



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

COURSE CONTENT

DATABASE MANAGEMENT SYSTEMS								
III Semester: CSE / CSD								
IV Semester: CSM								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
24X0503	Core	L	T	P	C	CIA	SEE	Total
		3	0	0	3	40	60	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil			Total Classes: 45			
Prerequisites: There are no prerequisites to take this course.								

Course Overview:

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. The course includes database design principles, normalization, concurrent transaction processing, security, recovery and file organization techniques. By using a DBMS, you can easily backup and recover the data. In addition, multi-user access to the database ensures that everyone can work together effectively.

Course Objectives:

1. Understand the role of database management system in an organization and learn the database concepts.
2. Design databases using data modeling and Logical database design techniques.
3. Construct database queries using relational algebra and calculus and SQL.
4. Understand the concept of a database transaction and related concurrent, recovery facilities.
5. Learn how to evaluate a set of queries in query processing

Course Outcomes: After Completion of the Course, Students should be able to

- Explain database system architecture, relational model concepts, data independence, and ER-based conceptual design principles.
- Apply relational algebra, relational calculus, integrity constraints, and logical database design techniques in relational databases.
- Construct SQL queries, constraints, and triggers, and perform schema refinement using normalization principles up to Fifth Normal Form.
- Analyze transaction management and concurrency control mechanisms including ACID properties, serializability, locking protocols, deadlock handling, and recovery techniques.
- Evaluate storage structures, file organization methods, and indexing techniques including hashing, ISAM, and B+ tree indexing for performance optimization.

UNIT - I: Database Systems: A Historical Perspective, File Systems versus a DBMS, Relational Model, Levels of Abstraction in a DBMS, Data Independence, Structure of DBMS.

Introduction to Database Design: Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER

Model, Conceptual Design with ER Model.

UNIT - II: Relational Model: Introduction, Integrity constraints over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views.

Relational Algebra and Calculus: Relational Algebra, Tuple relational Calculus, Domain relational calculus.

UNIT - III: SQL: Queries, Constraints, Triggers: Form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

Schema refinement: Problems caused by redundancy, Decompositions, problems related to decomposition, Reasoning about Functional Dependencies, FIRST, SECOND, THIRD normal forms, BCNF, Lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

UNIT - IV: Transaction Management: ACID properties, Transactions and Schedules, Concurrent execution of transactions, Lock-based Concurrency control, Performance of locking, Transaction support in SQL, Introduction to crash recovery.

Concurrency control: Serializability and Recoverability, Introduction to lock management, Lock conversions, Dealing with dead locks, Specialized locking techniques, Concurrency control without locking.

UNIT - V: Storage and Indexing: Data on External Storage, File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning **Tree structured Indexing:** Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

TEXT BOOKS:

1. Database Management Systems, Raghu Ramakrishanan, Johannes Gehrke, Tata McGraw Hill 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw hill, Vth edition

REFERENCE BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel, 7th Edition.
2. SQL The Complete Reference, James R. Groff, Paul N. Weinberg, 3rd Edition,
3. Oracle for Professionals, The X Team, S. Shah and V. Shah, SPD.
4. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.

ELECTRONIC RESOURCES:

1. <https://www.geeksforgeeks.org/search/?q=database+management+systems>
2. <https://www.programiz.com/sql/database-introduction>
3. <https://www.w3schools.in/dbms/intro>
4. <https://www.codechef.com/learn/course/college-dbms>

MATERIALS ONLINE:

1. Course template
2. Tutorial question bank
3. Tech talk and Concept Video topics
4. Open-ended experiments
5. Definitions and terminology
6. Assignments
7. Model question paper – I
8. Model question paper – II
9. Lecture notes
10. E-Learning Readiness Videos