Course code: CS-612 T   **Course Title: C2. Distributed Database Management System**

Total Credit: 2   Marks: 50 (UA: 40 + IA: 10)

Periods: 3 per week (50 Minutes each)

Prerequisites :- Database Management Systems & Networking

Learning Objectives

- To introduction to Distributed DBMS and associated problems.
- Students will be able to understand various algorithms and techniques for managing distributed database.

Learning Outcomes

On completion of the course, the students will be able to:

- Understand what is Distributed DBMS
- Understand various architectures of DDBMS
- Apply various fragmentation techniques given a problem
- Understand and calculate the cost of enforcing semantic integrity control
- How optimization techniques are applies to Distributed Database
- Learn and understand various Query Optimization Algorithms
- Understand various algorithms and techniques for deadlock and recovery in Distributed database

Course Outline

Unit – 1: Introduction: Distributed Data Processing, Distributed Database Systems, Promises of DDBSs, Complicating factors, Problem areas, Distributed DBMS Architecture : Models- Autonomy, Distribution, Heterogeneity DDBMS Architecture – Client/Server, Peer to peer, MDBS.

Unit – 2 : Data Distribution Alternatives: Design Alternatives – localized data, distributed data Fragmentation – Vertical, Horizontal (primary & derived), hybrid, general guidelines, correctness rules, Distribution transparency – location, fragmentation, replication, Impact of distribution on user queries – No Global Data Dictionary(GDD), GDD containing location information, Example on fragmentation

Unit – 3: Semantic Data Control : View Management, Authentication – database authentication, OS authentication, Access Rights,Semantic Integrity Control – Centralized & Distributed , Cost of enforcing semantic integrity, Query Processing : Query Processing Problem, Layers of Query Processing Query Processing in Centralized Systems – Parsing & Translation, Optimization, Code generation, Example Query Processing in Distributed Systems – Mapping global query to local, Optimization,

Unit – 4 : Optimization of Distributed Queries: Query Optimization, Centralized Query Optimization, Join Ordering Distributed Query Optimization Algorithms, Distributed Transaction Management & Concurrency Control: Transaction concept, ACID property, Objectives of transaction management, Types of transactions, Objectives of Distributed Concurrency Control,Concurrency Control anomalies, Methods of concurrency control,Serializability and recoverability, Distributed Serializability, Enhanced lock based and timestamp based protocols, Multiple granularity, Multi version schemes, Optimistic Concurrency Control techniques, Distributed Deadlock & Recovery

Unit– 5: Test and Tutorial

Reference Books :

1. Principles of Distributed Database Systems, Ozsu, Pearson Publication
2. Distributed Database Mangement Systems, Rahimi & Haug, Wiley
3. Distributed Database Systems, Chanda Ray, Pearson Publication
4. Distributed Databases, Sachin Deshpande, Dreamtech