

BCSC1003: DATABASE MANAGEMENT SYSTEM

Objective: The objective of the course is to enable students to understand and use a relational database & NoSQL system. Students learn how to design and create a good database.

Credits: 03

L-T-P-J: 3-0-0-0

Module No.	Content	Teaching Hours
I	<p>Introduction: An Overview of Database Management System, Database System Vs File System, Database System Concept and Architecture, Data Model Schema and Instances, Data Independence, Database Language and Interfaces (DDL, DML, DCL), Database Development Life Cycle (DDLC) with Case Studies.</p> <p>Data Modeling Using the Entity-Relationship Model: ER Model Concepts, Notation for ER Diagram, Mapping Constraints, Keys, Specialization, Generalization, Aggregation, Reduction of an ER Diagram to Tables, Extended ER Model.</p> <p>Relational Data Model and Language: Relational Data Model Concepts, Integrity Constraints, Entity Integrity, Referential Integrity, Keys Constraints, Primary Key, Foreign Key, Candidate Key, Super Key, Domain Constraints, Relational Algebra.</p> <p>Database Design & Normalization I: Functional Dependencies, Canonical Cover, Normal Forms, First, Second, Third Normal Forms, BCNF.</p>	20
II	<p>Database Design & Normalization II: Lossless Join and Dependency Preserving Decomposition, MVD and 4th Normal Form, JD and 5th Normal Form, Inclusion Dependence.</p> <p>File Organization: Indexing, Structure of Index files and Types, Dense and Sparse Indexing</p> <p>Transaction Processing Concept: Transaction System, Testing of Serializability, Serializability of Schedules, Conflict & View Serializable Schedule, Recoverability, Recovery from Transaction Failures, Log Based Recovery, Deadlock Handling.</p> <p>Concurrency Control Techniques: Concurrency Control, Locking Techniques for Concurrency Control, 2PL, Time Stamping Protocols for Concurrency Control, Validation Based Protocol.</p> <p>Distributed Database: Introduction of Distributed Database, Data Fragmentation and Replication.</p>	20

Text Books:

- Elmasri and Navathe, "Fundamentals of Database Systems", 6th Edition, Addison Wesley, 2010.
- Sadalage, P. & Fowler, "NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence", Pearson Education, 2012.

References Books:

- Date C J, "An Introduction to Database Systems", 8th Edition, Addison Wesley.
- Korth, Silbertz & Sudarshan, "Database Concepts", 5th Edition, TMH, 1998.
- Redmond, E. & Wilson, "Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL Movement", 1st Edition.

Outcome: After the completion of the course, the student will:

- CO1: Understand the concept of database management systems and Relational database.
- CO2: Identify the various data model used in database design.
- CO3: Design conceptual models of a database using ER modeling for real life applications and construct queries in Relational Algebra.
- CO4: Create and populate a RDBMS for a real life application, with constraints and keys using SQL.
- CO5: Select the information from a database by formulating complex queries in SQL.
- CO6: Analyze the existing design of a database schema and apply concepts of normalization to design an optimal database.
- CO7: Discuss indexing mechanisms for efficient retrieval of information from a database.
- CO8: Discuss recovery system and be familiar with introduction to web database, distributed databases.

Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs):

COs	POs/PSOs
CO1	PO1 /PSO1
CO2	PO2, PO3/ PSO2
CO3	PO2,PO3,PO6,PO11/PSO1,PSO2,PSO4
CO4	PO1,PO3/PSO1
CO5	PO1,PO5/PSO1
CO6	PO2,PO3,PO9/ PSO2
CO7	PO1,PO11 /PSO1
CO8	PO1,PO3,PO12/ PSO2