

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																				
<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. OBJECTIVES: The course should enable the students to:</p> <ul style="list-style-type: none"> I Efficient ways of designing database by encapsulating data requirements for business and organizational scenarios II Analyzing and developing sophisticated queries in database language SQL for extracting information from large datasets III Enhancing skills in developing and managing data efficiently in related engineering problems. <p>III. COURSE OVERVIEW: After successful completion of the course, students should be able to:</p> <ul style="list-style-type: none"> CO 1 Outline the importance of database system, RDBMS and its functionalities for voluminous data storage and management. Understand CO 2 Model the real world database systems using Entity Relationship Diagrams from the requirement specification. Apply CO 3 Construct queries in Relational Algebra, Relational Calculus and SQL to retrieve desired information. Apply CO 4 Identify appropriate normalization technique using dependencies for controlling the redundancy of data in database. Apply CO 5 Demonstrate ACID properties of Transaction processing, currency control protocols and recovery to preserve the database in a consistent state. Understand CO 6 Organize data storage and file organization techniques using tree and hash indices for effective query processing. Apply <p>IV. SYLLABUS:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">MODULE -I</th> <th style="width: 65%;">CONCEPTUAL MODELING INTRODUCTION</th> <th style="width: 20%;">Classes: 10</th> </tr> </thead> <tbody> <tr> <td colspan="3">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</td> </tr> <tr> <th>MODULE -II</th> <th>RELATIONAL APPROACH</th> <th>Classes: 08</th> </tr> <tr> <td colspan="3">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.</td> </tr> <tr> <th>MODULE -III</th> <th>SQL QUERY - BASICS , RDBMS - NORMALIZATION</th> <th>Classes: 10</th> </tr> <tr> <td colspan="3">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</td> </tr> </tbody> </table>									MODULE -I	CONCEPTUAL MODELING INTRODUCTION	Classes: 10	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	Classes: 08	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	Classes: 10	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 1 st , 2 nd and 3 rd normal forms, Basic definitions of MVDs and JDs, 4 th and 5 th normal forms		
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MODULE -IV	TRANSACTION MANAGEMENT	Classes: 10
<p>Transaction processing: Transaction Concept, Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability.</p> <p>Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling.</p> <p>Recovery: Failure Classification, Storage Structure ,Recovery and Atomicity, Log-Based Recovery, Shadow Paging, Recovery With Concurrent Transactions Buffer Management</p>		
MODULE -V	DATA STORAGE AND QUERY PROCESSING	Classes: 07
<p>Data storage: Overview of Physical Storage Media, Magnetic Disks, Storage Access, File Organization, Organization of Records in Files.</p> <p>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.</p> <p>Query Processing: Overview, Measures of Query Cost.</p>		
Text Books:		
<ol style="list-style-type: none"> 1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, "Database System Concepts", McGraw-Hill, 6th Edition, 2017. 		
Reference Books:		
<ol style="list-style-type: none"> 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, Corlos Coronel, "Database System, Design, Implementation and Management", Thompson Learning Course Technology, 5th Edition, 2003 		
Web References:		
<ol style="list-style-type: none"> 1. https://www.youtube.com/results?search_query=DBMS+onluine+classes 2. http://www.w3schools.in/dbms/ 3. http://beginnersbook.com/2015/04/dbms-tutorial/ 		
E-Text Books:		
<ol style="list-style-type: none"> 1. http://www.e-booksdirectory.com/details.php?ebook=10166 2. http://www.e-booksdirectory.com/details.php?ebook=7400re 3. https://docs.google.com/file/d/0B9aJA_iV4kHYM2dieHZhMHhyRVE/edit 		
MOOC Course		
<ol style="list-style-type: none"> 1. https://onlinecourses.nptel.ac.in/noc18_cs15/preview 2. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems-fall-2010/ 		