DATABASE MANAGEMENT SYSTEMS

IV Semester: CSE/IT								
Course Code	**Category**	**Hours / Week**			**Credits**	**Maximum Marks**		
ACSB08	**Core**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	-	-	3	30	70	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		

OBJECTIVES:

The students will try to learn:

I	Acquire analytical thinking and identify efficient ways of designing database by encapsulating data requirements for business and organizational scenarios.
II	Develop expertise in database language SQL to develop sophisticated queries to extract information from large datasets.
III	Enhance skills to develop and manage data in solving related engineering problems.

COURSE OUTCOMES:

After successful completion of the course, Students will be able to:

CO 1   **Define database, characteristics, functions of database management system and types of users to describe large sets of data**

CO 2   **Compare traditional File Processing System and a Database System for constructing a database.**

CO 3   **Describe data models, schemas, instances, view levels and database architecture for voluminous data storage**

CO 4   **Model** the real world database systems using Entity Relationship Diagrams **from the requirement specification**

CO 5   **Define the relational data model, its constraints and keys to maintain integrity of data**

CO 6   **Define the concept of Relational Algebra and Relational Calculus from set theory to represent queries.**

CO 7   **Build queries in Relational Algebra and Relational Calculus to retrieve desired information**

CO 8   **Demonstrate the use of SQL for database creation and maintenance**

CO 9   **Make Use of SQL queries for data aggregation, calculations, views, sub-queries, embedded queries manipulation**

CO 10   **Illustrate the definition of Functional Dependencies, Inference rules and minimal sets of FD's to maintain data integrity.**

CO 11   **Apply normalization techniques to normalize a database**

CO 12   **State the concepts of transaction, states and ACID properties in data manipulation**

CO 13   **Make use of concurrency control protocols to preserve the database in a consistent state**

CO 14   **Illustrate the problems of data management in a concurrent environment by using recovery techniques to recover the lost data**

CO 15   **Describe disk storage devices, file organization to select efficient data storage.**

CO 16	**Apply** indexing ,hashing techniques to access the records from the file effectively
CO 17	**Compare** between indexing and hashing for efficient search process
CO 18	**Design** a full real size database system for an industry or business scenario.

MODULE - I	**CONCEPTUAL MODELING INTRODUCTION**

Introduction to Data bases: Purpose of Database Systems, View of Data, Data Models, Database Languages, Database Users, Various Components of overall DBS architecture, Various Concepts of ER Model, Basics of Relational Model.

MODULE -II	**RELATIONAL APPROACH**

Relational algebra and calculus: Relational algebra, selection and projection, set operations, renaming, joins, division, examples of algebra queries, relational calculus: Tuple relational calculus, Domain relational calculus, expressive power of algebra and calculus.

MODULE -III	**SQL QUERY - BASICS, RDBMS - NORMALIZATION**

SQL – Data Definition commands, Queries with various options, Mata manipulation commands, Views, Joins, views, integrity and security; Relational database design: Pitfalls of RDBD, Lossless join decomposition, Functional dependencies , Armstrong Axioms, Normalization for relational databases 1st 2nd and 3rd normal forms, Basic definitions of MVDs and JDs, 4th and 5th normal forms

MODULE - IV	**TRANSACTION MANAGEMENT**

Transaction processing: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability.
Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multi version Schemes, Deadlock Handling.
Recovery: Failure Classification, Storage Structure ,Recovery and Atomicity, Log-Based Recovery, Shadow Paging, Recovery With Concurrent Transactions Buffer Management.

MODULE -V	**DATA STORAGE AND QUERY PROCESSING**

Data storage: Overview of Physical Storage Media, Magnetic Disks, Storage Access, File Organization, Organization of Records in Files. Indexing and Hashing: Basic Concepts: Ordered Indices, B+-Tree Index Files, B-Tree Index Files, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing.Query Processing: Overview, Measures of Query Cost.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill, 4th Edition, 2002.
2.

Reference Books:

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamental Database Systems", Pearson Education, 6th Edition, 2014. 2. Raghu Rama krishnan, "Database Management System", Tata McGraw
2. Raghu Rama krishnan, "Database Management System", Tata McGraw-Hill Publishing Company, 3rd Edition, 2007
3. Hector Garcia Molina, Jeffrey D. Ullman, Jennifer Widom, "Database System Implementation", Pearson Education, United States, 1st Edition, 2000.
4. Peter Rob, Corlos Coronel, "Database System, Design, Implementation and Management", Thompson Learning Course Technology, 5th Edition, 2003.

Web References:

1. https://www.studytonight.com/dbms/
2. https://in.udacity.com/course/database-systems-concepts-design--

E-Text Books:

1. https://kakeboksen.td.org.uit.no/Database..System..Concepts 6th .edition.pdf
2. http://bayanbox.ir/view/8736593520639826197/Ramakrishnan-Database-Management-Systems-3rd-Edition-1-1.pdf