3. Database Management Systems (CS-111) **(3-0-2)**

Database Approach - System Concepts and Architecture, Database Users; Database Design - Entity-Relationship (E-R) Model, Relational Model, Mapping E-R to Relational Model; Languages - Relational Algebra, Tuple and Domain Relational Calculus , SQL; Normalization - Functional and Multivalued Dependency, 1NF to 5NF; Security; Transaction Management - Transaction, ACID properties, Concurrency, Recovery ; Query Optimization - Cost based and Heuristics based. Practical: Design E-R model for a real world, map to relational model, implement using available RDBMS and execute SQL queries.

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References:

1. Elmasri, R., Navathe, S., Fundamentals of Database Systems, Sixth Edition, Pearson Education, 2006.
2. Silberschatz A., Korth H, Sudarshan S., Database System Concepts, Sixth Edition, McGraw-Hill, 2010.