Name of Faculty	:	Faculty of Computer Science & Applications
Name of Program	:	Bachelor of Computer Applications in Data Science
Course Code	:	2BCA05
Course Title	:	Database Management System
Type of Course	:	Professional core
Year of Introduction	:	2023-24

Prerequisite	:	Maths, logic and most importantly zeal to learn
Course Objective	1	To learn the fundamentals of data models and to represent a database system using ER diagrams.
	2	To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
	3	To understand the fundamental concepts of transaction processing- concurrency control techniques and recovery procedures.
	4	To have an introductory knowledge about the Storage and Query processing Techniques.
	5	To study SQL and relational database design.
Course Outcomes	:	After learning the course the students will be able to:
	CO1	Describe the fundamental elements of relational database management systems
	CO2	Demonstrate the understanding of database design using normalization.
	CO3	Analyze and Select storage and recovery techniques of database system.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	0	2	4	50	25	50	25	150

*Legends: **L**-Lecture; **T**–Tutorial/Teacher Guided Theory Practice; **P**– Practical,**C** – Credit, **SEE** – Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations /MCQ Tests, etc.))*

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with CO
1	**Introduction:** Database, Data models, Database management system, Schemas and instances, Three-schema architecture of DBMS, Components of DBMS. Data independence, Functions of DBA, ER model- E-R diagram, Weak Entity sets, Generalization, Specialization, Aggregation	07	20%	CO1
2	**Relational Model:** Structure of relation database-Domains, Relations, Keys, Key attributes, Referential integrity, Intension and Extension. **SQL Query & Relational Algebra :** Basics of SQL, DDL, DML, DCL, structurecreation, alteration, defining constraints, Data extraction from tables, Joins, Complex queries, Relational Algebra and Relational Calculus	08	20%	CO3
3	**Relational Database Design:** Functional Dependency , Normalization- Introduction, 1NF, 2NF, 3NF, Decomposition, Dependency Preservation , BCNF, Mutivalued Dependency, 4NF, Join Dependency and 5NF **Query Processing:** Query Evaluation, Operator Evaluation, Query Optimization, Optimization Methods- Heuristic Based, Cost Estimation based, Semantic Query Optimization	07	20%	CO2
4	**Transaction Management**: Transaction concepts, ACID properties, Transaction systems, Testing of Serilizability, Serializability of schedules, conflict & view serializable schedule, recoverability, Concurrency Control Technique-Concurrency Control, locking Techniques for concurrency control	07	20%	CO3
5	**Storage & Data Security:** Storage structure, file organization, Recovery and atomicity, Performance measures of discs, RAID levels, Indices, B+ Tree, Hashing, Bitmap indices, Query optimizations , Database Security, Data mining models and techniques, Distributed Databases, GIS.	07	20%	CO3

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	**20**	**30**	**30**	**20**	**0**	**0**

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

Suggested List of Experiments/Tutorials

Sr. No.	Name of Experiment/Tutorial	Teaching Hours
1	Creation of a database and writing SQL queries to retrieve iformation from the database	01
2	Performing Insertion, Deletion, Modifying, Altering, Updating and Viewing records based on conditions.	01
3	Creation of Views, Synonyms, Sequence, Indexes, Save point.	02
4	Creating an Employee database to set various constraints.	01
5	Creating relationship between the databases.	02
6	Study of PL/SQL block.	01
7	Write a PL/SQL block to satisfy some conditions by accepting input from the user.	01
8	Write a PL/SQL block that handles all types of exceptions.	01
9	Creation of Procedures.	01
10	Creation of database triggers and functions.	01

Major Equipment/ Instruments and Software Required

Sr. No.	Name of Major Equipment/ Instruments and Software
1	VB, ORACLE and/or DB2
2	CB, MY SQL SERVER 2000

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.geeksforgeeks.org/introduction-of-dbms-database-management-system-set-1/
2	https://www.guru99.com/what-is-dbms.html
3	https://www.javatpoint.com/dbms-tutorial

Reference Books

Sr. No.	Name of Reference Books
1	Ramez Elmasri, Shamkant B. Navathe, Fundamentals of Database Systems, 4 th ed., US, Pearson/Addision Wesley, 2003.
2	Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, Database Systems: The Complete Book, 2nd ed., Pearson, 2008
3	Raghu Ramakrishnan, Database Management Systems, 3rd ed. New Delhi, McGraw Hill, 2014.