AC – 27/12/2023
Item No. – 6.8 (N)

As Per NEP 2020

University of Mumbai

Title of the program

A- U.G. Certificate in **Computer Science**
B- U.G. Diploma in **Computer Science**
C- B.Sc. (**Computer Science**)
D- B.Sc. (Hons.) in **Computer Science**
E- B.Sc. (Hons. with Research) in **Computer Science**

Syllabus for

Semester – I & II

Ref: GR dated 20th April, 2023 for Credit Structure of UG

(With effect from the academic year 2024-25 progressively)

Name of the Course: Database Management Systems Using PL/SQL

Sr. No.	Heading	Particulars
1	**Description the course:**	**Introduction:** The Database Management Systems (DBMS) Using PL/SQL course is a comprehensive exploration into the principles and practices of managing databases using the powerful PL/SQL language. This course provides participants with the skills needed to design, implement, and maintain robust database systems. **Relevance:** In the era of information technology, databases serve as the backbone of applications. The course is highly relevant as it delves into PL/SQL, a procedural language designed for seamless interaction with Oracle databases, one of the most widely used database management systems. **Usefulness:** The course is invaluable for individuals seeking proficiency in database management. Participants learn to harness the capabilities of PL/SQL for efficient data storage, retrieval, and manipulation, enhancing the functionality and performance of database systems. **Application:** The concepts learned in this course find direct application in real-world scenarios. Participants design and implement database structures, write PL/SQL scripts for data manipulation, and optimize database performance, ensuring the efficient operation of data-centric applications. **Interest:** The hands-on and problem-solving nature of working with databases and PL/SQL often captivates students. Through practical exercises, participants engage in creating and managing databases, fostering a deep interest in efficient data storage and retrieval. **Connection with Other Courses:** This course establishes strong connections with other courses in the field of database management, data analytics, and software development. It provides a foundation for advanced studies in database optimization,

		data warehousing, and application development. **Demand in the Industry:** Professionals proficient in database management using PL/SQL are in high demand. Industries spanning finance, healthcare, and e-commerce actively seek individuals who can design and manage databases to ensure data integrity, security, and optimal performance. **Job Prospects:** Graduates from a DBMS Using PL/SQL course find diverse job prospects. Roles may include database administrator, SQL developer, data analyst, and database architect. These professionals are valued for their ability to create and manage databases critical to organizational success.
2	**Vertical:**	SEC
3	**Type:**	Practical
4	**Credits:**	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5	**Hours Allotted:**	60 Hours
6	**Marks Allotted:**	50 Marks
7	**Course Objectives(CO):** **CO 1.** To develop understanding of concepts and techniques for data management **CO 2.** To learn about widely used systems for implementation and usage **CO 3.** To develop understanding of Transaction management and crash recovery.	
8	**Course Outcomes (OC):** **OC 1.** Master concepts of stored procedure, functions, cursors and triggers and its use. **OC 2.** Learn about using PL/SQL for data management. **OC 3.** Use efficiently Collections and records. **OC 4.** Understand concepts and implementations of transaction management and crash recovery.	
9	**Modules:-** **Module 1 (30 hours):**	
	Overview of PL/SQL: Advantages of PL/SQL, Main Features of PL/SQL, Architecture of PL/SQL **Fundamentals of PL/SQL:** Character Sets, Lexical Units, Declarations, References to Identifiers, Scope and Visibility of Identifiers, Assigning Values to Variables, Expressions, Error-Reporting Functions, Data Types., Control Statements: Conditional Selection Statements, LOOP Statements, Sequential Control Statements, GOTO, and NULL Statements.	

	Sequences: creating sequences, referencing, altering, and dropping a sequence. **Stored Procedures and Functions:** Procedures: Types and benefits of stored procedures, creating stored procedures, executing stored procedures, altering stored procedures, viewing stored procedures. Functions: Calling function and recursion function. **Collections and Records:** Associative Arrays, Varrays (Variable-Size Arrays), Nested Tables, Collection Constructors, Assigning Values to Collection Variables, Multidimensional Collections, Collection Comparisons, Collection Methods, Collection Types Defined in Package Specifications, Record Variables, Assigning Values to Record Variables. **Error Handling:** Compile-Time Warnings, Overview of Exception Handling, Internally Defined Exceptions, Predefined Exceptions, User- Defined Exceptions, Redeclared Predefined Exceptions, Raising Exceptions Explicitly, Exception Propagation, Unhandled Exceptions.
	Module 2 (30 hours):
	Cursors: Overview of Cursor, Types of cursors, Invalid cursor Exception. **Static SQL:** Description of Static SQL, Cursors Overview, Processing Query Result Sets, Cursor Variables, CURSOR Expressions, **Transaction Processing and Control**: Autonomous Transactions, Commit Protocol, Concurrency Control, Lock Management, Read-Write Locks, Deadlocks Handling, **Dynamic SQL:** Native Dynamic SQL, DBMS_SQL Package, SQL Injection. **Triggers:** Overview of Triggers, implementing triggers – creating triggers, Insert, delete, and update triggers, nested triggers, viewing, deleting, and modifying triggers, enforcing data integrity through triggers. **Packages:** Overview of a Package. Need of Packages, Package Specification, Package Body, Package Instantiation, and Initialization. Create nested tables and work with nested tables.
10	**Text Books** 1. Mastering PL/SQL Through Illustrations: From Learning Fundamentals to Developing Efficient PL/SQL Blocks, Dr. B. Chandra, BPB Publication, 2020 2. Oracle Pl/SQL Training Guide., Training guide, BPB Publications, 2016 3. Raghu Ramakrishnam, Gehrke, Database Management Systems, McGraw-Hill,3rd Edition, 2014 4. Abraham Silberschatz, Henry F. Korth,S. Sudarshan , Database System Concepts, 6th Edition 2019
11	**Reference Books** 1. Ivan Bayross, SQL, PL/SQL -The Programming language of Oracle, B.P.B. Publications 2009 2. Ramez Elmasri & Shamkant B.Navathe, Fundamentals of Database Systems, Pearson Education, 2008

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<tr><td>12</td><td>Internal Continuous Assessment: 40%</td><td>Semester End Examination: 60%</td></tr>
<tr><td>13</td><td>The internal evaluation will be determined by the completion of practical tasks and the submission of corresponding write-ups for each session. Each practical exercise holds a maximum value of 5 marks. The total evaluation, out of 50 marks, should be scaled down to a final score of 20 marks.

Total: 20 marks</td><td>A Semester End Practical Examination of 2 hours duration for 30 marks as per the paper pattern given below.

Certified Journal is compulsory for appearing at the time of Practical Exam

Total: 30 Marks</td></tr>
<tr><td>14</td><td colspan="2">Format of Question Paper:

Total Marks: 30 Duration: 2 Hours

<table>
<tr><th>Question</th><th>Practical Question Based On</th><th>Marks</th></tr>
<tr><td>Q. 1</td><td>Module 1</td><td>12</td></tr>
<tr><td>Q. 2</td><td>Module 2</td><td>12</td></tr>
<tr><td>Q. 3</td><td>Viva</td><td>06</td></tr>
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