

**Kadi Sarva Vishwavidyalaya, Gandhinagar**  
**MASTERS OF COMPUTER APPLICATION (MCA)**  
**Year – II (Semester – IV) (W.E.F. January 2015)**  
**Subject: DISTRIBUTED DATABASES (DD) - MCA-406(B)**

Sub Total Credit	Teaching scheme		Examination scheme				
	(per week)		MID	CEC	External		Total Marks
	Th	Pr	Th	Th	Th.	Pr.	
3	3	0	25	25	50	0	100

**Course Description:**

The objective of this course is based on Design, Architecture, Query Optimization, Transaction Management and Concurrency control aspects of Distributed Database Management Systems (DDBMS). It covers theoretical as well as applied aspects of distributed platform and analyzes a number of working systems (case studies) and discusses the future infrastructure.

**Learning Objectives:**

Students will learn Five aspect of DDBMS in this course, which is as under:

- In “**Introduction to DDBMS**” they will learn about basic concepts of DDBMS
- In “**DDBMS Architecture** ” they will learn architectural components of DDBMS
- In “**Distributed Database Design**” they will learn various design concepts to develop DDBMS.
- In “**Query Optimization**” they will learn how to optimize the data retrieval using various algorithms
- In “**Transaction Management and Concurrency Control in DDBMS**” they will learn how to manage transaction and deal with concurrency problems in DDBMS.

**Prerequisites :**

- Knowledge of database management system concepts
- Knowledge of Computer Networks concepts

**UNIT-I : Introduction to DDBMS**

**[20%]**

- Distributed Data Processing
- Defining Distributed Database System
- Promises of DDBMS
- Complicating Factors
- Problem Areas

**UNIT-II : DDBMS Architecture****[20%]**

- Architectural Models for Distributed DBMSs: Autonomy, Distribution and Heterogeneity.
- Architectural alternatives
- Client/Server Systems
- Peer-to-Peer Distributed System
- Multi-DBMS Architecture (MDBS)

**UNIT-III : Distributed Database Design****[20%]**

- Alternative Design Strategies
- Distribution design issues
- Fragmentation
- Allocation

**UNIT-IV : Query Optimization****[20%]**

- Defining Query Optimization
- Centralized Query Optimization
- Join Ordering in fragment queries
- Distributed query optimization algorithms

**UNIT-V : Transaction Management and Concurrency Control in DDBMS****[20%]**

- Types of Transaction
- Serializability
- Locking based Concurrency Control
- Time stamp based Concurrency Control
- Optimistic concurrency control
- Deadlock Management
- "RELEXED" Concurrency Control

**Text Book(s):**

1. Principles of Distributed Database Systems. Ozsu and Valduriez. Prentice Hall.
2. DISTRIBUTED DATABASE MANAGEMENT SYSTEMS :A Practical Approach, by SAEED K. RAHIMI and FRANK S. HAUG, A JOHN WILEY & SONS, INC., PUBLICATION

**Reference Books:**

1. Distributed Databases Principles and Systems. Ceri , Pelagatti, MGH 2008
2. Distributed Database System by Chhand Ray , Pearson
3. Modern Database Management by Jeffery Hoffer, Seventh Edition, PEARSON
4. Database Systems Concepts by Abraham, Korth, S. Sudarsan, Fifth Edition, MGH
5. Raghu Rama Krishnan and Johannes Gechrib, "Database Management Systems", Mc Graw Hill.
6. Date C. J, "An Introduction to Database System, Vol1 & II", Addition Wesley.
7. Elmasari , Navathe, "Fundamentals of Data Base Systems", Addition Wesley.
8. RamaKrishnan , Gehke, "Database Management System", McGraw Hill

### Unit wise coverage from text book(s): DISTRIBUTED DATABASES (DD) - MCA-406(B)

UNIT 1 :	BOOK 1	CH 1 (FULL)
UNIT II	BOOK 1	CH 4 (FULL)
UNIT III	BOOK 1	CH 5 (FULL)
UNIT IV	BOOK 1	CH 9 (FULL)
UNIT V	BOOK 1	CH 10 (10.3) CH 11 (FULL)

### List of practicals/case studies for class demonstration will be based on (BOOK 2, BOOK1)

- Designing Distributed databases (BOOK 2 CH 2, ch 3))
  - Database fragmentation strategies (BOOK 2 CH 2)
  - database horizontal / vertical partitioning (BOOK 2 CH 2)
  - data control (BOOK 2 CH 3)
- Query optimization (BOOK 2 CH 4)
  - Joining multiple tables at different sites

### Continuous Evaluation Management(Internal Marks)

The continuous evaluation will be organized as follows:

**Project:** There will be one research project where each student has to solve a research problem and develop efficient solution. It is emphasize that the research report must be of conference or journal quality. A list of useful projects (unsolved problem) will be presented to the class and students are free to select a topic from this list. A student is free to select a research topic out side of this list but the topic must be related to the course material and must be approved by the subject faculty before students begins his/her research.

**Seminar/Presentation:** Each student must present a seminar on the topic of their research. They can select the same topic for seminar and research paper. Each seminar will be an hour long and 15 minutes for question and answer and the seminar participation is mandatory for each student of this course. These seminars will be presented near the end of the semester. In case of high enrollment two students may be assigned to a project and seminar. (This can be perform as group activity with limited team member size)

**Internal Marks:** The final internal marks will be obtained on the basis of the quality of the seminar, participation in the class discussion, and the quality of the research report.

Students are encouraged to join in the class discussion and present their thoughts and ideas on the all distributed system problems.