

**COURSE MODULE OF THE SUBJECT TAUGHT FOR THE SESSION
2023-2024 (ODD SEMESTER)**

Course Syllabus with CO's

Academic Year: 2023-24							
Department: Computer Science and Design				Course Coordinator: Mrs. Pushpa P			
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
18CS53	Database Management System	Core	-	3	2	-	50
Objectives	1. Provide a strong foundation in database concepts, technology, and practice. 2. Practice SQL programming through a variety of database problems. 3. Demonstrate the use of concurrency and transactions in database. 4. Design and build database applications for real world problems.						
Topics Covered as Per Syllabus							
Module-1: Introduction to Databases: Introduction, Characteristics of database approach, Advantages of using the DBMS approach, 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, The Database System environment. Conceptual Data Modeling using Entities and Relationships: Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples, Specialization and Generalization. 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. SQL: SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL, Additional features of SQL. Module-3: SQL: Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. Database Application Development: Accessing databases from applications, An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Case study: The internet bookshop. Internet Applications: The three-Tier application architecture, The presentation layer, The Middle Tier. Module-4: Normalization: Database Design Theory–Introduction to Normalization using Functional and Multi valued Dependencies: Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal							

Forms, Boyce-Codd Normal Form, Multi valued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form. **Normalization Algorithms:** Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Nulls, Dangling tuples, and alternate Relational Designs, Further discussion of Multivalued dependencies and 4NF, Other dependencies and Normal Forms.

Module-5: 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 supporting SQL. **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. **Introduction to Database Recovery Protocols:** Recovery Concepts, NO-UNDO/REDO recovery based on Deferred update, Recovery techniques based on immediate update, Shadow paging, Database backup and recovery from catastrophic failures.

List of Text Books

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.
2. Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill

List of Reference Books

1. Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc-Graw Hill, 2013.
2. Coronel, Morris, and Rob, Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.

List of URLs, Text Books, Notes, Multimedia Content, etc

1. <https://www.smartdraw.com/entity-relationship-diagram/>
2. https://en.wikipedia.org/wiki/Database_normalization
3. www.databasteknik.se/webbkursen/relalg-lecture
4. [https://technet.microsoft.com/en-us/library/bb264565\(v=sql.90\).aspx](https://technet.microsoft.com/en-us/library/bb264565(v=sql.90).aspx)
5. pages.cs.wisc.edu/~dbbook/openAccess/thirdEdition/.../Ch16_Overview_Xacts.pdf
6. www.c-sharpcorner.com/UploadFile/f0b2ed/transaction-management-in-sql/

Course Outcomes	The students should be able to:												
	1. Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS.												
	2. Use Structured Query Language (SQL) for database manipulation.												
	3. Design and build simple database systems.												
	4. Develop application to interact with databases.												

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

Subject Code:	21CS53	Title: Database 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	1	-	2	-	-	-	-	-	-	-	-	-	3
CO-2	-	1	3	-	3	-	-	-	-	-	-	-	7
CO-3	-	2	3	-	-	-	-	-	-	-	-	-	5
CO-4	-	-	3	-	-	-	-	-	-	-	-	-	3
Total	1	3	11	-	3	-	-	-	-	-	-	-	18

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)

Subject Code:	21CS53	Title: Database Management System	
List of Course Outcomes	Program Specific Outcomes		Total
	PSO-1	PSO-2	
CO-1	1	-	1
CO-2	1	-	1
CO-3	1	-	1
CO-4	1	-	1
Total	4	-	4

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