

## Oracle Database 11g: Introduction to SQL

**Duration: 40 Hours**

### What you will learn

Learn the SQL essentials using SQL Developer on Linux. This course offers students an introduction to Oracle Database 11g database technology. In this class students learn the concepts of relational databases and the powerful SQL programming language. This course provides the essential SQL skills that allow developers to write queries against single and multiple tables, manipulate data in tables, create database objects, and query meta data.

In addition, the advanced features of SQL in order to query and manipulate data within the database are taught.

Advanced querying and reporting techniques are explained. Schema objects that are useful for data warehousing and other application areas are discussed in detail. Students learn about manipulating large data sets and storing and retrieving dates according to different time zones.

In this course, students use Oracle SQL Developer on Linux as the main development tool.

This course is a combination of Oracle Database 11g: SQL Fundamentals I and Oracle Database 11g: SQL Fundamentals II courses.

Learn to:

Use SQL Statements to retrieve data from tables

Create and manage tables, and other schema objects

Employ SQL functions to generate and retrieve customized data

Control privileges at the object and system level

Run data manipulation statements (DML) to update data in the Oracle Database 11g

Search data using Advanced Sub queries, and retrieve hierarchical data

### Audience

Application Developers

Business Intelligence Developer

Database Administrators

End Users

Forms Developer

PL/SQL Developer

Portal Developer

### Prerequisites

#### *Suggested Prerequisites*

Familiarity with Data Processing Concepts and Techniques

Ability to use a graphical user interface (GUI)

### Course Objectives

Retrieve row and column data from tables with the SELECT statement.

Employ SQL functions to generate and retrieve customized data.

Run data manipulation statements (DML) to update data in the Oracle Database 11g.

Control user access and manage schema objects

## Course Topics

### Introduction

- List the Oracle Database 11g Main Features
- An Overview of: components, internet platform, apps server and developer suite
- Describe Relational and Object Relational Database Designs
- Review the System Development Life Cycle
- Define the term Data Models
- Describe different means of Sorting Data
- Show how Multiple Tables can be related
- Describe how SQL Communicates to the Database

### Writing SQL SELECT Statements

- Define projection, selection, and join terminology
- Review the basic SQL SELECT statement syntax
- Select all columns using a wildcard notation from a table
- State simple rules and guidelines for writing SQL statements
- Write a query containing the arithmetic operators
- Create a character expression with the concatenation operator
- Using the Oracle SQL Developer Environment

### Restricting and Sorting Data

- Limit rows using a selection
- Using the WHERE clause to retrieve specific rows
- Using the comparison conditions in the WHERE clause
- Use the LIKE condition to compare literal values
- List the logical conditions AND, OR, NOT
- Describe the rules of precedence for the conditions
- Sort rows with the ORDER BY clause
- Use ampersand substitution to restrict and sort output at run time

### Using Single-Row Functions to Customize Output

- Show the differences between single row and multiple row SQL functions
- Categorize the character functions into case manipulation and character manipulation types
- Use the character manipulation functions in the SELECT and WHERE clauses
- Explain and use the DATE and numeric functions
- Use the SYSDATE function to retrieve the current date in the default format
- Introduce the DUAL table as a means to view function results
- List the rules for applying the arithmetic operators on dates Use the arithmetic operators with dates in the SELECT clause

### Reporting Aggregated Data Using the Group Functions

- Describe and categorize the group functions
- Use the group functions
- Utilize the DISTINCT keyword with the group functions
- Describe how nulls are handled with the group functions
- Create groups of data with the GROUP BY clause
- Group data by more than one column
- Avoid illegal queries with the group functions

Exclude groups of data with the HAVING clause

### **Displaying Data from Multiple Tables**

Identify Types of Joins

Retrieve Records with Natural Joins

Use Table Aliases to write shorter code and explicitly identify columns from multiple tables

Create a Join with the USING clause to identify specific columns between tables

Use the ON clause to specify arbitrary conditions or specify columns to Join

Create a Three-way join with the ON clause to retrieve information from 3 tables

List the Types of Outer Joins LEFT, RIGHT, and FULL

Generating a Cartesian Product

### **Using Sub queries to Solve Queries**

List the syntax for sub queries in a SELECT statements WHERE clause

List the guidelines for using sub queries

Describe the types of sub queries

Execute single row sub queries and use the group functions in a sub query Identify illegal statements with sub queries

Execute multiple row sub queries

Analyze how the ANY and ALL operators work in multiple row sub queries

### **Using the SET Operators**

Use the UNION operator to return all rows from multiple tables and eliminate any duplicate rows

Use the UNION ALL operator to return all rows from multiple tables

Describe the INTERSECT operator

Use the INTERSECT operator

Explain the MINUS operator

Use the MINUS operator

List the SET operator guidelines

Order results when using the UNION operator

### **Manipulating Data**

Write INSERT statements to add rows to a table

Copy rows from another table

Create UPDATE statements to change data in a table

Generate DELETE statements to remove rows from a table

Use a script to manipulate data

Save and discard changes to a table through transaction processing

Show how read consistency works

Describe the TRUNCATE statement

### **Using DDL Statements to Create and Manage Tables**

List the main database objects and describe the naming rules for database objects

Introduce the schema concept

Display the basic syntax for creating a table and show the DEFAULT option

Explain the different types of constraints

Show resulting exceptions when constraints are violated with DML statements

Create a table with a sub query

Describe the ALTER TABLE functionality

Remove a table with the DROP statement and Rename a table

### **Creating Other Schema Objects**

- Categorize simple and complex views and compare them
- Create a view
- Retrieve data from a view
- Explain a read-only view
- List the rules for performing DML on complex views
- Create a sequence
- List the basic rules for when to create and not create an index
- Create a synonym

### **Managing Objects with Data Dictionary Views**

- Describe the structure of each of the dictionary views
- List the purpose of each of the dictionary views
- Write queries that retrieve information from the dictionary views on the schema objects
- Use the COMMENT command to document objects

### **Controlling User Access**

- Controlling User Access
- System versus Objects Privileges
- Using Roles to define user groups
- Changing Your Password
- Granting Object Privileges
- Confirming Privileges Granted
- Revoking Object Privileges
- Using Database Links

### **Manage Schema Objects**

- Using the ALTER TABLE statement
- Adding a Column
- Modifying a Column
- Dropping a Column, Set Column UNUSED
- Adding, Enabling and Disabling Constraints
- Creating Function-Based Indexes
- Performing FLASHBACK operations
- External Tables

### **Manipulating Large Data Sets**

- Using the MERGE Statement
- Performing DML with Sub queries
- Performing DML with a RETURNING Clause
- Overview of Multi-table INSERT Statements
- Tracking Changes in DML

### **Generating Reports by Grouping Related Data**

- Overview of GROUP BY Clause
- Overview of Having Clause
- Aggregating data with ROLLUP and CUBE Operators
- Determine subtotal groups using GROUPING Functions
- Compute multiple groupings with GROUPING SETS
- Define levels of aggregation with Composite Columns
- Create combinations with Concatenated Groupings

### **Managing Data in Different Time Zones**

Time Zones

Using date and time functions

Identifying TIMESTAMP Data Types

Differentiating between DATE and TIMESTAMP

Performing Conversion Operations

### **Searching Data Using Advanced Sub queries**

Sub query Overview

Using a Sub query

Comparing several columns using Multiple-Column Sub queries

Defining a Data source Using a Sub query in the FROM Clause

Returning one Value using Scalar Sub query Expressions

Performing ROW by-row processing with Correlated Sub

queries Reusing query blocks using the WITH Clause

### **Hierarchical Retrieval**

Sample Data from the EMPLOYEES Table

The Tree Structure of Employee data

Hierarchical Queries

Ranking Rows with LEVEL

Formatting Hierarchical Reports Using LEVEL and LPAD Pruning

Branches with the WHERE and CONNECT BY clauses

### **Regular Expression Support**

Regular Expression Support Overview

Describing simple and complex patterns for searching and manipulating data