

**PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY**

(Autonomous)

Kanuru, Vijayawada-520007

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (AI&ML)**

**II B. Tech – II Semester CSE (AI&ML)**

**DATABASE MANAGEMENT SYSTEMS**

<b>Course Code</b>	23AM3402	<b>Year</b>	II	<b>Semester</b>	II
<b>Course Category</b>	PCC	<b>Branch</b>	CSE(AI&ML)	<b>Course Type</b>	Theory
<b>Credits</b>	3	<b>L – T – P</b>	3-0-0	<b>Prerequisites</b>	Data Structures
<b>Continuous Internal Evaluation</b>	30	<b>Semester End Examination</b>	70	<b>Total Marks:</b>	100

**Course Outcomes**

Upon successful completion of the course, the student will be able to

<b>CO1</b>	Describe the foundational principles and concepts of database management systems	<b>L2</b>
<b>CO2</b>	Apply Entity-Relationship (ER) modeling, Relational Algebra, and SQL operations to design database solutions for a given application.	<b>L3</b>
<b>CO3</b>	Use normalization techniques to enhance the efficiency, consistency, and integrity of database design.	<b>L3</b>
<b>CO4</b>	Analyze real-world scenarios and use Conceptual and Relational data models to design efficient and effective database systems.	<b>L4</b>

**Contribution of Course Outcomes towards achievement of Program Outcomes & Strength of correlations (3: Substantial, 2: Moderate, 1: Slight)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
<b>CO1</b>	2													
<b>CO2</b>	3													
<b>CO3</b>	2													
<b>CO4</b>		2										2		

<b>Syllabus</b>		
<b>Unit No.</b>	<b>CONTENTS</b>	<b>Mapped CO</b>
<b>I</b>	<b>Introduction:</b> Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system environment, Centralized and Client Server architecture for the databases.	<b>CO1</b>
<b>II</b>	<b>Conceptual Data Modeling:</b> High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Refining the ER Design, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher Than Two. Relational Database Design Using ER-to-Relational Mapping.	<b>CO1, CO2, CO4</b>
<b>III</b>	<b>Relational Model:</b> Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance, Relational Algebra <b>Basic SQL:</b> Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update). SQL querying using where clause, arithmetic & logical operations, SQL functions (Date and Time, Numeric, String). Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, views, relational set operations.	<b>CO1, CO2, CO4</b>
<b>IV</b>	<b>Database Design Theory and Normalization:</b> Functional Dependencies, Normal forms based on Primary Keys, General definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multi valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form, Denormalization	<b>CO1, CO3</b>
<b>V</b>	<b>Transaction Processing:</b> Introduction, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability & Serializability, Transaction Support in SQL. <b>Introduction to Concurrency Control:</b> Two-Phase Locking Techniques for concurrency control: Types of Locks and System Lock Tables, Guaranteeing Serializability by Two-Phase Locking. <b>Introduction to Recovery Protocols:</b> Recovery Concepts, No-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging.	<b>CO1</b>

**Learning Resources****Text Books**

1. Fundamentals of Database Systems, Ramez Elmasri, Shamkant B. Navathe, Seventh edition, Pearson.

**Reference Books**

1. Introduction to Database Systems, Eighth Edition, C J Date, Pearson.
2. Data base System Concepts, Abraham Silberschatz, Henry F Korth, S. Sudarshan, Fifth Edition, McGraw Hill.
3. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, Third Edition, TMH
4. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

**E-Resources & other digital material**

1. <https://nptel.ac.in/courses/106/105/106105175/>
2. [https://infyspringboard.onwingspan.com/web/en/app/toc/lex\\_auth\\_01275806667282022456\\_shared/overview](https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_shared/overview)
3. [https://onlinecourses.nptel.ac.in/noc21\\_cs04/](https://onlinecourses.nptel.ac.in/noc21_cs04/)
4. <https://nptel.ac.in/courses/106/106/106106093/>