

DATABASE MANAGEMENT SYSTEMS

IV Semester: CSE / IT / CSIT / CSE (AI&ML) / CSE (DS) / CSE (CS)								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
AITC05	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
Contact Classes: 45		Tutorial Classes: Nil			Practical Classes: Nil		Total Classes: 45	
Prerequisites: Programming for Problem Solving, Data Structures								
<p>I. COURSE OVERVIEW: Database management system is intended to provide a clear understanding of fundamentals with emphasis on their applications to create and manage large data sets. It emphasizes on technical overview of database software to retrieve data from database. This includes database design principles, normalization, and concurrent transaction processing, security, recovery and file organization techniques. This will provide adequate knowledge to understand future evolutions of data technologies.</p> <p>II. COURSE OBJECTIVES: The students will try to learn:</p> <p style="margin-left: 20px;">I Acquire analytical thinking and identify efficient ways of designing database by encapsulating data requirements for business and organizational scenarios.</p> <p style="margin-left: 20px;">II Develop expertise in database language SQL to develop sophisticated queries to extract information from large datasets.</p> <p style="margin-left: 20px;">III Enhance skills to develop and manage data in solving related engineering problems.</p> <p>III. COURSE OUTCOMES: After successful completion of the course, students should be able to:</p> <p>CO 1 Describe data models, schemas, instances, view levels and database architecture for voluminous data storage. Remember</p> <p>CO 2 Define the concept of Relational Algebra and Relational Calculus from set theory to represent queries. Remember</p> <p>CO 3 Make Use of SQL queries for data aggregation, calculations, views, sub-queries, embedded queries manipulation. Apply</p> <p>CO 4 Illustrate the definition of Functional Dependencies, Inference rules and minimal sets of FD's to maintain data integrity. Understand</p> <p>CO 5 State the concepts of transaction, states and ACID properties in data manipulation. Remember</p> <p>CO 6 Apply indexing, hashing techniques to access the records from the file effectively. Apply</p> <p>IV. SYLLABUS: 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.</p> <p>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.</p> <p>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.</p>								

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, multiversion 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.

V. TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill, 6th Edition, 2017.

VI. REFERENCE BOOKS:

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamental Database Systems", Pearson Education, 6th Edition, 2014.
2. Raghu Ramakrishnan, "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.

VII. WEB REFERENCES:

1. https://www.youtube.com/results?search_query=DBMS+online+classes
2. <http://www.w3schools.in/dbms/>
3. <http://beginnersbook.com/2015/04/dbms-tutorial/>