



# MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

## COURSE CONTENT

DATABASE PROGRAMMING WITH PL/SQL								
I Semester: CSE								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
2415813	Foundation	3	0	0	3	40	60	100
		Practical Classes: Nil			Total Classes: 45			
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
<b>Prerequisites:</b> Basic understanding of programming concepts along with fundamental database concepts & SQL.								

### Course Overview:

This course introduces database programming concepts using Procedural Language/Structured Query Language (PL/SQL) in the context of relational database management systems. It focuses on integrating SQL with procedural constructs to design, develop, and manage efficient database-driven applications.

### Course Objectives:

1. To understand the fundamentals of SQL and PL/SQL programming for database application development.
2. To learn PL/SQL block structures, data types, control structures, cursors, and exception handling techniques.
3. To develop procedures, functions, and packages for efficient database programming and transaction management.
4. To study the implementation and usage of triggers, collections, and object types in PL/SQL applications.
5. To enhance database programming skills for designing secure, reliable, and efficient database-driven applications.

### Course Outcomes: After Completion of the Course, Students should be able to

1. Identify the components of PL/SQL blocks including variables, control structures, exceptions, and transactions can be used in real time applications.
2. Apply conditional statements, loops, cursors, and different collections including V array, Table, and Associative Arrays in PL/SQL programs.
3. Write functions and procedures using different ways of passing in real time applications.
4. Evaluate values (positional, named, etc.) and handle transactions in given application.
5. Analyze the process of creating and using PL/SQL packages, including the management of access permissions and dependencies within the specified application.

### UNIT - I: PL/SQL Basics

Block Structure, Behavior of Variables in Blocks, Basic Scalar and Composite Data Types, Control Structures, Exceptions, Bulk Operations, Functions, Procedures, and Packages, Transaction Scope

## **UNIT - II: Language Fundamentals & Control Structures**

Lexical Units, Variables and Data Types, Conditional Statements, Iterative Statements, Cursor Structures, Bulk Statements, Introduction to Collections, Object Types: Varray and Table Collections, Associative Arrays, Oracle Collection API

## **UNIT - III: Functions and Procedures**

Function and Procedure Architecture, Transaction Scope, Calling Subroutines, Positional Notation, Named Notation, Mixed Notation, Exclusionary Notation, SQL Call Notation, Functions, Function Model Choices, Creation Options, Pass-by-Value Functions, Pass-by-Reference Functions, Procedures, Pass-by-Value Procedures, Pass-by-Reference Procedures, Supporting Scripts.

## **UNIT – IV:**

Package Architecture, Package Specification, Prototype Features, Serially Reusable Precompiler Directive, Variables, Types, Components: Functions and Procedures, Package Body, Prototype Features, Variables, Types, Components: Functions and Procedures, Definer vs. Invoker Rights Mechanics, Managing Packages in the Database Catalog, Finding, Validating, and Describing Packages, Checking Dependencies, Comparing Validation Methods: Timestamp vs. Signature.

## **UNIT – V:**

Introduction to Triggers, Database Trigger Architecture, Data Definition Language Triggers, Event Attribute Functions, Building DDL Triggers, Data Manipulation Language Triggers, Statement-Level Triggers, Row-Level Triggers, Compound Triggers, INSTEAD OF Triggers, System and Database Event Triggers, Trigger Restrictions, Maximum Trigger Size, SQL Statements, LONG and LONG RAW Data Types.

## **TEXT BOOKS:**

1. Oracle Database 12c PL/SQL Programming Michael McLaughlin, McGraw Hill Education.

## **REFERENCE BOOKS:**

1. Benjamin Rosenzweig, Elena Silvestrova Rakhimov, Oracle PL/SQL by example Fifth Edition.
2. Dr. P. S. Deshpande, SQL & PL / SQL for Oracle 11g Black Book.

## **ELECTRONIC RESOURCES:**

1. <https://hackr.io/tutorial/oracle-plsql-tutorial-for-beginners>
2. <https://www.udemy.com/course/oracle-plsql-tutorial/>
3. <https://www.learnvern.com/pl-sql-tutorial>
4. <https://www.tecklearn.com/course/oracle-pl-sql-training/>

## **MATERIALS ONLINE:**

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos (ELRV)