

Course: Major
Database Management System

Semester: I	Credits: 2	Subject Code: BSMAJCS123121	Lectures: 30
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Course Outcomes:

At the end of this course, the learner will be able to:

- CO1 - Understand the fundamental concepts of data storage.
- CO2 - Use diagramming tools such as E-R Model and create models in software development
- CO3 - Evaluate and apply database management operations to use database systems
- CO4 - Analyze the raw data and design data dependencies, constraints, views, triggers, and functions in databases

Unit 1: DBMS and Conceptual Design

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- Introduction to DBMS -Data and Database, What is Database System? File system Vs DBMS, Structure of DBMS, Users of DBMS, Advantages of DBMS, Data models (relational, hierarchical, network), Levels of abstraction, Data independence, Database Languages (DDL, DML, DCL, TCL)
- Conceptual Design (Entity-Relationship Model) E-R Data Model (entities, attributes, entity sets, relations, relationship sets), Additional constraints (key constraints, participation constraints), Weak and Strong entity, Aggregation and Generalization, Conceptual design using E-R (entities Vs attributes, entity Vs relationship, binary Vs ternary), Conceptual design for small to large enterprises, Assignment: Case study based on E-R model

Unit 2: Structured Query Language using RDB design

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- SQL-Introduction to SQL: SQL: Basic structure, DDL Commands, DML commands, Forms of a basic SQL query (Expression and strings in SQL), Features of SQL: Set operations, Aggregate Operators and functions, Date and String functions, Null values, Nested Subqueries, SQL mechanisms for joining relations (inner joins, outer joins and their types), Views, Examples on SQL queries.
- Relational Database Design-Introduction to Relational-Database Design, Undesirable properties of a RDB design, Functional Dependency (Basic concepts, F+, Closure of an Attribute set, Armstrong's axioms), Concept of Decomposition: Desirable Properties of Decomposition (Lossless join, Lossy join, Dependency Preservation), Concept of normalization: Normal Forms (1NF, 2NF and 3NF), keys Concept with Examples: Candidate Keys and Super Keys, Algorithm to find the super keys / primary key for a relation.

Reference Books:

- Avi Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts*-6th edition- McGraw-Hill
- Elmasri, Navathe, *Fundamentals of Database Systems* -5th edition –Pearson.



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- Joshua D. Drake, John C Worsley, *Practical Postgresql*, (O'Reilly publications)
- Raghu Ramakrishnan, *Database Management Systems*, Mcgraw-hill higher Education, ISBN:9780071254342
- Raghu Ramakrishnan and Johannes Gehrke, *Database Management Systems*, McGraw-Hill Science/Engineering/Math; 3 edition, ISBN: 9780072465631

Websites:

- <http://www.postgresql.org/docs/9.3/static/tutorial.html>

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