Distributed and Object Oriented Database

Course Title: Distributed and Object Oriented Database   **Full Marks:** 60 + 20 + 20
Course No: CSC480   **Pass Marks:** 24 + 8 + 8
Nature of the Course: Theory + Lab   **Credit Hrs:** 3
Semester: VIII

Course Description:
This course aims to discuss concepts of distributed and object oriented database management systems. Main focus is given to basic concepts of DDBMS, distributed database design, distributed query processing, distributed concurrency control, concepts of OODBMS, and language and design of object oriented database.

Course Objectives:
- Discuss basic concepts related to distribute DBMS.
- Exemplify design of distributed database.
- Describe distributed query processing and concurrency control.
- Discuss basic concepts of OODBMS.
- Demonstrate language and design for distributed database.

Course Contents:
Unit 1: Introduction to Distributed Database (4 Hrs.)
Distributed Data Processing, Distributed Database Systems, Promises of DDBS, Complicating Factors, Design Issues of DDBMS, and Distributed DBMS Architectures: Autonomy, Distribution, Heterogeneity DDBMS Architecture – Client/Server, Peer to peer, MDBS.

Unit 2: Distributed Database Design and Access Control (4 Hrs.)
Top-Down Design Process, Distribution Design Issues, Fragmentation, Allocation, Data Directory, View Management, Data Security, Semantic Integrity Control.

Unit 3: Query Processing, Decomposition, and Localization (6 Hrs.)
Query Processing Problem, Objectives of Query processing, Complexity of RA Operations, Characterization of Query Processors, Layers of Query Processing, Query Decomposition, Localization of Distributed Data.

Unit 4: Distributed Concurrency Control(8 Hrs.)
Serializability Theory, Taxonomy of Concurrency Control Mechanisms, Lock Based Concurrency Control Algorithms, Time-Stamp Based Concurrency Control Algorithms, Optimistic Concurrency Control Algorithms, Deadlock management.

Unit 5: Object Oriented Database Concepts (6 Hrs.)
Overview of Object-Oriented Concepts, Object Identity, Object Structure, and Type Constructors, Encapsulation of Operations, Methods, and Persistence, Type Hierarchies and Inheritance, Complex Objects, Other Objected-Oriented Concepts

Unit 6: OODBMS Languages and Design (6 Hrs.)
Object Model, Object Definition Language, Object Query Language, Object Database Conceptual Design, Examples of ODBMSs.

Laboratory Works:
Students should implement all the concepts of object oriented and distributed databases mentioned in the course.

Text Books:
1. M. Tamer Özsu and Patrick Valduriez, Principles of Distributed Database Systems, Fourth Edition, Springer, 2019.
2. ElmasriRamez and NavatheShamkant, Fundamentals of Database System, Seventh Edition, Pearson Education, 2017.