IV Year I Semester	L	T	P	To	C
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MT 441 DATABASE MANAGEMENT SYSTEMS (ELECTIVE - IV)

Course Description & Objectives:

This course strives to emphasize fundamentals of Database Management Systems, the relational model, ER diagrams, SQL. This course serves as fundamentals of Transaction Processing and Query Processing as well as Security Issues in Databases.

Course Outcomes:

At the end of the course, the student would be able to:

1. *design databases for applications.*
2. *use the relational model, er diagrams.*
3. *apply concurrency control and recovery mechanisms for practical problems.*
4. *design the query processor and transaction processor.*
5. *apply security concepts to databases.*

UNIT I: Introduction to DBMS:

File Systems Organization - Sequential, Pointer, Indexed, Direct - Purpose of Database System-Database System Terminologies-Database characteristics- Data models – Types of data models – Components of DBMS-Relational Algebra. LOGICAL DATABASE DESIGN: Relational DBMS - Codd's Rule - Entity-Relationship model - Extended ER Normalization – Functional Dependencies, Anomaly- 1NF to 5NF- Domain Key Normal Form – Denormalization

UNIT II: SQL & Query Optimization:

SQL Standards - Data types - Database Objects- DDL-DML-DCL-TCL-Embedded SQL-Static Vs Dynamic SQL - QUERY OPTIMIZATION: Query

Processing and Optimization - Heuristics and Cost Estimates in Query Optimization.

UNIT III: Transaction Processing and Concurrency Control:

Introduction-Properties of Transaction- Serializability- Concurrency Control – Locking Mechanisms- Two Phase Commit Protocol-Dead lock.

UNIT IV: Trends in Database Technology:

Overview of Physical Storage Media – Magnetic Disks – RAID – Tertiary storage – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing – Introduc tion to Distributed Databases- Client server technology- Multidimensional and Parallel databases- Spatial and multimedia databases-Mobile and web databases- Data Warehouse-Mining- Data marts.

UNIT V: Advanced Topics:

DATABASE SECURITY: Data Classification-Threats and risks – Database access Control – Types of Privileges –Cryptography- Statistical Databases.- Distributed Databases-Architecture-Transaction Processing-Data Warehousing and Mining-Classification -Association rules-Clustering-Information Retrieval- Relevance ranking-Crawling and Indexing the W eb-Object Oriented Databases-XML Databases.

TEXT BOOK:

1. Ramez Elmasri and Shamkant B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education, 2008.

REFERENCES:

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, “Database System Concepts”, Sixth Edition, Tata Mc Graw Hill, 2011.
2. C.J.Date, A.Kannan and S.Swamynathan, “An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
3. Atul Kahate, “Introduction to Database Management Systems”, Pearson Education, New Delhi, 2006.
4. Alexis Leon and Mathews Leon, “Database Management Systems”, Vikas Publishing House Private Limited, New Delhi, 2003.
5. Raghu Ramakrishnan, “Database Management Systems”, Fourth Edition,Tata Mc Graw Hill, 2010.
6. G.K.Gupta, “Database Management Systems”, Tata Mc Graw Hill, 2011. Rob Cornell, “Database Systems Design and Implementation”, Cengage Learning, 2011