

**FACULTY OF COMPUTER APPLICATIONS**
**Bachelor of Science (Information Technology)**  
**B.Sc. (IT)**

- **Sem.** : 2
- **Subject Code** : 05BS0204
- **Subject** : Database Management System – 2
  
- **Course Objectives** :
  1. To understand the basics of PL/SQL.
  2. To perform cursor management in PL/SQL.
  3. To get familiarize with the concepts of Exception Handling.
  4. To get familiarize with workings of various database objects like stored procedures and functions.
  5. To create and implement database triggers.
- **Prerequisites** :
  1. Knowledge of Fundamental Database Management System Concepts.
  2. Working Knowledge of SQL.

Unit No	Topics Covered	No of lectures required
<b>1</b>	<b>PL/SQL Basics:</b> Brief introduction to SQL Fundamentals, Basics of PL/SQL, Advantages of PL/SQL, PL/SQL Block Structure. PL/SQL Fundamentals: PL/SQL Variables and PL/SQL Data Types, Variable Attribute (%type, %rowtype). PL/SQL Control Structure: Conditional Control, Iterative Control and Sequential Control.	<b>10</b>
<b>2</b>	<b>Cursor Management:</b> Introduction to Cursor, Types of Cursors, Implicit Cursor, Cursor Attributes, Explicit Cursors: Cursor declaration, opening, fetching data from cursor, closing, Cursor FOR loop, Parameterized Cursor.	<b>10</b>
<b>3</b>	<b>Exception Handling:</b>	<b>10</b>

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	Introduction, Exception Types, Predefined Exception with example, User Defined Exception with example, Raise_Application_Error procedure.	
<b>4</b>	<b>Stored Procedures and Functions:</b> Introduction to Procedures and Functions, Creating Procedures, Formal and Actual parameters: (IN, OUT and INOUT parameters), Stored Functions, User Defined Functions, Procedures v/s Functions.	<b>10</b>
<b>5</b>	<b>Triggers:</b> Brief overview of Triggers, Types of triggers, Creating DML Triggers (Row trigger, Statement triggers, Before and after triggers, using OLD and NEW qualifier), Dropping a Trigger, Applications of Triggers.	<b>10</b>

**Course Outcomes:**

1. Student will be able to understand the basic concept of PL/SQL.
2. Student will be able to manage implicit and explicit cursors.
3. Student will be able to trace and correct the errors by using the concepts of exception handling.
4. Student will be able to work with database objects like stored procedures and functions.
5. Students will develop an ability to create and implement database triggers.

## Course Outcomes – Program Outcomes Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L		L			M			H	
CO2		M			L					
CO3				L			M			M
CO4	M				M			L		
CO5		M		L			H			H

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**Text Book :**

1. "SQL, PL/SQL the programming Language of Oracle", Ivan Byross, BPB, 4th Edition

**Reference Books :**

1. "Practice book on SQL and PL/SQL with examples", Ms. Anjali Jivani and Ms. Amisha Shingala, Nirav and Roopal Publications.
2. "SQL and PL/SQL for Oracle 11g" Black Book, P.S.Deshpande, Dreamtech Publication.
3. "Oracle Database 11g: The Complete Reference", Kevin Loney, Oracle Press.

**Web References:**

1. <https://www.oracletutorial.com/>
2. <https://www.plsqltutorial.com/>
3. <https://www.guru99.com/pl-sql-tutorials.html>
4. [https://www.oracle.com/webfolder/technetwork/tutorials/obe/db/12c/r1/odb\\_quickstart/odb\\_quick\\_start.html](https://www.oracle.com/webfolder/technetwork/tutorials/obe/db/12c/r1/odb_quickstart/odb_quick_start.html)
5. <https://www.techonthenet.com/oracle/index.php>

**App References:**

1. <https://livesql.oracle.com/apex/>
2. <https://apex.oracle.com/en/>
3. <https://www.oracle.com/database/technologies/appdev/plsql.html>
4. <http://orasql.org/2014/12/30/simple-android-oracle-client/>
5. [https://play.google.com/store/apps/details?id=com.msh.plsqllearning&hl=en\\_IN&gl=US](https://play.google.com/store/apps/details?id=com.msh.plsqllearning&hl=en_IN&gl=US)

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**Syllabus Coverage from text /reference book & web/app reference:**

Unit #	Chapter Numbers
1	Book - 1: Chapter 15
2	Book - 1: Chapter 16
3	Book - 1: Chapter 17
4	Book - 1: Chapter 18 (Procedure & Functions)
5	Book - 1: Chapter 18 (Triggers)

## PRACTICALS

# **Tool:** Oracle 10g or above

Unit No	List of Practical
<b>1</b>	1) Write a PL/SQL block that calculates the simple interest based on given principal amount, rate of interest and number of years. 2) Write a PL/SQL block to calculate the square and cube of the given number. 3) Write a PL/SQL block to accept product name, qty and price from user and then calculate discount in Rs. based on the given (%). 4) Write a PL/SQL block which accepts measurement in feet and displays it in cm, inch and meter. 5) Write a PL/SQL block which converts temperature from Celsius to Fahrenheit. 6) Write a program to generate the numbers using LOOP, FOR LOOP and WHILE LOOP up to the number inputted by user. 7) Write a PL/SQL block to calculate the total, percentage and grade of student based on his/her Rollno from RESULT table. (Create RESULT table with Rollno, Name, Sub1, Sub2, Sub3, Sub4, Sub5, Total, Per, Grade attributes with appropriate data type). 8) Write a PL/SQL block which displays gross salary of employees as per user input EID. (Consider EMP

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	<p>table with EID, EName, Deptno, Deptname Gender, Age, BasicSal) with appropriate data types.) Gross_Salary: BASICSAL + (DA + HRA + Medical) – PF. Rules: HRA = 15% of basic, DA = 50% of basic, Medical = Rs. 500, PF = 10% of basic.</p> <p>9) Write a PL/SQL block which displays all records of Male employees working in HR Dept from EMP table.</p> <p>10) Write a PL/SQL block to delete the record of employee for given EID.</p>
<p><b>2</b></p>	<p>1) Write a PL/SQL block that uses a cursor attribute SQL%ROWCOUNT to raise the basic salary of employees by 10% that are working in department number 10 and also display the appropriate message based on the existence to the record in the EMP table. (Use Implicit Cursor)</p> <p>2) Write a PL/SQL block that uses a cursor attribute %ISOPEN and %NOTFOUND to raise the basic salary of employees of department number 20 by 5% and also display the appropriate message based on the existence to the record in the EMP table. Whenever any such raise is given to the employees, a record for the same is maintained in the emp_update table. (Perform using both Implicit and Explicit Cursor)</p> <p>3) Write a PL/SQL block that uses a cursor attribute %ROWCOUNT to display the name, department and basic salary of first 5 employees getting the highest basic salary. (Use Explicit Cursor)</p> <p>4) Write a PL/SQL block using a cursor FOR loop to display name and the basic salary of top 3 highest paid employees. (Use Cursor For Loop)</p> <p>5) Write a PL/SQL block using a parameterized cursor that displays the department wise basic salary of</p>

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	each employee and department wise total gross salary. (Parameterized Cursor and Use Cursor For Loop)
<b>3</b>	<ol style="list-style-type: none"> <li>1) Write a PL/SQL block that explains the use of ZERO_DIVIDE exception.</li> <li>2) Write a PL/SQL block to accept student name from a user if it is exist display his/her result from RESULT table otherwise display appropriate message using exception handling.</li> <li>3) Write a PL/SQL block to accept employee name from a user if it is exist display his/her basic salary otherwise display appropriate message using exception handling.</li> <li>4) Write a PL/SQL block to display the salary of that employee whose age is 50 year otherwise display appropriate message using exception handling.</li> <li>5) Write a PL/SQL block using a cursor to insert the records of employee in EMP_BACKUP table for given department number, also raise a user defined exception NO_DEPT_FOUND when no records are found for entered DEPT_NO. (Use User Defined Exception)</li> </ol>
<b>4</b>	<ol style="list-style-type: none"> <li>1) Write a simple procedure without any parameter that shows user defined message on the screen. Call the procedure using separate PL/SQL block and on the command line.</li> <li>2) Write a simple procedure that increases the basic salary of employees for the given department no by percentage inputted by the user using IN parameter.</li> <li>3) Write a procedure that search's whether the given employee id is present or not in the table. If employee is found then show its name otherwise raise appropriate error message (Use both IN and</li> </ol>

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	<p>OUT mode variables) and also write a PL/SQL block to call the procedure.</p> <p>4) Write a function that returns the square of the given number. Execute the function using separate PL/SQL block and on the command line.</p> <p>5) Write a function that returns balance for given account number. (Create ACCOUNT table with ACNO, CNAME, BNAME, BALANCE columns using appropriate datatypes)</p>
<b>5</b>	<p>1) Write a trigger to restrict user from accessing the table on weekends.</p> <p>2) Write a trigger that restricts the entry of record in EMP table if salary is greater than Rs 50000.</p> <p>3) Write a trigger to insert the values into the NEWEMP table when the records are inserted into the EMP table.</p> <p>4) Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is updated in EMP table.</p> <p>5) Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is deleted from EMP table.</p>