

Database Management Systems

Course Code	19IT3503	Year	III	Semester	I
Course Category	PC	Branch	IT	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 Operations: Select and Project, Relational Algebra Operations from Set Theory, Binary Relational Operations: Join and Division, Examples of	CO1,CO2, CO3

	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, Ramez Elmasri, Shamkant B. 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, Eighth 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/