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Learning Style: Virtual Classroom

Technology:

Difficulty: Intermediate

Course Duration: 2 Days

Next Course Date: June 29, 2026

Advanced SQL Programming (TTSQL005)

About This Course:

This Advanced SQL Programming course is designed to strengthen your expertise in managing and analyzing relational databases. You will begin with a focus on relational database concepts, including the Entity-Relationship Model and key

modeling conventions. Understanding these fundamentals will prepare you for applying more complex techniques in real-world scenarios, using practical examples from the tables provided throughout the course.

Course Objectives:

- Understand the relational database model and apply entity-relationship modeling conventions
- Utilize group functions to aggregate data, handle null values, and nest functions
- Implement advanced queries with joins, including natural, outer, and cross joins
- Execute subqueries, including single-row, multiple-row, and multiple-column subqueries
- Use set operators like UNION, INTERSECT, and MINUS to combine queries
- Perform DML operations like inserting, updating, and deleting rows, with real-world applications
- Understand DDL statements for creating and managing database schema objects
- Implement and enforce constraints such as NOT NULL, PRIMARY KEY, and FOREIGN KEY

Audience:

- This intermediate-to-advanced course is ideal for SQL developers, database professionals, data analysts, and IT professionals who work with databases and seek to advance their skills in complex data manipulation, analysis, and management.

Prerequisites:

- Basic SQL Programming experience is required. This course is not intended for beginners.

Course Outline:

1. Introduction

    - Relational Database Concept
    - Entity Relationship Model
    - Relationship Modeling Conventions
    - Tables used in this course

2. Group Functions

    - Types of Group Functions
    - Using the MIN and MAX Functions
    - Group Functions and Null Values
    - Using the GROUP BY Clause
    - Illegal Queries Using Group
    - Using the HAVING Clause
    - Nesting Group Functions

3. Displaying Data from Multiple Tables Using Joins

    - Types of Joins
    - Retrieving Records with Natural Joins
    - Retrieving Records with the USING Clause
    - Qualifying Ambiguous Column Names
    - Creating Joins with the ON Clause
    - Retrieving Records with Nonequijoins
    - LEFT/RIGHT OUTER JOIN
    - Creating Cross Joins

4. Using Subqueries to Solve Queries

    - Subquery Syntax

- Types of Subqueries
- Executing Single-Row Subqueries
- HAVING Clause with Subqueries
- No Rows Returned by the Inner Query
- Using the ALL Operator in Multiple-Row Subqueries
- Multiple-Column Subquery
- Null Values in a Subquery

5. Using Set Operators

- Set Operator Rules
- UNION Operator
- Using the INTERSECT Operator
- Using the MINUS Operator
- Matching SELECT Statements
- Using the ORDER BY Clause in Set

6. Managing Tables Using DML Statements

- HR Application Scenario
- Data Manipulation Language
- Inserting New Rows
- Inserting Specific Date and Time Values
- UPDATE Statement Syntax
- Updating Two Columns with a Subquery
- Deleting Rows from a Table
- TRUNCATE Statement
- Committing Data

- Implementing Read Consistency

7. Introduction to Data Definition Language

    - Database objects
    - Naming rules
    - Data types
    - CREATE TABLE statement
    - Overview of constraints: NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK constraints
    - Creating a table using a subquery
    - ALTER TABLE statement
    - DROP TABLE statement