| MCA- C105 Database Management System | | | |
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**Course objective:**
1. To learn data models, conceptualize and depict a database system using ER diagram.
2. To understand the internal storage structures in a physical DB design.
3. To know the fundamental concepts of transaction processing techniques.

**Course outcomes:**
1. For a given specification of the requirement design the databases using E-R method and normalization.
2. For a  given specification construct the  SQL  queries
3. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
4. Implement the isolation property, including   locking, time stamping   based on concurrency control and Serializability of scheduling

**Introduction:** Purpose of Database System, Views of data, data models, database management system, three-schema architecture of DBMS, components of DBMS, ER Model, notations, examples.

**Relational Model:** Relational Data Model, Concept of relations, schema-instance distinction, keys, referential integrity and foreign keys, relational algebra operators, SQL: Introduction, data definition in SQL, table, key and foreign key definitions, update behaviours. Querying in SQL, notion of aggregation, aggregation functions group by and having clauses, embedded SQL

**Database Design:** Dependencies and Normal forms, dependency theory, functional dependencies, Armstrong's axioms for FD's, closure of a set of FDs', minimal covers, definitions of 1NF, 2NF, 3NF and BCNF, decompositions and desirable properties of them, algorithms for 3NF and BCNF normalization.

**Transactions:** Transaction processing and Error recovery - concepts of transaction processing, ACID properties, concurrency control, locking based protocols for CC, error recovery and logging, undo, redo, undo-redo logging and recovery methods.

**Implementation Techniques**: Data Storage and Indexes, File organizations, primary, secondary index structures, various index structures, hash-based, dynamic hashing techniques, multi-level indexes, B+ trees.

**Recommended Books:**
1. Silberschatz, H F Korth and S. Sudarshan, Database System Concepts, McGraw Hill
2. Elmasari and Navathe, Fundamentals of Database Systems, Addison Wesley Publishing Company

HEAD
Department of Computer Science
Gurukul Kangri Vishwavidyalaya
Haridwar (UK) – 249404