CS210: Database Management System	L	T	P	Data Structures
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Course Objective: To provide knowledge about the principles, concepts and applications of Database Management System.

S. No.	Course Outcomes (CO)
CO1	Ability to differentiate database systems from traditional file systems and compare their functionality and benefits.
CO2	Transform information model into a relational database schema and define the schema using data definition language in DBMS.
CO3	Formulate SQL, relational algebra and TRC query for broad range of query problems.
CO4	Able to use a DBMS software to create, populate, maintain, and query a database.
CO5	Ability to analyze functional dependencies and design of database.
CO6	Describe normalization theory and apply such knowledge to the normalization of a database.
CO7	List basic database storage structures and access techniques: file and page organizations, including B-tree and hashing.
CO8	Pursue advance courses and acquire knowledge of new technologies, skills in the field of DBMS.
CO9	Generate and integrate databases for real life projects.

S. No	Contents	Contact Hours
UNIT 1	Introduction: Database system concepts and its architecture, Data models schema and instances, Data independence and database language and interface, Data definition languages, DML. Overall database structure. Data modeling using Entity Relationship Model: E.R. model concept, notation for ER diagrams mapping constraints, Keys, Concept of super key, candidate key, primary key generalizations, Aggregation, reducing ER diagrams to tables, extended ER model.	10
UNIT 2	Relational Data Model and Language: Relational data model concepts, integrity constraints, Keys domain constraints, referential integrity, assertions, triggers, foreign key relational algebra, relational calculus, domain and tuple calculus, SQL data definition queries and updates in SQL.	8

UNIT 3	Data Base Design: Functional dependencies, normal forms, 1NF, 2NF, 3NF and BCNF, multi-valued dependencies fourth normal form, join dependencies and fifth normal form. Inclusion dependencies, lossless join decompositions, normalization using FD, MVD and JDs, alternatives approaches to database design.	8
UNIT 4	File Organization, Indexing and Hashing: Overview of file organization techniques, Indexing and Hashing- Basic concepts, Static Hashing, Dynamic Hashing, Ordered indices, Multi-level indexes, B-Tree index files, B+- Tree index files, Buffer management Transaction Management: Transaction concept, schedule and recoverability, Serializability of schedules, conflict & view serializable schedule, Testing of serializability.	8
UNIT 5	Concurrency Control: Lock-based protocols for concurrency control, Timestamp-based protocols for concurrency control, concurrency control in distributed systems. multiple granularities and multi-version schemes, deadlock handling. Recovery System: Failure Classification, Log-based recovery, Recovery with concurrent transactions, Buffer management Case Studies: Commercial databases, Oracle, Postgres, MySQL, NoSQL	8
	Total	**42**