DATABASE MANAGEMENT SYSTEMS

III Semester: IT /IV Semester: CSE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACS005	Core	3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

OBJECTIVES:

The course should enable the students to:

I. Discuss the basic database concepts, applications, data models, schemas and instances.
II. Design Entity Relationship model for a database
III. Demonstrate the use of constraints and relational algebra
IV. Describe the basics of SQL and construct queries using SQL
V. Understand the importance of normalization

COURSE LEARNING OUTCOMES (CLOs):

1. Define the terminology, features, and characteristics of database system
2. Differentiate database systems from file systems by enumerating various features provided by database systems.
3. Describe Data Models, Schemas, Instances, Three Schema Architecture and DBMS Component Modules.
4. Analyze an information storage problem and derive an information model expressed in the form of an entity relation diagram.
5. Model the real world database systems using Entity Relationship Diagrams (ERD) from the requirements specification.
6. Describe basics of the relational data model.
7. Define and illustrate the Relational Data Model, Constraints and Schemas.
8. Transform an information model into a relational database schema and implement schema using data definition language and/or utilities.
9. Formulate solutions to a broad range of query problems using relational algebra.
10. Apply relational calculus to solve broad range of query problems.
11. Illustrate the Functional Dependencies , Inference Rules, Minimal Sets of FDs.
12. Understand normalization theory and criticize a database design and improve the design by normalization.
13. Explain various Normal Forms and Apply to normalize a database.
14. Understand the SQL Data definition statements to formulate solutions to a broad range of query and data update problems.
15. Use an SQL interface of a multi-user relational DBMS package to create, secure, populate, maintain, and query a database
16. Use SQL queries for data aggregation, calculations, views, sub-queries, embedded queries, manipulation, and report generation.
17. Demonstrate PL/SQL including stored procedures, stored functions, cursors, packages.
18. Gain knowledge on transaction processing to maintain consistency and integrity of data in database systems..
19. Describe concurrency control techniques to implement data integrity in database systems.
20. Illustrate various backup and recovery techniques for database systems.
21. Analyze transaction processing , concurrency control, Database recovery techniques.
22. Define disk storage devices, files of records, unordered files, ordered files and hashed files and

organizations.
23. Familiar with basic database storage structures and access techniques- file and page organizations, indexing methods
24. Illustrate various operations in implementing data indices using various hashing techniques
25. Possess the knowledge and skills for employability and to succeed in national and international level competitive examinations

Unit-I	**CONCEPTUAL MODELING**	**Classes: 08**

Introduction to file and database systems: Database system structure, data models, introduction to network and hierarchical models, ER model, relational model.

Unit -II	**RELATIONAL APPROACH**	**Classes: 10**

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

Unit -III	**BASIC SQL QUERY**	**Classes: 08**

Transaction processing: Introduction, need for concurrency control, desirable properties of transaction, schedule and recoverability, serializability and schedules, concurrency control; Types of locks: Two phases locking, deadlock, time stamp based concurrency control, recovery techniques, concepts, immediate update, deferred update, shadow paging.

Unit -IV	**TRANSACTION MANAGEMENT**	**Classes: 10**

Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory; Input or output organization: Input or output Interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access.

Unit -V	**DATA STORAGE AND QUERY PROCESSING**	**Classes: 09**

Record storage and primary file organization, secondary storage devices, operations on files, heap File, sorted files, hashing techniques, and index structures for files; Different types of indexes, B tree, B+ tree, query processing

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill, 4th Edition, 2002.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamental Database Systems", Pearson Education, 3rd Edition, 2003

Reference Books:

1. John. P. Hayes, “Computer System Architecture”, McGraw-Hill, 3rd Edition, 1998.
2. Carl Hamacher, Zvonko G Vranesic, Safwat G Zaky, “Computer Organization”, McGraw-Hill, 5th Edition, 2002.
3. William Stallings, “Computer Organization and Architecture”, Pearson Edition, 8th Edition, 2010.

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