

Academic Year: 2023-2024							
Department: Computer Science and Engineering- Data Science							
Course Code	Course Title	Core/Elective	Prerequisite	Contact Hours			Total Hrs/ Sessions
				L	T	P	
21CS53	Database Management System	Core	-	3	2	-	40
Objectives	1. Provide a strong foundation in database concepts,technology,andpractice. 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 worldproblems.						
Topics Covered as Per Syllabus							
<u>MODULE-1:</u>							
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.							
<u>MODULE-2:</u>							
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 Logical Design: Relational Database Design using ER-to-Relational mapping.							
<u>MODULE-3:</u>							
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.							
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.

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. Examples of Normal Forms.

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 Multi valued 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 support in SQL.

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

List of Text Books

1. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B.Navathe,7thEdition, 2017,Pearson.
2. Data base management systems, Ramakrishnan, and Gehrke,3rdEdition,2014,McGrawHill

List of URLs,TextBooks,Notes,Multimedia Content,etc

Weblinks and Video Lectures (e-Resources):

1. <https://www.youtube.com/watch?v=3EJlovevfcA>
2. <https://www.youtube.com/watch?v=9TwMRs3qTcU>
3. <https://www.youtube.com/watch?v=ZWl0Xow304I>
4. <https://www.youtube.com/watch?v=4YilEjkNPrQ>
5. <https://www.youtube.com/watch?v=CZTkgMoqVss>
6. <https://www.youtube.com/watch?v=Hl4NZB1XR9c>
7. https://www.youtube.com/watch?v=EGEwkad_IIA
8. <https://www.youtube.com/watch?v=t5hsV9IC1rU>

Course Outcomes	At the end of the course the student will be able to: CO 1. Identify, analyze and define database objects, enforce integrity constraints on a database using RDBMS CO 2. Use Structure Query Language (SQL) for database manipulation and also demonstrate the basic of query evaluation. CO 3. Design and build simple database systems and relate the concept of transaction, concurrency control and recovery in database CO 4. Develop application to interact with databases, relational algebra expression. CO 5. Develop applications using tuple and domain relation expression from queri
------------------------	---

The Correlation of Course Out comes (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	-	-	-	-	-	-	-	-	-	4
CO-3	-	2	3	-	-	-	-	-	-	-	-	-	5
CO-4	-	-	3	-	-	-	-	-	-	-	-	-	3
Total	1	3	11	-	-	-	-	-	-	-	-	-	15

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