Final

ADIKAVI SRI MAHARSHI VALMIKI UNIVERSITY, RAICHUR

SYLLABUS

B.Sc. Three Year Degree Program for the Subject

Computer Science

With Effect from 2024-25

DISCIPLINE SPECIFIC CORE COURSE (DSC) FOR SEM I-IV, SKILL ENHANCEMENT COURSE (SEC) FOR SEM IV/V/VI and ELECTIVE COURSES FOR SEM V AND VI

AS PER N E P (Revised): 2024

SEMESTER: III

Course Code: CC3	Course Title: Database Management System
Course Credits: 04	Contact Hours per Week: 04
Total Contact Hours: 64	Formative Assessment Marks: 20
Exam Marks: 80	Examination Duration: 03 Hours

Course Learning Objectives:

1. Understanding Core Concepts of DBMS
2. Proficiency in Database Design and SQL
3. Application of Advanced Database Techniques

Course Outcomes: On successful completion of the course, the students shall be able to

1. Understand the basic concepts of database management systems
2. Apply SQL to find solutions to a broad range of queries.
3. Apply normalization techniques to improve database design
4. Analyze a given database application scenario to use ER model for conceptual design of the database

Unit-I **18 Hrs.**

Introduction to Databases: Definition of Data, Database, and DBMS, Overview of Database Applications, Advantages and Disadvantages of DBMS, Roles of Database Users and Administrators Data Models: Introduction to Data Models, Types of Data Models (Hierarchical, Network, Relational, Object-oriented), Importance of Data Models in DBMS Database Design: Database architecture. Data independence. Database languages, interfaces, and classification of DBMSKeys: Primary Key, Candidate Key, Super Key, Foreign Key, Composite Key, Alternate Key, Unique Key, Surrogate Key,Constraints in a table: Primary Key, Foreign Key Unique Key, NOT NULL, CHECK, Entity-Relationship (ER) Model,Entities and Entity Sets, Attributes and Relationships,ER Diagrams,Key Constraints and Weak Entity Sets, Extended ER Features,Introduction to the Relational Model and Relational Schema

Unit-II **18 Hrs.**

Relational Algebra and Calculus: Introduction to Relational Algebra, Operations: Selection, Projection, Set Operations, Join Operations, Division,Tuple and Domain Relational Calculus Structured Query Language (SQL): SQL Basics: DDL and DML, Aggregate Functions (Min(), Max(), Sum(), Avg(), Count()), Logical operators (AND, OR, NOT), Predicates (Like, Between, Alias, Distinct), Clauses(Group By, Having, Order by, top/limit), Inner Join, Natural Join, Full Outer Join, Left Outer Join, Right outer Join, Equi Join Advanced SQL: Analytical queries, Hierarchical queries, Recursive queries, Views, Cursors, Stored Procedures and Functions, Packages, Triggers. Introduction to PL/SQL & programming of above operations in PL/SQL.

Unit-III **12 Hrs.**

Dynamic SQL Normalization and Database Design: Functional Dependencies: Armstrong's Axioms, Definition, Properties (Reflexivity, Augmentation, Transitivity), Types (Trivial, Non-Trivial, Partial and Full Functional Dependency), Closure of Functional Dependencies, Normal Forms (1NF, 2NF, 3NF, BCNF), Denormalization.

Unit-IV **16 Hrs.**

Transaction Management:ACID Properties, Transactions and Schedules, Concurrent Execution of Transactions, Lock-Based Concurrency Control, Performance of Locking, Transaction Support in SQL,Introduction to Crash Recovery, 2PL, Serializability, and Recoverability, Introduction to Lock Management, Dealing with Deadlocks Database Storage and Indexing: Data on External Storage, File Organizations and Indexing, Index Data Structures, Comparison of File Organizations, Indexes and Performance Tuning, Guidelines for Index Selection, Basic Examples of Index Selection.

Text books:

1. Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", third edition, McGraw – Hill, 2018
2. Benjamin Rosenzweig, Elena Rakhimov, "Oracle PL/SQL by Example", fifth edition, Prentice Hall, 2015
3. Brad Dayley, "NoSQL with MongoDB in 24 Hours", 1st edition, Sams Publishing, 2024

References:

1. Korth, Silbertz, Sudarshan," Database System Concepts", Seventh Edition, McGraw - Hill.(2019)
2. R.P. Mahapatra, Govind Verma, "Database Management Systems", Khanna Publishing House, 2025.

SEMESTER: III (Practical)

Course Code:LAB 3	Course Title: RDBMS Lab
Course Credits: 02	Contact Hours per Week: 04
Total Contact Hours: 64	IA Marks: 10
Exam Marks: 40	Examination Duration: 03 Hours

List of Assignments

PART-A

1. Execute a single line query
2. Execute group functions.
3. Execute DDL Commands.
4. Execute DML Commands.
5. Execute DCL Commands.
6. Execute TCL Commands.
7. Implement the Nested Queries.
8. Implement Join operations in SQL
9. Create views for a particular table.
10. Implement Locks for a particular table.

PART-B

1) Write PL/SQL program to display square and cube ofa given number.
2) Write PL/SQL program to find area of rectangle.
3) Write PL/SQL program to find simple interest.
4) Write PL/SQL program to check whether a number is even or odd.
5) Write PL/SQL program to do reverse of given number.
6) Write PL/SQL program to find factorial of a given number.
7) Write PL/SQL procedure to accept EMPNO as input and display EMPLOYEE NAME.
Raise an EXCEPTION if EMPNO is not in the EMPLOYEE Table.
8) Write PL/SQL procedure to display the contents of EMPLOYEE table using CURSORS
9) Write PL/SQL procedure to create a FUNCTION to count the number of employees in the EMPLOYEE table
10) Write PL/SQL procedure to demonstrate PACKAGES.

Examination:

- Student has to answer and execute Two programs

Evaluation Scheme for Lab Examination:

Criteria	**Marks**
Writing Program	10
Execution	20
Record+Viva-Voce	10
IA	10
Total	**50**