
 - ~ Calendar Differences
 - ~ Additional Calendar Functions
 - ~ Calendar Functions Example
- ~ PIVOT
 - ~ PIVOT Column Names
 - ~ UNPIVOT
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 6 – Subqueries

- ~ The Subquery
- ~ Basic Subquery Concepts
- ~ Relating Concepts and Subqueries
- ~ Adding Conditions
- ~ Nesting Subqueries
- ~ Multiple Column Matching
- ~ NOT EXISTS
- ~ EXISTS
- ~ NULL and NOT IN Subquery
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 7 - Inner Join

- ~ Inner Join Concepts
- ~ Inner Join vs. Subquery
- ~ Comparing Subqueries and Inner Joins
- ~ Table Name Qualifications and Aliasing
- ~ Varied Forms of INNER Join
- ~ Many-Table INNER Joins
- ~ Varied Forms of Many-Table Inner Joins
- ~ Using Parentheses to Understand Order
- ~ Using Parentheses with Other Forms
- ~ Self Joins
- ~ Guaranteeing Uniqueness
- ~ IN vs. Inner Join
- ~ NOT IN vs. Inner Join
- ~ Cross Join
- ~ Cartesian Products
- ~ Mistakes on Table Aliasing
- ~ Mistakes on Column Aliasing
- ~ Summary

- ~ Review Questions
- ~ Lab Exercises

Module 8 - Set Operators

- ~ What are Set Operators?
- ~ The Three Set Operators
 - ~ UNION
 - ~ UNION ALL
 - ~ INTERSECT
 - ~ EXCEPT (MINUS)
 - ~ EXCEPT and ALL
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 9 - Outer Join

- ~ What is an Outer Join?
- ~ Outer Join Concepts
- ~ Simulating an Outer Join
- ~ Outer Join Syntax
- ~ Types of Outer Joins
- ~ Employee as Left Outer
- ~ Nulls and the Inner Table
- ~ Department as Outer
- ~ Outer Joins and WHERE
- ~ Syntax Variations
- ~ Parts of Speech
- ~ Three Table Inner Join – Review
- ~ Three Table Outer Join
- ~ Multiple Table Variations
- ~ Three Table Outer Join Results
- ~ A Typical Outer Join?
- ~ Considering Nulls
- ~ Full Outer Join
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 10 - Aggregation

- ~ The Aggregate Functions
- ~ Aggregate Functionality
- ~ COUNT(*)
- ~ Getting Department Sums
- ~ Aggregating Groups
- ~ Adding Grouping Columns
- ~ The HAVING Clause
- ~ WHERE Clause Explain
- ~ HAVING on Non-Aggregates
- ~ Aggregation and Joins
- ~ COUNT DISTINCT
- ~ Some Other Variations

- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 11 - CASE

- ~ CASE Overview
- ~ Valued Form (Projection List)
- ~ Valued Form (Predicate)
- ~ Valued Form and Null
- ~ Searched Form
- ~ CASE and Aggregation
- ~ NULLIF Function
- ~ NULLIF for Division
- ~ COALESCE Function
- ~ COALESCE and Multiple Arguments
- ~ NULLIF and COALESCE Aggregation Quiz
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 12 - Permanent and Derived Tables

- ~ Data Definition Language
- ~ Table Level Options
- ~ Set vs. Multiset
- ~ CREATE TABLE
- ~ Column Level Options
- ~ Index Level Options
- ~ Creating and Dropping Secondary Indexes
- ~ Help Index
- ~ Deleting vs. Dropping Tables
- ~ Using Real Tables – “Temporarily”
- ~ “Derived” Tables
- ~ Multiple “WITH” Derived Tables
- ~ Including the NULL Department
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 13 - UPDATE-INSERT-DELETE

- ~ Updating Data via SQL
- ~ Inserting a Single Row
- ~ Inserting an Apostrophe
- ~ Inserting Default Values
- ~ Default Values and NOT NULL
- ~ Insert-Select
- ~ CASESPECIFIC and SET Tables
- ~ CASESPECIFIC and MULTISSET Tables
- ~ UPDATE
- ~ Updating with Joins
- ~ UPDATE and FROM
- ~ DELETE

- ~ Deleting with Joins
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 14 - SAMPLE and RANDOM

- ~ SAMPLE Introduction
- ~ SAMPLE Syntax
- ~ Multiple Samples (Number of Rows)
- ~ SAMPLE WITH REPLACEMENT
- ~ Significance of the Order of Operations
- ~ Using Derived Tables
- ~ SAMPLE and Subqueries
- ~ SAMPLE and Joins
- ~ Stratified Sampling – What is it?
- ~ RANDOMIZED ALLOCATION
 - ~ The RANDOM Function
 - ~ Duplicate Random Values
 - ~ RANDOM for Test Data
 - ~ RANDOM and Limitations
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 15 - TOP N

- ~ TOP N
 - ~ TOP N Defined
 - ~ TOP N Limitations
 - ~ TOP N Example
 - ~ TOP N WITH TIES
- ~ Without Ties – Same Result
- ~ WITH TIES – Same Result
- ~ Getting Bottom Results
- ~ Bottom Results – WITH TIES
- ~ WITH TIES – Adding a Bottom Tie
- ~ Unordered Rows
- ~ Unordered Rows and WITH TIES
- ~ TOP N and Randomness
- ~ The PERCENT Option
 - ~ PERCENT Option – WITH TIES
 - ~ PERCENT Option – No ORDER BY

- ~ PERCENT Option and Millions of Rows
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 16 - Views

- ~ What is a View?
- ~ Creating and Using Views
- ~ Replacing a View
- ~ Using Views to Rename Columns
- ~ Join View
- ~ Join Necessity?
- ~ Joining Views
- ~ Create View Strategies
- ~ Using Views for Formatting
- ~ Views with Aggregates
- ~ Aggregates and HAVING
- ~ Views and TOP N
- ~ Updating with Views
- ~ Views WITH CHECK OPTION
- ~ Restrictions on Views
- ~ Advantages and Suggestions
- ~ View Column Info
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises

Module 17 - Macros

- ~ What is a Macro?
- ~ CREATE, EXECUTE, DROP Macro
- ~ Replacing a Macro
- ~ Multiple Statement Macros
- ~ Macros vs. Multi-Statement Requests
- ~ Simple Parameterized Macros
- ~ A More Complex Macro
- ~ EXECUTE
- ~ DDL and Macros
- ~ Parameterizing an In-List
- ~ Summary
- ~ Review Questions
- ~ Lab Exercises