Course Code: BTCS501-18	Course Title: Database Management Systems	3L:0T:0P	3Credits

Detailed Contents:

Module 1:   Database system architecture

Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object oriented Data models, integrity constraints, data manipulation operations.

[7hrs] (CO1,2)

Module 2:   Relational query languages

Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE, DB2, SQL server. Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design. Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.   **[10hrs] (CO2,4)**

Module 3:

Storage strategies, Indices, B-trees, hashing.   **[3hrs] (CO3)**
Module 4:   Transaction processing

Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.   **[6hrs] (CO3)**

Module 5:   Database Security

Authentication, Authorization and   access control, DAC, MAC and RBAC models, Intrusion

detection, SQL injection.   **[8hrs] (CO 4,5)**
Module 6:   Advanced Topics

Object oriented and object relational databases, Logical databases, Web databases, Distributed

databases.   **[8hrs] (CO 5)**
Course Outcomes:
At the end of study the student shall be able to:

CO1: write relational algebra expressions for a query and optimize the Developed expressions **CO2:** design the databases using ER method and normalization.
CO3: construct the SQL queries for Open source and Commercial DBMS-MYSQL, ORACLE, and DB2.
 CO4: determine   the transaction atomicity, consistency, isolation, and durability.

CO5: Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

Text Books:

1. "Database System Concepts", 6th Edition by Abraham Silberschatz, Henry F. Korth,
S.

Sudarshan, McGraw-Hill.

Reference Books:

1. "Principles of Database and Knowledge–Base Systems", Vol1 by J. D. Ullman, Computer Science Press.
2. "Fundamentals of Database Systems", 5th Edition by R. Elmasri and S. Navathe, Pearson Education.
3. "Foundations of Databases", Reprint by Serge Abiteboul, Richard Hull, Victor Vianu, Addison-Wesley.