

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, Data 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, 4 th Edition, 2002	
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, Carlos 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](https://kakeboksen.td.org.uit.no/Database..System..Concepts%206th%20edition.pdf)
2. <http://bayanbox.ir/view/8736593520639826197/Ramakrishnan-Database-Management-Systems-3rd-Edition-1-1.pdf>