

constraints, Weak entity types, ER diagrams, Specialization and Generalization.

Textbook 1: Ch 1.1 to 1.8, 2.1 to 2.6, 3.1 to 3.10

RBT: L1, L2, L3

Module 2:

Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, transactions, and dealing with constraint violations.

Relational Algebra: Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra. Mapping Conceptual Design into a Logical Design: Relational Database Design using ER-to-Relational mapping.

Textbook 1: Ch 5.1 to 5.3, Ch 8.1 to 8.5; Ch 9.1 to 9.2 **Textbook 2:** 3.5

RBT: L1, L2, L3

Module 3:

Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

SQL: SQL data definition and data types, Schema change statements in SQL, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL

Textbook 1: Ch 14.1 to 14.7, Ch 6.1 to 6.5

RBT: L1, L2, L3

Module 4:

SQL: Advanced Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL.

Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL.

Textbook 1: Ch 7.1 to 7.3, Ch 20.1 to 20.6

RBT: L1, L2, L3

Module 5:

Concurrency Control in Databases: Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering, Multiversion Concurrency control techniques, Validation Concurrency control techniques, Granularity of Data items and Multiple Granularity Locking.

NOSQL Databases and Big Data Storage Systems: Introduction to NOSQL Systems, The CAP Theorem, Document-Based NOSQL Systems and MongoDB, NOSQL Key-Value Stores, Column-Based or Wide Column NOSQL Systems, NOSQL Graph Databases and Neo4j

Textbook 1: Chapter 21.1 to 21.5, Chapter 24.1 to 24.6

RBT: L1, L2, L3

List of Text Books	
1. Fundamentals of Data Base Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson. 2. Data Base Management Systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill.	
Course Outcomes	The student will be able to: - Describe the basic elements of a relational database management system - Design entity relationship for the given scenario. - Apply various Structured Query Language (SQL) statements for database manipulation. - Analyse various normalization forms for the given application. - Develop database applications for the given real world problem. - Understand the concepts related to NoSQL databases.

The Correlation of Course Outcomes (CO's) and Program Outcomes (PO's)

Course Code: 21CS53		Course Title: Data Base Management System											
List of Course Outcomes	Program Outcomes												Total
	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	
CO-1	3	2	2	2	2	-	-	2	1	-	-	2	16
CO-2	2	2	2	2	3	-	-	2	2	-	-	2	17
CO-3	2	2	2	3	2	-	-	2	2	-	-	2	17
CO-4	2	2	2	2	2	-	-	2	2	-	-	2	16
CO-5	3	2	1	2	2	-	-	2	2	-	-	2	16
CO-6	2	2	2	2	2	-	-	2	2	-	-	2	16
Total	14	12	13	13	14	-	-	12	11	-	-	12	98

Note: 3 = Strong Contribution 2 = Average Contribution 1= Weak Contribution 0 = No Contribution

The Correlation of Course Outcomes (CO's) and Program Outcomes (PSO's)

SubjectCode: BCS403		Course Title: Data Base Management System	
List of Course Outcomes	Program Specific Outcomes		Total
	PSO-1	PSO-2	
CO-1	2	-	2
CO-2	2	-	2
CO-3	2	-	2
CO-4	2	-	2
CO-5	2	-	2
CO-6	2	-	2
Total	12	-	12

Note: 3 = Strong Contribution 2 = Average Contribution 1= Weak Contribution 0 = No Contribution