

DSE355Advance DBMS

Semester: V	Course Title: Advance DBMS	Credit: 4
Course Code: DSE355		(3 T + 1 P)

Course Outcomes: On successful completion of the course the learner will be able to

CO	COGNITIVE ABILITIES	COURSE OUTCOMES
CO1	REMEMBERING	Recall fundamental security goals, cryptographic principles, and common ciphers.
CO2	UNDERSTANDING	Explain symmetric/asymmetric encryption algorithms, hashing, and digital signatures.
CO3	APPLYING	Apply cryptographic algorithms, steganographic techniques, and secure communication protocols.
CO4	ANALYSING	Analyze vulnerabilities, attacks, and security risks in digital systems.
CO5	EVALUATING	Evaluate privacy policies, security mechanisms, and legal compliance requirements.
CO6	CREATING	Design secure systems incorporating cryptography, data hiding, and privacy-by-design principles.

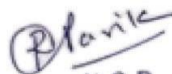
	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
CO 1	3	3	2	2	1
CO 2	2	3	3	2	1
CO 3	2	3	2	3	2
CO 4	2	3	3	2	2
CO 5	3	3	3	2	1
CO 6	3	3	3	3	2

Unit No.	Detailed Syllabus	Teaching Hours
I	Review of RDBMS concepts Relational model, constraints, keys, normalization review, ER and EER modelling; Advanced SQL – complex queries, joins, subqueries, views, aggregate and analytic functions; PL/SQL & procedural extensions – stored procedures, functions, triggers, cursors, error handling; Query optimization – execution plans, indexing, cost-based optimization.	15
II	Transaction Management & Concurrency Control: Transactions – ACID properties, transaction states, serializability & recoverability; Concurrency control – lock-based protocols, timestamp ordering, deadlock detection & prevention; Recovery techniques – shadow paging, write-ahead logging (WAL), checkpoints, recovery algorithms; Database security – authentication, authorization, access control, encryption, SQL injection prevention.	15
III	Advanced Topics & Emerging Trends: Distributed databases – architecture, fragmentation, replication, query processing; NoSQL & big data databases – document, key-value, columnar, and graph databases, MongoDB, Cassandra, Neo4j overview; Data warehousing & OLAP – star & snowflake schemas, ETL process, OLAP operations, cube design; Database	15

	in cloud & new technologies – DBaaS, multi-tenant databases, introduction to graph query languages (Cypher, Gremlin).	
IV	Practical Component (using MySQL and PostgreSQL) • Complex joins • subqueries, views, analytic functions • Stored procedures • Functions • Triggers • Simulating lock-based and timestamp ordering protocols • Testing deadlock scenarios • Mini Project • End-to-end database design, implementation, and optimization for a real-world problem	15

Suggested Reference Books:

1. Database System Concepts, Abraham Silberschatz, Henry F. Korth and S. Sudarshan, McGraw-Hill Education, 7th Edition.
2. Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, Pearson Education, 7th Edition.
3. MySQL Stored Procedure Programming by Guy Harrison and Steven Feuerstein (O'Reilly)
4. MySQL 8.0 Reference Manual, Oracle Corporation
5. Data Warehouse Toolkit, Ralph Kimball and Margy Ross, Wiley, 3rd Edition.


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