

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								
I. COURSE OVERVIEW:								
<p>The purpose of this course is to provide a clear understanding of fundamentals with emphasis on their applications to create and manage large data sets. It highlights on technical overview of database software to retrieve data from a database. The course includes database design principles, normalization, concurrent transaction processing, security, recovery and file organization techniques.</p>								
II. COURSE OBJECTIVES:								
The students will try to learn:								
<ol style="list-style-type: none"> I. Understand the role of database management system in an organization and learn the database concepts. II. Design databases using data modeling and Logical database design techniques. III. Construct database queries using relational algebra and calculus and SQL. IV. Understand the concept of a database transaction and related concurrent, recovery facilities. V. Learn how to evaluate a set of queries in query processing. 								
III. 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.								
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, 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.								

IV. TEXT BOOKS:

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

V. 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.

VI. 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/>