Course Syllabus
Gyanmanjari Diploma Engineering College
Semester-3 (Diploma)

Subject: Database Management System-DETCE13204

Type of course: Major (Core)

Prerequisite: Basic knowledge of Computer Programming.

Rationale:

The course will enable student understand the different issues involved in the design and implementation of a database system. Student will understand essential DBMS concepts like data storage, retrieval, and management. These subject covers principles, architectures, and technologies necessary for organizing data, optimizing queries, managing transactions, and ensuring security. Proficiency in DBMS is essential for designing robust databases, vital in software engineering, data analytics, and business intelligence fields.

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	
4	0	2	5	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.

Course Content:

Sr. No	Course Content	Hrs.	% Weightage
1	**Introduction to Database System Concept:** Introduction, Basic Concepts and Definitions, Data, Information, Data Item or Fields, Records, Files, Data Dictionary, Data base Management System, Database Administrator (DBA), File oriented System vs. database system, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server.	08	15%

2	**Relational Data Models:** Entity-relationship model, network model, relational and object-oriented data models, integrity constraints, data manipulation operations.	08	15%
3	**Interactive and Advanced SQL:** Basics of SQL, DDL, DML, DCL, structure – creation, alteration, defining constraints – Primary key, foreign key, unique, not null, check, Clause, aggregate functions, Built-in functions –numeric, date, string functions, join.	16	25%
4	**Relational Database:** Introduction to database design, Functional dependencies, Normalization techniques: 1NF, 2NF, 3NF & BCNF.	14	20%
5	**Transaction Processing:** ACID property, Serializability of scheduling, Database recovery.	08	15%
6	**Database Security:** Authentication, Authorization and Access control, DAC, MAC, SQL injection.	06	10%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	**Open-Source vs. Commercial Database Comparison:** In this activity, students will conduct a comparative analysis between open-source and commercial database software. They will select popular options from each category, such as MySQL (open-source) and Microsoft SQL Server (commercial), or PostgreSQL (open-source) and Oracle Database (commercial). Students will research and compare various aspects of these databases, including features, performance, scalability, licensing models, support options, community engagement, security measures, and ecosystem integrations. They will compile their findings into a comprehensive report and highlighting the advantages and limitations of each type of database software and recommending suitable options for different parameters and upload it on GMIU web portal.	10
2	**Database Design Challenge:** In this challenge, students will work individually to design a database schema based on a given scenario. They will start by analyzing the requirements and constraints provided in the scenario and then proceed to create an ER diagram to represent the conceptual schema. Students will need to carefully consider the relationships between entities, the attributes of each entity, and any additional constraints such as primary keys and foreign keys. The challenge can prepare ER diagram for real-time example such as e-commerce, healthcare, or education and upload it on GMIU web portal.	10

3	**Constraint Puzzle:** Distribute a partially completed data dictionary for the real-time application to students, containing entries for some data elements, attributes, and relationships and a list of constraints. Ask students to review and validate the entries for accuracy, consistency, and completeness. Students work individually to identify any missing data elements, correct inaccuracies, identify where each constraint should be applied to ensure data integrity and upload improved data dictionary on GMIU web portal.	10
	Total	30

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 %	25%	35%	20%	10%	05%	05%

Course Outcome:

After learning the course the students should be able to:	
CO1	Understand a basic fundamental of Database Management System and its applications.
CO2	Create Entity Relational Diagram using various symbols.
CO3	Optimize and demonstrate the SQL query.
CO4	Apply and relate the concepts of Normalization and Transaction control in database.
CO5	Identify different security constraint and its requirement on Database.

List of Practical

Sr. No	Description	Unit No	Hrs.
1	Draw E-R Diagram of the given problem statement.	02	02
2	Get familiar with the command-line interface or graphical user interface (GUI) for interacting with the DBMS.	03	02
3	Create a new database using SQL commands or GUI tools.	03	02
4	Create student tables with a few columns representing common data types (integer, text, date etc.) using DDL commands.	03	02
5	Apply Primary keys and NOT NULL constraints.	03	02
6	Insert sample data into your tables using SQL INSERT statements. Verify the data has been inserted correctly.	03	02
7	Practice basic SELECT queries to retrieve data from tables.	03	02
8	Practice using SQL UPDATE and DELETE statements to modify data.	03	02
9	Use Foreign keys to establish Relationships between tables.	03	02
10	Add constraints like NOT NULL and UNIQUE to your tables.	03	02
11	Implement SQL queries using Date functions like add-months, months-between, round, next day, truncate, etc.	03	02
12	Implement SQL queries using Numeric functions like abs, ceil, power, mod, round, trunc, sqrt, etc.	03	02
13	Implement SQL queries and String Functions like initcap, lower, upper, rtrim, replace, substring, instr, etc.	03	02
14	Implement SQL queries using Conversion function like to-char, to-date, to-number.	03	02
15	Implement SQL queries using Group function like Avg, Min, Max, Sum, Count, Decode, etc.	03	02
		Total	30

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] Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill.
[2] Database Management Systems by Ramakrishnan, Gehrke, Tata McGraw-Hill
[3] SQL- PL/SQL, Ivan bayross