

ITSE 2070 Course Syllabus

1. Name of Course: Program with Advanced PL/SQL

2. Number of Clock Hours: 60 hours

3. Course Description:

This course covers the use the advanced features of PL/SQL in order to design and tune PL/SQL to interface with the database and other applications in the most efficient manner. Using advanced features of program design, packages, cursors, extended interface methods, large objects, and collections, students learn to write powerful PL/SQL programs. Students also learn programming efficiency, use of external C and Java routines, fine-grained access and safeguarding code against SQL Injection attacks.. Prepares students for the Oracle Certified Professional exam #1Z0-146.

4. Prerequisites

ITSE 1073 Oracle 11G: Program with PL/SQL or equivalent

5. Course Objectives

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

- Write code to interface with external applications and the operating system
- Create PL/SQL applications that use collections
- Implement a virtual private database with fine-grained access control
- Write code to interface with large objects and use SecureFile LOBs
- Safeguard code against SQL injection attacks
- Design PL/SQL packages and program units that execute efficiently

6. Rationale:

Upon completion of this course, students will have a better understanding of Oracle 11g, a powerful and popular database system.

7. Required Materials:

Oracle Official Curriculum included.

8. Evaluation

Those who participate in class discussions, complete course lab work, and miss no more than three class meetings will be awarded 6.0 continuing education units.

9. Course Outline

Overview of the Development Environments

- SQL Developer
- SQL*Plus

Design Considerations

- Describe the predefined data types
- Create subtypes based on existing types for an application
- List the different guidelines for cursor design
- Use cursor variables
- Pass cursor variables as program parameters
- Compare cursor variables to static cursors

Using Collections

- Overview of collections
- Use Associative arrays
- Use Nested tables
- Use Varrays
- Write PL/SQL programs that use collections
- Use Collections effectively

Using Advanced Interface Methods

- Calling C from PL/SQL
- Calling Java from PL/SQL

Implementing VPD with Fine-Grained Access Control

- Understand how fine-grained access control works overall
- Describe the features of fine-grained access control
- Describe an application context
- Create an application context
- Set an application context
- List the DBMS_RLS procedures
- Implement a policy
- Query the dictionary views holding information on fine-grained access

Manipulating Large Objects

- Describe a LOB object
- Manage internal LOBs
- Describe BFILEs
- Create and use the DIRECTORY object to access and use BFILEs
- Describe the DBMS_LOB package
- Remove LOBs
- Create a temporary LOB programmatically with the DBMS_LOB package

Administering SecureFile LOBs

- Introduction to SecureFile LOBs
- Enable the environment for SecureFile LOBs
- Use SecureFile LOBs to store documents
- Convert BasicFile LOBs to SecureFile LOB format
- Examine the performance of SecureFile LOBs
- Enable deduplication and compression
- Enable encryption

Tuning and Performance

- Understand and influence the compiler
- Tune PL/SQL code
- Enable intra unit inlining
- Identify and tune memory issues

Improving Performance with SQL and PL/SQL Caching

- Describe result caching
- Use SQL query result cache
- PL/SQL function cache

Analyzing PL/SQL Code

- Use the supplied packages and dictionary views to find coding information
- Determine identifier types and usages with PL/Scope
- Use the DBMS_METADATA package to obtain metadata from the data dictionary as XML or creation DDL that can be used to re-create the objects

Profiling and Tracing PL/SQL Code

- Trace PL/SQL program execution
- Profile PL/SQL applications

Safeguarding Your Code Against SQL Injection Attacks

- Describe SQL injections
- Reduce attack surfaces
- Use DBMS_ASSERT
- Design immune code
- Test code for SQL injection flaws