**UNIT III:**

- DBMS Instance

- DBMS Internal Memory Structure

- Background Processes

- Data Types

- Roles & Privileges

- Introduction to Query Processing

- Translating SQL Queries into Relational Algebra

- Translating Relational Algebra into SQL Queries

- Algorithms for External Sorting

- Algorithms for SELECT and JOIN Operations

- Algorithms for PROJECT and SET Operations

- Implementing Aggregate Operations and Outer Joins

**UNIT IV:**

- Introduction, Secondary Storage Devices

- Buffering of Blocks and Placing File Records on Disk

- Operations on Files

- Heap Files, Sorted Files

- Hashing Techniques

- Parallelizing Disk Access using RAID Technology

- Secondary Access Paths, Types of Single-Level Ordered Indexes

- Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+ Trees

- Indexes on Multiple Keys

**UNIT V:**

- Introduction to Transaction Processing, Transaction and System Concepts

- Desirable Properties of Transactions

- Characterizing Schedules based on Recoverability

- Characterizing Schedules based on Serializability

- Introduction to Concurrency Control

- Two Phase Locking Techniques

UNIT III:

- DBMS Instance: NIL

- DBMS Internal Memory Structure: NIL

- Background Processes: NIL

- Data Types: Chapter-1 (Basics)

- Roles & Privileges: NIL

- Introduction to Query Processing: Chapter-6 (Relational Algebra)

- Translating SQL Queries into Relational Algebra: Chapter-6 (Relational Algebra)

- Translating Relational Algebra into SQL Queries: Chapter-6 (Relational Algebra)

- Algorithms for External Sorting: NIL

- Algorithms for SELECT and JOIN Operations: NIL

- Algorithms for PROJECT and SET Operations: NIL

- Implementing Aggregate Operations and Outer Joins: NIL

UNIT IV:

- Introduction, Secondary Storage Devices: NIL

- Buffering of Blocks and Placing File Records on Disk: NIL

- Operations on Files: NIL

- Heap Files, Sorted Files: NIL

- Hashing Techniques: NIL

- Parallelizing Disk Access using RAID Technology: NIL

- Secondary Access Paths, Types of Single-Level Ordered Indexes: Chapter-5 (Indexing)

- Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+ Trees: Chapter-5 (Indexing)

- Indexes on Multiple Keys: Chapter-5 (Indexing)

UNIT V:

- Introduction to Transaction Processing, Transaction and System Concepts: Chapter-9 (Transaction)

- Desirable Properties of Transactions: Chapter-9 (Transaction)

- Characterizing Schedules based on Recoverability: Chapter-9 (Transaction)

- Characterizing Schedules based on Serializability: Chapter-9 (Transaction)

- Introduction to Concurrency Control: Chapter-9 (Transaction)

- Two Phase Locking Techniques: Chapter-9 (Transaction)