## Advanced Database Management System

**Semester VI** **Subject Code: BS61706** **Lectures: 60**

**Objectives:**

- To introduce the students to advanced concepts in databases.
- To gain an awareness of the basic issues in objected oriented data models
- To learn about the Web-DBMS integration technology, familiarize with the data-warehousing and data-mining techniques and other advanced topics.

| **Unit 1: Advance Database Management System – Concepts & Architectures** | **6** |
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**Advance Database Management System – Concepts & Architectures**

- Centralized Database
- Client-Server Database
- Object Oriented Server system (Transaction servers, Data servers, Cloud based servers)
- Parallel Database
- Distributed Database
- Object Oriented Databases
- Web based system (Web architecture (2 tier , 3 tier, N-tier Architecture with respect to database) )

| **Unit 2: Types of Databases** | **21** |
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**Parallel Databases**

- Introduction
- Architecture of Parallel Database (Shared Memory Architecture, Shared Disk Architecture, Shared Nothing Architecture)
- I/O parallelism (Introduction)
- Types of Parallelism(Inter-query and Intra-query parallelism, Inter-operational and Intra-operational )

**Distributed Databases - Database Environment**

- Introduction
- Types of Distributed Databases(Homogeneous Distributed Databases,Heterogeneous Distributed Databases )
- Distributed DBMS Architectures
  - Client-Server Architecture for DDBMS
  - Peer to Peer Systems
  - Middleware Systems
- Storing Data in a Distributed DBMS(Fragmentation, Data Replication, Hybrid)
- Distributed Catalog Management
  - Naming Objects
  - Catalog Structure
  - Distributed Data Independence
- Distributed Query Processing
  - Nonjoin Queries in a Distributed DBMS
  - Joins in a Distributed DBMS
- Distributed transactions (transactions, transactions operations, transactions states, desirable properties of transactions, schedules and conflicts, serializability)
- Distributed Concurrency Control
  - Distributed Deadlock
  - Distributed Recovery
  - Normal Execution and Commit Protocols
  - Restart After Failure
  - Two-Phase Commit Revisited
- Three-Phase Commit

**Unit 3: Specialty Databases & Applications** **8**

**Specialty Databases & Applications**

- Object based Databases – OR & OO
  - Overview of Object- Oriented concepts & characteristics
  - Database design for OODBMS - Objects, OIDs and reference types
  - Database design for ORDBMS
  - Comparing RDBMS, OODBMS & ORDBMS
- Introduction to different types of OODBMS
  - Temporal databases
  - Spatial data & Geographic database
  - Multimedia data
  - Mobility & Personal databases

**Unit 4: Data Warehousing and Data Mining** **13**

**Data Warehousing**

- Introduction to Data warehousing
- Architecture (business analysis framework, three tier data warehouse architecture)
- Warehouse schemas /Dimensional data modeling- star, snowflake schemas, fact constellation
- OLAP and data cubes (introduction sto OLAP and data cubes)
- Operations on cubes (roll-up, drill down, slice and dice, pivote)
- Data preprocessing - need for
- Preprocessing, data cleaning, data integration & transformation, data reduction

**Introduction of Data Mining**

- Introduction to Data Mining
- Data Mining Models
  - Descriptive
  - Predictive
- Data mining Applications
  - Commercial system –( Market Analysis, Fraud Detection, Customer Retention, Production Control)
  - Scientific domain-( Science Exploration, Earth Sciencs, Climate Modeling and Romote Sensing, Scientific Modeling and Robotics)

**Reference Books:**

1. Abraham Silberschatz, Henry Korth, S, Sudarshan, *Database system concepts'*, 6th Edition – (McGraw Hill International )
2. Raghu Ramkrishnan, Johannes Gehrke, *Database Management Systems* - Second Edition, (McGraw Hill International )
3. Alexis Leaon, Mathews Leon, *Database Management System*, (leon press)
4. Remez Elmasri , Shamkant Navathe, *Fundamentals of Database Systems*,Pearson,5th Ed
5. Thomes M. Colnnolly, Carolyn E. Begg, *Database Systems – a Practical approach to design , implementation & Management*, Pearson 4th Ed.