

M.Sc. Computer Science Syllabus First Year (2018-23)

Distributed Database Concepts

Semester I

Subject Code: MS11803

Lectures: 60

Objectives:

The syllabus aims in equipping students with,

- To understand the principles and foundations of distributed databases.
- This course addresses architecture, design issues, integrity, query processing and optimization, transactions, and concurrency control & distributed transaction reliability.

Unit 1: Introduction

06

Ch 1. Distributed databases: An overview

2

- Features of distributed Vs centralized databases
- Why DDB? DDBMS
- Promises / problem areas in implementing a DDB

Ch 2. DDBMS Architecture

4

- DBMS Standardization
- Architectural models for DDBMS
- DDBMS architecture
- Distributed catalog management

Unit 2: Distributed database design

10

Ch 3. Distributed database design

10

- Alternative design strategies
- Distributed design issues
- Concepts of join graphs
- Fragmentation and allocation

BOS Members :

Dr. Reena Bharati (Subject Expert)

Dr. Manisha Bharambe (Subject Expert)

Dr. Jyoti Yadav (Subject Expert)

Mr. Vishal Salke (Industry Expert)

Ms. Amruta Nambiar (Alumni)

Prof. Ashwini Kulkarni (Chairman and Internal Faculty)

Prof. Shubhangi Jagtap (Internal Faculty)



Unit 3: Distributed Query Processing	6
Ch 4. Overview of Query processing	4
<ul style="list-style-type: none"> • Query processing problems • Objectives of query processing • Complexity of relational algebra operators • Characterization of query processors • Layers of query processing 	2
Ch 5. Query decomposition & data localization	
<ul style="list-style-type: none"> • Query decomposition • Localization of distributed data 	
Unit 4: Optimization of distributed queries	14
Ch 6. Optimization of distributed queries	12
<ul style="list-style-type: none"> • Query optimization • Centralized query optimization Join ordering in fragment queries • Distributed query optimization algorithms (R, R*, Ingres algorithm) 	
Ch 7. Management of distributed transactions	2
<ul style="list-style-type: none"> • Framework for transaction management • Supporting atomicity of distributed transactions • Concurrency control of distributed transactions • Architectural aspects of distributed transactions 	

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Unit 5: Distributed Transaction Processing	12
Ch 8. Concurrency control	6
<ul style="list-style-type: none"> • Foundations of distributed concurrency control • Lock management in distributed database, distributed 2PL • Distributed deadlocks • Concurrency control based on timestamps • Optimistic methods for distributed concurrency control 	
Ch 9. Distributed DBMS reliability	6
<ul style="list-style-type: none"> • Reliability concepts & measures • Failures & fault tolerance in distributed systems • Failures in DDBMS • Local reliability protocols • Distributed reliability protocols • Dealing with site failures • Network partitioning 	

*Contact hours – 12 hours

Reference Books:

1. M. Tamer Ozsu and Patrick Valduriez, *Principles of Distributed Database Systems*, 2nd Edition Publishers: Pearson Education Asia ISBN: 81-7808-375-2
2. Stefano Ceri and Giuseppo Pelagatti, *Distributed Database; Principles & Systems* Publications: McGraw-Hill International Editions ISBN: 0-07-010829-3
3. Raghuramakrishnan and Johannes, *Database systems* (2nd edition)

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