

Kadi Sarva Vishwavidyalaya, Gandhinagar

MCA Semester I

MCA-13:Advanced Database Management System

Course Description:

The primary objective of this course is to provide in-depth knowledge of the Advance concepts database management system: DDBMS, DW and back end programming through PL/SQL.

Prerequisites:

- Knowledge of centralized database management system, DBMS concepts, SQL

Learning Outcomes:

Students will learn Five components like DDBMS, Data Warehousing and Introduction to PL/SQL, Basic features of PL/SQL, Data retrieval and Exception handling in PL/SQL, Creating and managing named PL/SQL blocks (Procedure, function, package and triggers) and Advanced features of PL/SQL at the end of this course, which are as under:

- In “DDBMS”, they will understand concepts like distributed database processing, DDBMS architecture, Distributed database design, overview of query optimization and overview of transaction control in DDBMS.
- In “Data Warehousing”, they will understand concepts like DW architectures, important components, multidimensional, OLAP operations and enhancement of Group by clause in SQL for OLAP operations.
- In “PL/SQL”, they will understand three tire client/server application models and need of PL/SQL.
- In “Basic features of PL/SQL” they will practice and implement block structure of PL/SQL, variable declaration, datatypes and operators in PL/SQL, etc.
- In “Data retrieval and Exception handling in PL/SQL” they will practice and implement how to retrieve data using cursor and how errors are handled in PL/SQL.
- In “Creating and managing named PL/SQL blocks” they will practice and implement how to create and use Procedures, Functions, Packages and Triggers.
- In “Advanced features in PL/SQL” they will practice and implement how to create and manage bulk binds and the functionalities of dbms_SQL package.
- All these concepts are important to build their career as Back-End Developer, Database Programmer, and Back End API developer.

Teaching and Evaluation Scheme:

The objective of evaluation is to evaluate the students throughout the semester for better performance. Students are evaluated on the basis of continuous evaluation system both in theory and practical classes based on various parameters like term work, class participation, practical and theory assignments, presentation, class test, Regular Attendance, etc.

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
5	3	4	25	25	50	50	150

Course Contents:

UNIT-I : Introduction to DDBMS

[20%]

What is DDBMS? -Distributed Data Processing, Defining Distributed Database System, Promises of DDBMS, Complicating Factors, and Problem Areas. DDBMS Architecture: Client/Server Systems, Peer-to-Peer Distributed System and Multi-DBMS Architecture (MDBS). Distributed Database Design: Design strategies, design issues, basics of fragmentation and allocation. Basics of Query Optimization in DDBMS, Overview of Transaction Management and Concurrency Control in DDBMS.

UNIT-II Introduction to Data Warehousing

[20%]

Data Warehouse Definition with clear understanding of the four key-words appearing in it. Differences between Operational Database Systems and Data Warehouses; Difference between OLTP & OLAP. Data warehouse Architecture, Overview of Multi-dimensional Data Model (Star, Snowflakes and Fact Constellations Schema), and the basic differentiation between “Fact” and “Dimension”; OLAP Operations in Multi-dimensional Data Model: Roll-up, Drill- down, Slice & Dice, Pivot (Rotate), Type of OLAP Servers: ROLAP versus MOLAP versus HOLAP, Metadata of DW. Enhancement to Group by clause: Group by using Cube and Rollup.

UNIT-III : Introduction to PL/SQL

[20%]

Why PL/SQL?, Features of PL/SQL, Application models and PL/SQL, PL/SQL basic block structure, Language fundamentals: Lexical Units, Variable declaration, PL/SQL datatypes, Expressions and Operators, PL/SQL Programming construct: PL/SQL control structures, PL/SQL records, SQL within PL/SQL : DML in PL/SQL.

Data retrieval using Cursor: Explicit and Implicit cursor, cursor fetch loops and cursor variables.

UNIT-IV : Creating and handling Errors and Named PL/SQL Blocks

[20%]

Error handling: Declaring and Handling exceptions, Raising Exceptions, The EXCEPTION_INIT pragma, Using RAISE_APPLICATION_ERROR statement, Exception propagation. Creating subprograms Procedures and Functions, Procedures versus Functions, Local subprograms and stored subprograms. Database Triggers : Types of triggers, Managing Triggers.

UNIT-V : Advanced Features in PL/SQL

[20%]

Creating Packages: Package specification and package body, Packages and Scope, Overloading packaged subprograms, Package Initialization, overview of collections.

Language Features: Native dynamic SQL, Bulk binds, Bulk COLLECT and RETURNING INTO clause, DBMS_SQL package.

Text Book(s):

1. Principles of Distributed Database Systems. Ozsu and Valduriez. Prentice Hall.
2. DATA WAREHOUSING FUNDAMENTALS, PAULRAJ PONNIAH A Wiley-Interscience Publication JOHN WILEY & SONS, INC. New
3. "Oracle 9i PL/SQL Programming", Scott Urman, Oracle Press.
4. "SQL,PL/SQL The programming language of oracle", 3rd revised edition, Ivan Bayross, BPB Publication

Reference Books:

1. Professional Oracle Programming, by Rick Greenwald, Robert Stackowiak, Gary Dodge, David Klein, Ben Shapiro, Christopher G. Chelliah, Wiley Publication
2. Sams Teach Yourself PL/SQL in 21 Days
3. Oracle9i: The Complete Reference , by Kevin Loney, George Koch , Oracle Press
4. Programming with PL/SQL for beginners, Hiren Dand, Rajendra Patil, Tushar Sambare, SDP
5. DISTRIBUTED DATABASE MANAGEMENT SYSTEMS :A Practical Approach, by SAEED K. RAHIMI and FRANK S. HAUG, A JOHN WILEY & SONS, INC., PUBLICATION
6. Data Mining Concepts and Techniques Third Edition Jiawei Han University of Illinois at Urbana-Champaign Micheline Kamber Jian Pei Simon Fraser University

List of practical based on Designing and implementing database programming based on Case Study.

1. Design and implement star schema and snowflake schema.
2. Analytical SQL query using cube and rollup
3. Simple PL/SQL Blocks
4. PL/SQL Blocks using built-in functions
5. PL/SQL Blocks using cursors
6. PL/SQL Blocks for Error Handling
7. Stored Procedures
8. Stored Functions
9. Triggers
10. Packages and usage of in-built packages
11. Workshop based on other databases: Postgrace etc.

Unit wise coverage from text book(s):

UNIT 1: Text Book 1, Ref Book 5
UNIT2: Text Book 2, 3, Ref Book 6
UNIT3: Text Book 3
UNIT4: Text Book 3
UNIT5: Text Book 3