Gyanmanjari
Innovative University

Subject: Relational Database Management System -MSCIT11502

Type of course: Major Core

Prerequisite: knowledge about database and relational table.

Rationale:

The aim of this course is to get broad understanding of the basic concepts of database management system used for business, scientific and engineering application which stored centralized. The students will develop the skills to develop manage & retrieve data from different perspective using Structured Query Language (SQL) in ORACLE (centralized storage) so there is no need of storing data in files and paper. This will turn reduce of paper wastage. By the end of this course the students will be able to write simple and advanced PL/SQL code blocks, use advanced features such as cursors and bulk fetches and database designing with normalization. Hence students will be able to design database which will be helpful to them in the designing phase of project in the upcoming semester.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					
CI	T	P	C	Theory Marks		Practical Marks		CA	Total Marks
				ESE	MSE	V	P	ALA	
3	0	2	4	60	30	10	20	30	150

Legends: CI-ClassRoom Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.

Continuous Assessment:
(For each activity maximum-minimum range is 5 to 10 marks)

Sr. No	Active Learning Activities	Marks
1	Prepare seminar presentations explaining the organization of database in various live systems like banking, insurance, online booking etc.	10
2	Data Modeling: Assign students a real-world scenario (e.g., online shopping, library management) and ask them to create an entity-relationship (ER) diagram to model the database structure. They should identify entities, attributes, and relationships, and convert the ER diagram into a relational schema.	10
3	Group Projects: Form small groups of students and assign them a database-driven project. They can collectively design and implement a database system for a specific application, present their project to the class, and showcase their understanding of RDBMS concepts.	10
	Total	30

CourseContent:

Sr. No	Course content	Hrs	% Weightage
1	**Introduction to Database System and SQL commands** Data, Information, Data Item or Fields, Records, Metadata, Data dictionary and it's components, Schemas, Sub-schemas, and Instance, Database System environment, Centralized and client / Server Architecture for DBMS Advantages of DBMS approach, Data types, Database Language commands:(DDL): CREATE, ALTER, TRUNCATE, DROP(DML): INSERT, SELECT, UPDATE, DELETE, Transactional Control: Commit, Save point, Rollback ,DCL Commands: Grant and Revoke	10	25%
2	**Database Object, Operator & Joins** Views – Create, Alter, Drop views, Synonym: Create, Drop synonym, Sequences: Create, alter, Drop sequences, Index: Unique and composite – Create, Drop, SQL Set operators: Union, union all, Intersect, Minus, Joins: Simple, Inner-join, Outer -join, Self-Joins, cross - join.	08	15%

3	**Transaction processing** Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, characterizing Schedules based on recoverability and Serializability	06	15%
4	**PL/ SQL and Triggers** Basics of PL / SQL, Data types Advantages of PL/SQL over SQL, 3 Control Structures: Conditional, Iterative, Sequential Exceptions: Predefined Exceptions, User defined exceptions Cursors: Static (Implicit & Explicit), Dynamic, Procedures & Functions ,Fundamentals of Database Triggers ,Creating Triggers, Types of Triggers: Before, after for each row, for each statement	10	25%
5	**Database Design** Basics of Normalization, (Functional Dependencies, Multi-valued Dependency), Normal Forms First Normal Form(1NF) Second Normal Form(2NF) Third Normal Form(3NF) Boyce-Codd Normal Form(BCNF) Fourth Normal Form(4NF) Advantages and disadvantages of Normalization	08	20%

Suggested Specification table with Marks (Theory):60

Distribution of Theory Marks						
(Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage	20	10	10	10	5	5

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

After learning the course the students should be able to:	
CO1	Understand the fundamental concepts of database systems: Students will grasp the basic principles and components of a database system, including data models, schemas, tables, and relationships
CO2	Apply aggregate functions: Students will learn to use aggregate functions such as SUM, AVG, COUNT, MAX, and MIN to perform calculations on groups of data. They will understand how to apply these functions in combination with joins to generate meaningful insights from the database.
CO3	Understand the concept of transaction processing: Students will gain a clear understanding of the concept of transaction processing in the context of database systems. They will learn about the ACID (Atomicity, Consistency, Isolation, Durability) properties that ensure reliable and consistent transaction execution.
CO4	Understand PL/SQL fundamentals: Students will gain a solid understanding of PL/SQL (Procedural Language/Structured Query Language) and its role in database programming. They will learn about PL/SQL block structure, variables, data types, control structures, and exception handling.
CO5	Understand the purpose and benefits of normalization: Students will understand why normalization is essential in database design. They will learn how normalization helps in eliminating data redundancy, improving data integrity, and reducing anomalies in a relational database

List of Practical

(Minimum-10practical):

Sr. No	Descriptions	Unit No	Hrs
1	Implement SQL queries to perform various DDL Commands. (Create minimum 5 tables with different data types and operate upon them)	1	01
2	Implement SQL queries to perform various DML Commands. (Insert minimum10 rows using different insert methods, edit and remove data using update and delete commands)Retrieve data using SELECT command and various SQL operators.	1	01
3	Perform queries for TCL and DCL Commands	1	01
4	Implement SQL queries using Date functions like add-months, months-between, round, next day, truncate etc	1	02

5	Implement SQL queries using Numeric functions like abs, ceil, power, mod, round, trunc, sqrt etc. and Character Functions likeinitcap, lower, upper, ltrim, rtrim, replace, substring, instr etc.	1	02
6	Implement SQL queries using Conversion Functions like to-char, to-date, to-number andGroup functions like Avg, Min,Max, Sum, Count, Decode etc.	1	01
7	Implement SQL queries using Group by, Having and Order by clause	2	02
8	Implement SQL queries using Set operators like Union, Unionall, Intersect, Minus etc.	2	01
9	Retrieve data spread across various tables or same table usingvarious Joins.	2	01
10	Retrieve data from multiple tables using Subqueries (Multiple, Correlated) (write minimum 3 level subquery)	2	02
11	Perform queries to Create, alter and update views	3	02
12	Implement Practical-1 again with Domain Integrity, Entity Integrity and Referential Integrity constraints.	3	01
13	Perform queries to Create synonyms, sequence and index	3	01
14	Implement PL/SQL programs using control structures	4	01
15	Implement PL/SQL programs using Cursors	4	02
16	Implement PL/SQL programs using exception handling.	4	02
17	Implement user defined procedures and functions using PL/SQL blocks	4	02
18	Implement various triggers	4	02
19	Draw E-R Diagram of the given problem statements.	5	01
		Total	28

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.
From the content 10% topics are suggested for flipped mode instruction.
Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

[1] SQL/PL/SQL - Bayross, Ivan
[2] Database Systems Concepts, design and Applications 2/e - Singh, S.K.
[3] An Introduction to Database Systems - Date, C. J.
[4] Database System Concepts, -Korth, Henry