

PRASAD V. POTLURI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(Autonomous)

Kanuru, Vijayawada-520007

II B. Tech – II Semester

(Common to CSE, IT, CSE (AI&ML), CSE(DS))

DATABASE MANAGEMENT SYSTEMS

Course Code	23CS3402	Year	II	Semester	II
Course Category	PCC	Branch	CSE	Course Type	Theory
Credits	3	L – T – P	3-0-0	Prerequisites	Data Structures
Continuous Internal Evaluation	30	Semester End Examination	70	Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to		
CO1	Understand the basic concepts of database management systems	L2
CO2	Apply the ER model, Relational algebra and SQL operations to solve database-related problems.	L3
CO3	Apply Normalization techniques and Transaction management concepts to enhance the efficiency of database design.	L3
CO4	Analyze real-world scenarios to design databases using conceptual models, relational models and normalization.	L4

Syllabus

Unit No.	CONTENTS	Mapped CO
I	Introduction: 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.	CO1
II	Conceptual Data Modeling: 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.	CO1, CO2, CO4

III	<p>Relational Model: 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</p> <p>Basic SQL: 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.</p>	CO1, CO2, CO4
IV	<p>Database Design Theory and Normalization: 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</p>	CO1, CO3, CO4
V	<p>Transaction Processing: Introduction, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability & Serializability, Transaction Support in SQL.</p> <p>Introduction to Concurrency Control: Two-Phase Locking Techniques for concurrency control: Types of Locks and System Lock Tables, Guaranteeing Serializability by Two-Phase Locking.</p> <p>Introduction to Recovery Protocols: Recovery Concepts, No-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging.</p>	CO1, CO3

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
3. https://onlinecourses.nptel.ac.in/noc21_cs04/
4. <https://nptel.ac.in/courses/106/106/106106093/>