

ELX 383.3 Database Management Systems (3 – 1 – 3)

	Theory	Practical	Total
Sessional	30	20	50
Final	50	-	50
Total	80	20	100

Objectives:

The objective of this course is to provide fundamental concept, theory and practices in design and implementation of DBMS.

Course Contents:

- 1. Introduction (4hrs)**
Concept and applications, Motivation, Objectives and Evolution, Needs and organization of database, Data abstraction, Data independence, Schema and Instances, Concept of DDL and DML, Database Manager and users, Needs of DBMS.
- 2. Data Models (4 hrs)**
Logical, Physical and Conceptual, E-R Model, Network Data Model, Hierarchical Data Model.
- 3. Relational Model (4 hrs)**
Definitions and terminology, Structure of relational databases, The relational algebra, The relational calculus, Schemas and Views.
- 4. Relational Languages (3 hrs)**
SQL, DDL and DML, QBE
- 5. Relational Database Design (8hrs)**
Introduction, Integrity constraints, Referential Integrity, Multivalued and Join Dependencies, Normalization, Normal Forms, User schema or views design, Decomposition of relation schemes.
- 6. Security (3 hrs)**
Needs of Security, Security and integrity violations, Access control, Authorization, Security and Views, Encryption and decryption.

7. Query Processing (3 hrs)

Introduction to query processing, Query interpretation, Equivalence of expressions, Query Optimization, Join strategies, Query decomposition.

8. Filing and File Structure (5 hrs)

Needs of filing, Overview of storage devices, Organization of records into blocks, File organization, The sequential and the indexed sequential file organizations. B-Tree index files, Hashing and Hash function, Heap piling, Data Dictionary storage, Buffer Management.

9. Crash Recovery (4 hrs)

Introduction to crash recovery and its importance, Failure classification, Backup-recovery, Storage hierarchy, Transaction model, Log-based recovery, Shadow paging.

10. Concurrency Control (4 hrs)

Introduction, Transaction and Transaction processing, Scheduling and Serializability, Locking and Lock based protocols, Time-stamping-based protocols, Deadlock handling, Multiple Granularity.

11. Advanced Database Model (3 hrs)

Extended Relational Model, Object- Oriented Model, Distributed Model.

Laboratory:

There shall be 12 laboratory exercises based on ORACLE to cover theoretical part studied, An individual project should be given to each student. 10% of sessional marks should be allocated for evaluation.

Text Book:

1. A.K. Majumdar and P. Bhattacharaya, *Database Management Systems*, Tata McGraw Hill, India

Reference Books:

1. H.F. Korth and A. Silberschatz, *Database System Concepts*, McGraw Hill.
2. R. E. Mani and S.C. Nevathe, *Fundamentals of Database Systems*, Benjamin/Cummings Publishing Co. Inc.
3. G.C. Everest, *Database Management*, McGraw Hill.

