ADVANCED DBMS

Course Code: CS8PE422 **Credits: 3-0-0-0-3**

Unit I: Overview Of Storage And Indexing, Disks And Files 7 Hrs

Data on external storage; File organizations and indexing; Index data structures; Comparison of file organizations; Indexes and performance tuning. Memory hierarchy; RAID; Disk space management; Buffer manager; Files of records; Page formats and record formats.

Unit II: Overview Of Query Evaluation, External Sorting 8 Hrs

The system catalog; Introduction to operator evaluation; Algorithms for relational operations; Introduction to query optimization; Alternative plans: A motivating example; what a typical optimizer does. When does a DBMS sort data? A simple two-way merge sort; External merge sort.

Unit III: Evaluating Relational Operators 7 Hrs

The Selection operation; General selection conditions; The Projection operation; The Join operation; The Set operations; Aggregate operations; The impact of buffering.

Unit IV: A Typical Relational Query Optimizer 8 Hrs

Translating SQL queries in to Relational Algebra; Estimating the cost of a plan; Relational algebra equivalences; Enumeration of alternative plans; Nested sub-queries; Other approaches to query optimization.

Unit V: Physical Database Design And Tuning 9 Hrs

Introduction; Guidelines for index selection, examples; Clustering and indexing; Indexes that enable index-only plans; Tools to assist in index selection; Overview of database tuning; Choices in tuning the conceptual schema; Choices in tuning queries and views; Impact of concurrency; DBMS benchmarking.

More Recent Applications

Mobile databases; Multimedia databases; Geographical Information Systems; Genome data management.

Text Books:

1. Database Management Systems – Raghu Ramakrishnan and Johannes Gehrke, 3rd Edition, McGraw-Hill, 2003.
2. Fundamentals of Database Systems – Elmasri and Navathe, 5th Edition, Addison- Wesley, 2007. (Chapter 30)

Reference Book:

1. Database Systems– Connolly and Begg, 3th Edition, Pearson Education,

Course Outcomes:

1. Able to understand how data is store in file organization, indexing and query optimization
2. Apply the different sorting techniques; estimate the cost of different queries and different guidelines for index selection.
3. Able to understand the choices of database tuning techniques, recent applications like mobile databases, multimedia databases, GIS and Genome data mining.