Database Management Systems

Course Code	19CS3502	**Year**	III	**Semester**	I
Course Category	Program Core	**Branch**	CSE	**Course Type**	Theory
Credits	3	**L-T-P**	3-0-0	**Prerequisites**	Engineering Mathematics -1, Data Structures
Continuous Internal Evaluation :	30	**Semester End Evaluation:**	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 SQL as well as Relational Algebra to find solutions to a broad range of queries	**L3**
CO3	Apply various data models for database design	**L3**
CO4	Apply normalization techniques to improve database design	**L3**
CO5	Analyze a given database application scenario to use ER model for conceptual design of the database and make an effective report	**L4**

Syllabus		
Unit No.	**Contents**	**Mapped CO**
I	**Introduction to Databases:** Characteristics of the Database Approach, Advantages of using the DBMS Approach, A Brief History of Database Applications. Overview of Database Languages and Architectures: Data Models, Schemas and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Database System environment, Centralized and Client-Server Architecture for DBMSs.	**CO1**
II	**Relational Model:** The Relational Model Concepts, Relational Model Constraints and Relational Database Schemas. SQL: Data Definition, Constraints, and Basic Queries and Updates, SQL: Advanced Queries, Assertions, Triggers, and Views Formal Relational Languages: Relational Algebra: Unary Relational	**CO1,CO2, CO3**

	Operations: Select and Project, Relational Algebra Operations from Set Theory, Binary Relational Operations: Join and Division, Examples of Queries in Relational Algebra.	
III	**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,CO3, CO5**
IV	**Database Design Theory:** Functional Dependencies, Normal forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multi valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.	**CO1,CO4**
V	**Transaction Processing:** Introduction, Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability &Serializability, Transaction Support in SQL. Introduction to Concurrency Control: Two-Phase Locking Techniques: Types of Locks and System Lock Tables, Guaranteeing Serializability by Two-Phase Locking. Introduction to Recovery Protocols: Recovery Concepts, No-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging.	**CO1**

Learning Resources
Text Books
1. Database Systems Models, Languages, Design and Application Programming, RamezElmasri,ShamkantB. Navathe, Sixth edition, Pearson.
References
1. Data base System Concepts, Abraham Silberschatz, Henry F Korth, S. Sudarshan, Fifth Edition, McGraw Hill. 2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, Third Edition, TMH. 3. Introduction to Database Systems, C.J.Date, Eigth Edition , Pearson
e-Resources and other Digital Material:
1. https://nptel.ac.in/courses/106/105/106105175/ 2. https://onlinecourses.nptel.ac.in/noc21_cs04/ 3. https://nptel.ac.in/courses/106/106/106106093/