

## **ITSE 1078 [formerly ITSE 1045] Course Syllabus**

**1. Name of Course:** Oracle SQL and PL/SQL

**2. Number of Clock Hours:** 48 hours

### **3. Course Description:**

This course offers students an extensive introduction to data server technology. The class covers the concepts of relational databases and the powerful SQL and PL/SQL programming languages. Students are taught to create and maintain database objects and to store, retrieve, and manipulate data. In addition, students learn to create PL/SQL blocks of application code that can be shared by multiple forms, reports, and data management applications. Demonstrations and hands-on practice reinforce the fundamental concepts. Prerequisites: General computer knowledge including database concepts.

### **4. Course Objectives**

At the end of this course, students will be able to:

- Control data/user access
- Control transactions
- Create and maintain database objects
- Describe the features and syntax of PL/SQL
- Retrieve, insert, update, and delete data
- Handle runtime errors
- Describe relational database concepts
- Conditionally control code flow (loops, control structures, and explicit cursors)
- Use basic SQL\*Plus commands

### **5. Rationale:**

Upon completion of this course, students will have a better understanding of Oracle 9i, a powerful and popular database system.

### **6. Required Materials:**

Oracle Official Curriculum included.

### **7. Evaluation**

Those who participate in class discussions, complete course lab work, and miss no more than three class meetings will be awarded 3.6 continuing education units.

### **8. Course Outline**

#### **Introduction**

- Describing the Lifecycle Development Phases
- Defining a Database
- Discussing the Theoretical, Conceptual, and Physical Aspects of a Relational Database
- Describing How a Relational Database Management System (RDBMS) Is Used to Manage a Relational Database
- Describing the Oracle Implementation of Both the RDBMS and the Object Relational Database Management System (ORDBMS)
- Describing How SQL Is Used in the Oracle Product Set

- Describing PL/SQL
- Describing the Use of PL/SQL for the Developer and the DBA

#### **Writing a Basic SQL Statement**

- Describing the SQL Select Capabilities
- Executing a Basic Select Statement with the Mandatory Clauses
- Differentiating Between SQL and SQL\*Plus Commands

#### **Restricting and Sorting Data**

- Limiting the Rows Retrieved by a Query
- Sorting the Rows Retrieved by a Query

#### **Single Row Functions**

- Describing Various Types of Functions Available in SQL
- Using a Variety of Character, Number, and Date Functions in SELECT Statements
- Explaining What the Conversion Functions Are and How They Are Used

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

- Writing SELECT Statements to Access Data from More Than One Table
- Describing the Cartesian Product
- Describing and Using the Four Different Types of Join
- Writing Joins Using the Tips Provided

#### **Aggregating Data using Group Functions**

- Identifying the Different Group Functions Available
- Explaining the Use of Group Functions
- Grouping Data Using the GROUP BY Clause
- Including or Excluding Grouped Rows Using the HAVING Clause

#### **Writing Subqueries**

- Describing the Types of Problems That Subqueries Can Solve
- Describing What Subqueries Are
- Listing the Types of Subqueries
- Writing Single-Row and Multi-Row Subqueries

#### **Multi-Column Subqueries**

- Writing a Multi-Column Subquery
- Describing and Explaining the Behavior of Subqueries When NULL Values Are Retrieved
- Writing a Subquery in a FROM Clause

#### **Producing Readable Output with SQL\*Plus**

- Producing Queries that Require an Input Variable
- Customising the SQL\*Plus Environment
- Producing More Readable Output
- Creating and Executing Script Files
- Saving Customisations

#### **Manipulating Data**

- Describing Each Data Manipulation Language (DML) Command
- Inserting Rows into a Table
- Updating Rows in a Table
- Deleting Rows from a Table
- Controlling Transactions
- Describing Transaction Processing

#### **Creating and Managing Tables**

- Describing the Main Database Objects
- Creating Tables
- Describing the Oracle7 Data types and the Oracle8 Data types

- Altering Table Definitions
- Dropping, Renaming, and Truncating Tables

#### **Including Constraints**

- Describing Constraints
- Creating and Maintaining Constraints

#### **Creating Views**

- Describing Views and Their Uses
- Creating a View
- Retrieving Data Via a View
- Inserting, Updating, and Deleting Data Through Views
- Dropping Views
- Altering the Definition of a View
- Inline Views
- Top ?N? Analysis

#### **Other Database Objects**

- Creating, Maintaining, and Using Sequences
- Creating and Maintaining Indexes
- Creating Private and Public Synonyms

#### **Controlling User Access**

- Understanding the Concepts of Users, Roles, and Privileges
- Granting and Revoking Object Privileges
- Creating Roles and Granting Privileges to Roles
- Creating Synonyms for Ease of Table Access

#### **SQL Workshop**

- Applying Techniques Learned in This Course
- Preparing for Future Oracle Courses

#### **Declaring Variables**

- Recognizing the Basic PL/SQL Block and Its Sections
- Describing the Significance of Variables in PL/SQL
- Distinguishing Between PL/SQL and Non-PL/SQL Variables
- Declaring Variables and Constants
- Executing a PL/SQL Block

#### **Writing Executable Statements**

- Recognizing the Significance of the Executable Section
- Writing Statements Within the Executable Section
- Describing the Rules of Nested Blocks
- Executing and Testing a PL/SQL Block
- Using Coding Conventions

#### **Interacting with the Oracle Server**

- Writing a Successful SELECT Statement in PL/SQL
- Declaring the Data type and Size of a PL/SQL Variable Dynamically
- Writing DML Statements in PL/SQL
- Controlling Transactions in PL/SQL
- Determining the Outcome of SQL DML Statements

#### **Writing Control Structures**

- Identifying the Uses and Types of Control Structures
- Constructing an IF Statement
- Constructing and Identifying Different Loop Statements
- Controlling Block Flow Using Nested Loops and Labels
- Using Logic Tables.