Gyanmanjari
Innovative University

Course Syllabus
Gyanmanjari College of Computer Application
Semester-1(MCA)

Subject: Relational Database Management System - MCAXX11502

Type of course: Major Core

Prerequisite: Knowledge about database and relational table.

Rationale:

The aim of this course is to get a broad understanding of the basic concepts of database management systems used for business, scientific and engineering applications which are stored centralized. The students will develop the skills to develop, manage & retrieve data from different perspectives using Structured Query Language (SQL) in ORACLE (centralized storage) so there is no need of storing data in files and paper. This will reduce 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 a database which will be helpful to them in the designing phase of the project in the upcoming semester.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
				Theory Marks		Practical Marks		CA	
CI	T	P	C	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:

Sr. No.	Active Learning Activities	Marks
1	**Presentation :** Students have to Prepare presentations explaining the organization of databases in various live systems like banking, insurance, online booking etc... and upload it on Moodle.	10
2	**Data Modeling:** Students have to create an entity-relationship (ER) diagram to model the database structure on online shopping, library management etc... and upload it on Moodle.	10
3	**Group Projects :** A database-driven project will be assigned to a student group(four Students) . They have to collectively design and implement a database system for a specific application. prepare a database and upload it on Moodle.	10
	Total	30

Course Content:

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 its components, Schemas, Sub-schemas, and Instance, Database System environment, Three schema Architecture, DBMS Advantages , Data types, Database Language commands: (DDL): CREATE, ALTER, TRUNCATE, DROP, (DML): INSERT, SELECT, UPDATE, DELETE, (TCL): Commit, Save point, Rollback, (DCL) : Grant and Revoke	10	25%
2	**Database Object, Operator & Joins** Views–Create and Drop views, Synonym: Create, Drop synonym, Sequences: Create, Drop sequences, Index: Unique and composite–Create, Drop, SQL Set operators: Union, unionall, Intersect, Minus, Joins: Simple, Inner-join Outer -join, Self-Joins, cross - join.	08	15%
3	**Transaction processing** Introduction to Transaction Processing, Transaction and System	06	15%

	concepts, Desirable properties of Transactions, characterizing Schedules based on recoverability and Serializability. Relational Model concept: relational Model concept and terminologies		
4	**PL/ SQL and Triggers** Basics of PL/ SQL, Advantages of PL/SQL over SQL, 3 Control Structures: Conditional, Iterative, Sequential Exceptions: Predefined Exceptions, User defined exceptions Cursors: Implicit & Explicit, 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	35%	45%	10%	10%	00%	00%

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	Students should be able to recognize the various elements of Database Management Systems
CO2	Students should be able to identify the entities and relations and draw an E-R diagram and design database applying normalization.
CO3	Students should be able to solve the given problem using Relational Algebra, Relational Calculus, SQL and PL/SQL.
CO4	Students should be able to apply and relate the concepts of transaction, concurrency control, recovery and security in databases.
CO5	Students should be able to recognize the purpose of query processing, optimization and demonstrate the SQL query evaluation.

List of Practical

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 like initcap, lower, upper, ltrim, rtrim, replace, substring, instr etc.	1	02
6	Implement SQL queries using Conversion Functions like to-char, to-date, to-number and Group functions like Avg, Min, Max, Sum, Count 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 the same table	2	01

	using various Joins.		
10	Retrieve data from multiple tables using Sub queries .	2	02
11	Perform queries to Create and Drop 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	Write a PL/SQL block to find the greatest number from a given number.	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 the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any 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 the 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