Course Code				**23CGMAL232**			
Title of the Course				**Data base Management Systems**			
Offered to: (Programme/s)				**B.Sc. Hons. (CSCS)**			
L	**4**	**T**	**0**	**P**	**2**	**C**	**3**
Year of Introduction:	**2024-25**			**Semester:**			**3**
Course Category:	**Major Theory**			**Course Relates to:**			**Global / National / Regional / Local**
Year of Revision:				**Percentage:**			
Type of the Course:				**Skill Development / Employability**			
Crosscutting Issues of the Course :							
Pre-requisites, if any				Basic understanding of computer science principles.			

Course Description:
This course provides an in-depth introduction to Database Management Systems (DBMS). Students will explore the fundamental concepts and techniques for designing, implementing, and managing databases.

Course Aims and Objectives:

S. NO	COURSE OBJECTIVES
1	Introduce students to the fundamental concepts of databases and demonstrate the process of data modeling using the Entity-Relationship (ER) model and relational model, emphasizing the importance of attributes, keys, and constraints.
2	Ensure students to get proficiency in SQL Data Definition and Management
3	Provide students to write and optimize complex SQL queries to manage and retrieve data.
4	Develop efficient PL/SQL programs to access Oracle databases
5	Enable students to manage data retrieval using implicit and explicit cursors

Course Outcomes

At the end of the course, the student will be able to…

CO NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Develop a comprehensive understanding of database concepts to design efficient and normalized relational databases.	K2	1,2	1
CO2	Demonstrate proficiency in using SQL for defining and manipulating database structures	K3	1,2	1
CO3	Develop the ability to perform data manipulation operations	K3	1,2	1
CO4	Gain proficiency in developing PL/SQL programs	K3	1,2	1
CO5	Effectively Manage Data Retrieval and Error Handling using PL/SQL	K3	1,2	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

CO-PO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2	3						2	
CO2	3	2						2	
CO3	2	3						3	
CO4	3	3						2	
CO5	3	3						3	

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate; K6: Create

Unit – 1 : Database Concepts-A Relational approach (12Hrs)

Database - Relationships - DBMS - Relational data model - Integrity rules. Database Design: Data modeling -Dependency - Database design - Normal forms - Dependency diagrams – De normalization

- **Description:**
  This unit introduces the basics of databases, covering their purpose, users, and benefits. It explains key concepts such as data models, schemas, and the three-schema architecture, emphasizing data independence. The unit also explores database languages, interfaces, and different DBMS architectures, including centralized and client/server models, and classifies various DBMS types.
- **Learning Outcomes:**
  - Explain the fundamental concepts of databases, including data models, schemas, and DBMS architectures, and analyse the advantages of using a DBMS approach over traditional file processing systems.

Exercises/Projects:

- Draw the ER diagram for the online book store

Specific Resources: (web)

- Lucidchart - Database Design
- NPTEL videos : https://www.youtube.com/playlist?list=PLIwC9bZ0rmjSkm1VRJROX4vP2YMIf4Ebh

Unit – 2 : Structured Query Language (SQL) (12Hrs)

Introduction – DDL - Naming rules and conventions – Data Types -Constraints- Creating a table- Displaying table information - Altering an existing table – Dropping, renaming, and truncating table.

- **Description:**
  This unit delves into advanced topics in relational database theory, focusing on the fundamental operations of relational algebra and calculus.

- **Learning Outcomes:**
  Apply advanced relational algebra and calculus operations to database queries and design, implement, and manage complex schemas and constraints using SQL.

Exercises/Projects:

- Create tables for the **Employee Management System**.

Specific Resources: (web)
Resoure 1: https://nptel.ac.in/courses/106106093
Resource 2:
https://www.youtube.com/playlist?list=PL_c9BZzLwBRJ8f9-pSPbxSSG6lNgxQ4m9

Unit – 3 : Working with tables:
DML - Adding a new Row - Updating and deleting an existing rows/records - Retrieving data from table - Arithmetic operations - Restricting data with WHERE clause. Functions and Grouping: Built-in functions - Grouping data. Joins and Views: Join - join types-Views: Views - Creating a view - Removing a view - Altering a view.

- **Description:**
  This unit delves into unary and binary relational operations. It also covers SQL standards, providing an in-depth understanding of schema definition, constraints, queries, and views, as well as data manipulation through INSERT, DELETE, and UPDATE statements. The purpose is to equip learners with the knowledge to design, query, and manage relational databases effectively.
- **Learning Outcomes:**
  Apply database queries on data manipulations using SQL

Exercises/Projects:
Create database for Retail Store Inventory Management

- Designing and Implementing the Database Operations:
- Adding a New Row: Insert a New Product
- Updating an Existing Row: Update the Quantity of a Product
- Deleting an Existing Row: Delete a Product
- Retrieving Data from Table: Retrieve All Products:
- Arithmetic Operations: Calculate Total Value of Products in Stock
- Built-in Functions and Grouping: Calculate the Average Price of Products:
- Group Sales Data by Product:
- Join Products and Sales to Retrieve Sales Information:
- Join Sales and Employees to Find Sales Made by Each Employee:
- Create a View to Show Product Sales Summary:
- Retrieve Data from the View:
- Alter the View to Include Total Sales Value:

Specific Resources: (web)
Resource 1: https://www.youtube.com/playlist?list=PL_c9BZzLwBRJ8f9-pSPbxSSG6lNgxQ4m9
Unit – 4 : PL/SQL: (12Hrs)
Fundamentals - Block structure - comments - Data types - Variable declaration -Assignment operation. Control Structures and Embedded SQL: Control structures - Nested blocks - SQL in PL/SQL - Data manipulation - Transaction control statements.

- **Description:**

This unit helps to understand the basics of programming and database management, laying the groundwork for more complex concepts.

- **Learning Outcomes:**

These concepts form the basis of PL/SQL programming, allowing you to write efficient and effective database applications.

Exercises/Projects

Customer Order Processing System

- Create a PL/SQL Block to Process an Order:
- Embedded SQL and Data Manipulation:
- Use SQL in PL/SQL
- Transaction Control Statements:

Specific Resources: (web)

Resource 1: https://www.youtube.com/playlist?list=PLL_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ

Unit – 5 : PL/SQL Cursors and Exceptions (15/12Hrs)

Cursors - Implicit & explicit cursors and attributes – cursor FOR loops - cursor with parameters - Cursor variables- Exceptions - Types of exceptions -Procedures -Functions –Triggers

Description:

This section covers the basic building blocks of PL/SQL programming, focusing on understanding block structure, comments, data types, variable declarations, and assignment operations. These fundamentals are essential for writing clear and efficient PL/SQL code.

Learning Outcomes:

Understand the structure and components of PL/SQL blocks.

Exercises/Projects:

Create database for Library Management System

- Cursors: Implicit Cursor Example
- Explicit Cursor Example:
- Cursor FOR Loop Example:
- Cursor with Parameters Example:
- Cursor Variables Example:
- Exceptions
- Creating and testing trigger

Specific Resources: (web)

https://www.youtube.com/playlist?list=PLL_LQvNX4xKyiExzq9GKwORoH6nvaRnOQ

Text Books:

4. Nilesh Shah. (2011). *Database Systems Using ORACLE* (2nd ed.). PHI

References:

1. Michael McLaughlin.(2014). Oracle Database 12c PL/SQL Programming, (1st ed.). McGraw Hill education

2. Abraham Silberschatz, Henry Korth, and S. Sudarshan. (2019.). Database System Concepts, (7th ed.). McGraw-Hill

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SEMESTER -END QUESTION PAPER STRUCTURE

Course Code & Title of the Course:	**23CGMAP232: Data Base Management Systems**
Offered to:	**B.Sc. Hons (CSCS)**
Category:	**SEMESTER: 3**
Max. Marks	**70**
Max.Time	**3 Hrs**

Section A: Short Answer Questions (20 Marks)
Answer All questions. Each question carries 4 Marks.

1 (a) Define the following terms:
(i) Entity (ii) Entity set (iii) Attribute.(iv) Tuple (K1)

OR

(b) What are the integrity rules of the relational model? (K1)

2 (a) Describe the naming rules and conventions of SQL. (K2)

OR

(b) List out data types of SQL with a brief description. (K2)

3 (a) Explain about WHERE clause. (K2)

OR

(b) How to add a record in to table? List various methods. (K2)

4 (a) Explain the PL/SQL block structure.

OR

(b) Implement a cursor FOR LOOP with one example table. (K2)

5 (a) Develop a function with your own example in PL/SQL. (K3)

OR

(b) Develop a procedure with your own example in PL/SQL. (K3)

Section B: Long Answer Questions (50 Marks)
Answer All questions. Each question carries 10 Marks.

6 a) Explain about Normal forms with examples (K2)

OR

(b) What are different types of keys? What is their use? (K1)

7 (a) How to enforce different types of constraints on tables? ? (K2)

OR

(b) Write a SQL query to create the emp, dept tables with required fields and constraints and insert 5 records in each table in oracle.. (K2)

8 (a) Give a brief description about joins and explain types of joins with examples. (K2) 10M

OR

(b) What are the various types of functions available in Oracle? List and explain at least 4 from each category. (k1) 10M

9 (a) Explain about the control structures in PL/SQL. (K2)

OR

(b) How to manipulate (insert/update/delete) the data in PL/SQL? (K2)

10 (a) Differentiate between implicit and explicit cursors with examples. (K2)

OR

(b) Explain about built in exceptions in Oracle. (K2)