

# PLSQL

Course Plan  
2015 - 16

**Foundation Phase**  
**Technical Learning Services**

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## Course Objectives

|  |       |                              |                      |
|--|-------|------------------------------|----------------------|
| <b>Course</b>  | PLSQL | <b>Code</b>                  |                      |
| <b>Phase</b>   |       | <b>Duration (Days @ Hrs)</b> | 8 @ 8 hrs. = 64 hrs. |
| <b>Prerequisites</b>   |       |                              |                      |
| Participants need to have prior knowledge/skill of <ul style="list-style-type: none"> <li>• Good practical exposure on SQL</li> <li>• Should be aware of some basic computer concepts.</li> </ul>  |       |                              |                      |
| <b>Course Objectives</b>   |       |                              |                      |
| On completion of the course the learner will be able to : <ul style="list-style-type: none"> <li>• Able to write affective PLSQL programs using best coding practices.</li> <li>• Able to design packages, functions and procedures.</li> <li>• Apply bulk collect, cursors and exceptions concepts while writing PLSQL Blocks.</li> <li>• Able to create collection types using Built in data type or objects.</li> </ul> |       |                              |                      |
| <b>Mode of Facilitation and S/W Required:</b>  |       |                              |                      |
| <ul style="list-style-type: none"> <li>• Lecture + Demonstration + Hands-on on SQL Plus</li> </ul>   |       |                              |                      |
| <ul style="list-style-type: none"> <li>• Oracle 10g Client</li> </ul>  |       |                              |                      |

## Course Contents

| S.No | Main Course Title  | Sub Topics   | Concept Types | Day   |
|------|--|--|---------------|-------|
| 1    | Introduction to PLSQL Architecture and Oracle PLSQL Basics | <b>Oracle PL/SQL Basics</b> <ul style="list-style-type: none"> <li>PLSQL Introduction</li> <li>Advantages of PLSQL</li> <li>PLSQL Architecture</li> <li>PLSQL Environment</li> </ul>   | C1            | Day 1 |
|      |  | <ul style="list-style-type: none"> <li><b>PL/SQL Anonymous Block</b></li> <li>PLSQL Named Blocks</li> <li>PLSQL Block Structure</li> </ul>   | C2            |       |
|      |  | <ul style="list-style-type: none"> <li>PLSQL Data Types</li> <li>PLSQL Variable creation Guidelines</li> <li>Inherited data type, record type, bind variable, subtypes, operators, comments in PLSQL</li> <li>SQL function usage in PLSQL</li> </ul>   | C1,C2         |       |
|      |  | <b>Executing PLSQL Block</b>   |               |       |
|      |  | <ul style="list-style-type: none"> <li>Executing in SQL Plus and SQL Developer Environment</li> </ul>  | C2, C3        |       |
|      |  | <ul style="list-style-type: none"> <li>Creation and Execution of Anonymous block, Named Block, nested Block</li> <li>Using SQL in PLSQL</li> <li>How SQL is getting Executed</li> <li>Using select with %TYPE, %ROWTYPE, RECORD Type</li> <li>Using DML in PLSQL</li> <li>Using SEQUENCE , BIND variables in PLSQL</li> <li><b>Objective Quiz</b></li> </ul> | C2, C3        |       |
| 2    | Cursors  | <ul style="list-style-type: none"> <li>Using Control structure in PLSQL</li> <li>Good Coding practices</li> </ul>  | C2, C3        | Day 2 |
|      |  | <ul style="list-style-type: none"> <li>Understand the concept of Cursors and its types &amp; attributes</li> <li>Processing of Explicit cursor</li> </ul>  | C1,C2         |       |
|      |  | <ul style="list-style-type: none"> <li>Use Cursors with LOOPS</li> <li>Implement Parameterized Cursors</li> <li>Use FOR UPDATE and WHERE CURRENT OF clauses with cursor</li> </ul>   | C2, C3        |       |
|      |  | <ul style="list-style-type: none"> <li>Understand the concept of REF Cursors and its types</li> <li>One Demo on Ref cursor</li> <li>Good Coding practices</li> <li><b>Objective Quiz</b></li> </ul>  | C1, C2        |       |

|   |                    |  |        |       |
|---|--------------------|--|--------|-------|
| 3 | Exception Handling | <ul style="list-style-type: none"> <li>Understanding Exception and Exception handling in PLSQL</li> <li>Handling user defined, Oracle predefined (named) and non-predefined (unnamed) exceptions.</li> </ul>   | C1, C2 | Day 3 |
|   |                    | <ul style="list-style-type: none"> <li>Using SQLERRM and SQL_CODE</li> <li>Handling unnamed exceptions using pragma EXCEPTION_INIT</li> <li>RAISE_APPLICATION_ERROR procedure</li> </ul>   | C2, C3 |       |
|   |                    | <ul style="list-style-type: none"> <li>Propagation of exceptions raised in different parts of a PL/SQL block (nested blocks) with examples</li> <li>Best practices for Error Management</li> </ul>   | C1, C2 |       |
| 4 | DML Triggers       | <ul style="list-style-type: none"> <li>Understand database triggers</li> <li>Differentiate between stored procedures and triggers</li> <li>Identify the trigger types</li> <li>Create statement and row level DML triggers</li> <li>Use OLD and NEW Qualifiers</li> <li>Sequence of Execution of Triggers</li> <li>Objective Quiz</li> </ul>                         | C1,C2  |       |
| 5 | Subprograms        | <ul style="list-style-type: none"> <li>Understand subprograms and their need</li> <li>Comprehend the difference between stored and unstored subprograms</li> </ul>   | C1     | Day 4 |
|   |                    | <ul style="list-style-type: none"> <li>Create stored procedures</li> <li>Various Parameter modes</li> <li>Apply different parameter modes in subprograms</li> </ul>  | C2, C3 |       |
|   |                    | Functions :  |        |       |
|   |                    | <ul style="list-style-type: none"> <li>Creating a function in PLSQL</li> <li>Calling Stored Functions from Different Locations</li> </ul>  | C2     |       |
|   |                    | <ul style="list-style-type: none"> <li>Difference between procedure and functions</li> <li>Dropping sub programs</li> <li>Understand and use procedures and functions that are local to a stored subprogram</li> <li>Method of passing parameters</li> <li>Understand the different data dictionary views</li> <li>Best Practices</li> <li>Objective Quiz</li> </ul> | C2, C3 |       |

|   |                                    |   |        |       |
|---|------------------------------------|---|--------|-------|
|   |                                    |   |        |       |
| 6 | Packages                           | <ul style="list-style-type: none"> <li>Understand the need for Packages</li> <li>Visibility of Package components</li> <li>Access Rules for Package Members</li> </ul>  | C1     | Day 5 |
|   |                                    | <ul style="list-style-type: none"> <li>Write Package specification</li> <li>Write Package body</li> <li>Concept of Global variable in a package</li> <li>One Time Only procedure</li> <li>Write Overloaded subprograms</li> <li>Dropping and Recompiling a Package</li> <li>Data Dictionary views</li> <li></li> </ul>  | C2, C3 |       |
| 7 | Collections : Objects              | <ul style="list-style-type: none"> <li>Understanding Object type</li> <li>Creating Object types : Specification and Body</li> <li>Using Object Type in Anonymous Block</li> <li>Create Object Type</li> <li>Using Object Type as Table Attribute</li> <li>Relational Tables versus Object Relational Tables</li> </ul>  | C1, C2 |       |
| 8 | Collections : PLSQL Tables         | <ul style="list-style-type: none"> <li>Collection types</li> <li><b>Listing Characteristics for Collections</b></li> <li><b>Using Collections Effectively</b></li> <li><b>PLSQL Tables</b></li> <li>PLSQL Tables in Anonymous Block</li> <li><b>Objective Quiz</b></li> </ul>   | C1, C2 |       |
| 9 | Collection : Nested Tables, Varray | <ul style="list-style-type: none"> <li>Nested Tables</li> <li>Nested Tables in Anonymous Block</li> <li>Nested Table used as Database Object</li> <li>Nested table Demo of Built in Data type</li> <li>DML operations on Nested Table of Built in Data Type</li> <li>Nested table Demo using Object type</li> <li>DML operations on Nested Table using Object type</li> <li>Varray Type</li> <li>Varray in Anonymous Block</li> <li>Varray in Database</li> <li>DML operations in Varray</li> </ul> | C2, C3 | Day 6 |

|    |            |  |        |       |
|----|------------|--|--------|-------|
|    |            | <ul style="list-style-type: none"> <li>Collection Methods</li> <li>Collection Exceptions</li> <li>Concept of BULK BIND</li> <li>Bulk Collect</li> <li>FORALL clause</li> <li>Performance comparison with cursor for loop</li> <li><b>Objective Quiz</b></li> </ul> | C1, C2 |       |
| 10 | Case Study | Case study solving   |        | Day 7 |
| 11 | Exam       | scenario based practical Assessment  |        | Day 8 |

## \*Concept Type

*C1 - Factual knowledge:* The basic elements that associates must know and understand.

*C2 - Conceptual knowledge:* The interrelationships among the basic elements within a large structure that enable them to function together.

*C3 - Procedural Knowledge:* How to do something; methods of inquiry and criteria for using skills, algorithms, techniques and methods.

| Collaterals Details   |                           |
|---|---------------------------|
| Collaterals Deployed  | Collateral Available Path |
| Course presentations  |                           |
| Lab sheets (Exercises)  |                           |
| Case studies  |                           |
| Take home Assignments   |                           |
| Resources Required  |                           |
| <ul style="list-style-type: none"> <li>Windows XP and above</li> <li>Oracle 10g Client</li> <li>SQL Plus</li> </ul> |                           |
| References  |                           |
| <ul style="list-style-type: none"> <li>Oracle Database 10g : The Complete Reference – by Kevin Loney</li> </ul>     |                           |

- Oracle Database 10g PL/SQL – by Allen C.
- <http://www.tutorialspoint.com/plsql/>
- <https://oracle-base.com/articles/misc/introduction-to-plsql>

## Version History

| #   | Date       | Created/Changed by | Changes made | Reviewed by                |
|-----|------------|--------------------|--------------|----------------------------|
| 1.0 | 1/Jun/2016 | Sarita Rani        |              | Vijay Anand<br>Arjunwadkar |

## Version Info

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