UNIVERSITY OF MADRAS

MASTER OF COMPUTER APPLICATIONS (MCA) DEGREE PROGRAMME

SYLLABUS WITH EFFECT FROM 2023-2024

Title of the Paper	**Database Management Systems**		
Core -V Theory	I Year & II Semester	Credit:4	435C2A

OBJECTIVES

- To learn the fundamentals of data models and to represent a database system using ER diagrams.
- To study SQL and relational database design.
- To understand the internal storage structures using different file and indexing techniques which will help in physical DB design.
- To understand the fundamental concepts of transaction processing - concurrency control techniques and recovery procedures.
- To have an introductory knowledge about the Storage and Query processing Techniques

Unit I: Introduction to Database Systems – Relational Model – Structure – Relational Algebra – Null Values – SQL – Set Operation – Views – Advanced SQL – Embedded SQL – Recursive Queries – The Tuple Relational Calculus – Domain Relational Calculus.

Unit II: E-R Model – Constraints – E-R- Diagrams Weak Entity Sets – Reduction to Relational Schemes – Relational Database Design – Features of Relational Design – Automatic Domains and First Normal Form – Decomposition using Functional Dependencies – Multivalued Dependencies – More Normal Forms – Web Interface – Object – Based Databases – Structured Types and inheritance in SQL – Table inheritance – Persistent.

Unit III: Storage and File Structure – RAID – File Organization – Indexing and Hashing – B Tree – B Tree Index files - Static and Dynamic Hashing – Query Processing – Sorting & Join Operators – Query Optimization – Choice of Evaluation Plans.

Unit IV: Transaction Management – Implementation of Atomicity and Durability – Serializability – Recoverability – Concurrency Control – Dead Lock Handling – Recovery System – Buffer Management.

Unit V: Database – System Architecture – Client Server – Architectures – Parallel System – Network Types – Distributed Database – Homogeneous and Hetrogeneous Database – Directory System – Case Study – Oracle – MSSQL Server.

Recommended Text

1. A. Silberschatz, H.F. Korth and S. Sudharshan, 2006, Database System Concepts, 5th Edition, Tata McGraw Hill, New Delhi.

Reference Books

1. J. D. Ullman,1988,Principles of Database Systems, Galgotia Publishers, New Delhi.
2. C.J. Date, 1985, An Introduction to Database Systems, Third Edition, Narosa, New Delhi.

3. Elmasri and Navathe, 1999, Fundamentals of Database Systems, Third Edition, Pearson Education, Delhi.
4. C. Ritchie, 2004, Relational Database Principals, 2ndEdition,Thomson, Singapore.

Website and e-Learning Source :

1) http://www.cse.iitb.ac.in/dbms/DataPapers-Local/DBConceptsBook/slide-dir/

Course Outcomes

Course Outcome	Description	Knowledge Level
CO1	Classify the modern and futuristic database applications based on size and complexity	K1-K6
CO2	Map ER model to Relational model to perform database design effectively	K1-K6
CO3	Write queries using normalization criteria and optimize queries	K1-K6
CO4	Compare and contrast various indexing strategies in different database systems	K1-K6
CO5	Appraise how advanced databases differ from traditional databases.	K1-K6

2) K1- Remember, K2- Understand, K3- Apply, K4- Analyze, K5- Evaluate, K6- Create

Mapping with Programme Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S	S	M	S	M	S	L	M	L	L
CO2	S	M	L	S	M	S	M	L	M	M
CO3	L	M	S	L	M	M	S	L	S	M
CO4	S	M	L	M	L	L	M	M	M	S
CO5	M	S	M	S	S	S	M	L	M	L

S-Strong M-Medium L-Low