

**IV/IV B. TECH. FIRST SEMESTER
ADVANCED DATABASES (Elective-I)**

Course Code: CS 7T4B**Credits: 3****Lecture:3 periods/week****Internal assessment: 30 Marks****Tutorial: 1period/week****Semester end examination: 70 Marks**

Prerequisites: Databases _ Algorithms and data structures _ Programing and programming engineering

Course Objectives:

1. The main objective of this course is to familiarize students with the Advanced concepts on data bases.
2. To Comprehend the concepts of Query Processing & Optimization Techniques.
3. It also gives the knowledge of transaction processing and concurrency control.
4. To Introduce the Recovery Techniques.
5. To Introduce the basic concepts of Emerging and Advanced Databases .

Course Outcomes:

At the end of this course student will:

CO1) Understand the Processing and Optimization of Queries

CO2) Interpret the transaction management Techniques

CO3) Discuss Concurrency control Protocols

CO4) Describe different Database Recovery Techniques

CO5) Summarize the relevant Emerging and Advanced Database concepts

Syllabus:**UNIT 1****Introduction to Query Processing and Query Optimization Techniques:**

Translating SQL Queries into Relational Algebra, Algorithms for External Sorting, Algorithms for SELECT and JOIN Operations, Algorithms for PROJECT and Set Operations, Implementing Aggregate Operations and OUTER JOINS, Combining Operations Using Pipelining, Using Heuristics in Query Optimization, Using

Selectivity and Cost Estimates in Query Optimization, Overview of Query Optimization in Oracle, Semantic Query Optimization.

UNIT 2

Foundations of Database Transaction Processing: Introduction to Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability, Transactions Support in SQL.

UNIT 3

Introduction to Protocols for Concurrency Control in Databases : Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Multiversion Concurrency Control Techniques, Validation Concurrency Control Techniques, Granularity of Data Items and Multiple Granularity Locking, Using Locks for Concurrency Control in Indexes, Other Concurrency Control Issues.

UNIT 4

Introduction to Database Recovery Protocols: Recovery Concepts, NO_UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm, Recovery in multidatabase Systems, Database Backup and Recovery from Catastrophic Failures.

UNIT 5

Emerging Database Technologies and Applications : Mobile Data Management, Multimedia Data Management, Geographic Information Systems(GIS), Biological and Genomic Databases and Emerging Applications.

Advanced Database Models and Applications : Active Database Concepts and Triggers, Temporal Database Concepts, Spatial Database Concepts, Multimedia Database Concepts, Introduction to Deductive Databases.

Learning Resource

Text Books

DATABASE SYSTEMS Models, Languages, Design and Application Programming, 6th Edition, Ramez Elmasri ,Shamkant B.Navathe , Pearson.

References

- 1.Data base System Concepts, 5th Edition, Abraham Silberschatz, Henry F Korth, S.Sudarshan,Mc Graw Hill.
- 2.Data base Management Systems, 3rd Edition, Raghurama Krishnan, Johannes Gehrke, TMH