

**Unit 1:**

Introduction to Transaction Management, Read and Write Operations, ACID properties Concurrency Control, System Log, Commit Point, Schedules and Serializability, Concurrency control Techniques-Two Phase Locking, Multiversion, validation/optimistic, Database Recovery Types (REDO, UNDO), Database recovery techniques-Write ahead logging, checkpointing, shadow paging. Backup and Recovery from catastrophic failures

**Unit 2:**

Database Security, Goals of DBMS security, Discretionary access control (Grant/Revoke privileges, Audit Trails), Firewalls, Data encryption-simple substitution method, polyalphabetic substitution method. Introduction to OO databases, Object Oriented data model, Comparison of OOMD and ER model, Object oriented database concepts-classes, objects, Relationships, OODBMS-Advantages and Disadvantages

**Unit 3:**

Parallel database systems-Advantages and Disadvantages, Architecture of Parallel Databases, Key elements-speedup, scale-up, synchronization, locking. Query Parallelism-Inter and Intra-Distributed Database system concepts-Types, Advantages and Disadvantages, Architecture-client-server, Middleware systems, Distributed data base system design-data fragmentation, data allocation, data replication, Concurrency control in distributed databases, Recovery control in distributed databases (two phase/three phase commit)

**Unit 4:**

Data warehousing Concepts-Definition, features, Data warehouse architecture, Data warehousing schemas, Fact tables, Dimension Table, Concept of Data Marts, The role of Metadata, Data Pre-processing, ETL (Extraction, Transformation, Loading). Online Analytical Processing (OLAP): Features and functions. Data Mining Concepts, Knowledge Discovery in Database.

**Recommended Books**

- 1) Introduction to Database Concepts, Bipin Desai, Galgotia Publications
- 2) Database Management System, R. Ramakrishanan Johannes, Tata Mcgraw Hill
- 3) Fundamentals of Database Management System, Rameez Elmsari , S B Navathe, Pearson