

CSE11108	Database Management Systems	L	T	P	C
Version 1.0	Contact Hours 45	3	0	0	3
Pre-requisite/Exposure	Set Theory, Knowledge of programming language.				
Co-requisite	NIL				

Course Objectives:

- To understand database concepts, applications, data models, schemas and instances.
- To implement the relational database design and data modelling using entity-relationship (ER) model.
- To demonstrate the use of constraints and relational algebra operations and Normalization process
- To learn the new emerging Technologies and Applications in database.

Course Outcomes:

On the completion of this course the student will be able to

Describe the characteristics of database and the architecture of Database system.

Model the elements used in Entity- Relationship diagram.

Summarize relational model concept and illustrate the relational constraints.

Build Structured Query Language (SQL) and apply to query a database and Define normalization for relational databases.

Develop some Standalone (Example)/ Mobile/ Web Application DB on real world case studies.

Course Description:

Databases form the backbone of all applications today tightly or loosely coupled, intranet or internet based, financial, social, administrative, and so on. Database Management Systems (DBMS) based on relational and other models have long formed the basis for such databases. Consequently, Oracle, Microsoft SQL Server,

Sybase etc. have emerged as

in the details, they share a common set of models, design paradigms and a Structured Query Language (SQL).

In this

database design, data modeling, database management, data & query optimization, and database implementation. More specifically, the course introduces relational data models; entity-relationship modeling, SQL, data normalization, and database design. Further it introduces query coding practices using MySQL (or any other open system) through various assignments. Design of simple multi-tier client / server architectures based and Web based database applications is also introduced.

Course Content:

Units	Lecture Hours
Unit-I: Overview of database management systems and the relational mode: Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object-oriented data models, integrity constraints, data manipulation operations. ER models: Entity Set, Relation ShipSet, Cardinality Properties, Type of Entities, Type of Keys, Aggregation, Specialization and Generalization.	9
Unit-II: Database design: E-R diagrams, constraints, normal forms Relational algebra, Fundamental Operations, Additional Operations. Select, Project, Cartesian Product, UNION, Set difference, Rename. Types of joining operations, Division, Intersection, Aggregate. Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS - MYSQL, ORACLE,DB2, SQL server.	9
Unit-III: SQL: data definition, data manipulation, queries, views, constraints, triggers: Relational database design: Integrity Constraint, Domain Constrains, Referential Integrity, Functional Dependencies, Closure of Set, Cover and Canonical Cover, Types of Anomalies, Armstrong's axioms, ExtendedArmstrong's axioms, Assertions and Demons. Data Base Decomposition: Domain and data dependency, Normalforms: 1NF, 2 NF, 3 NF, BCNF, Dependency preservation, Lossless design.	9
Unit-IV: Storage and indexing: B-trees, hashing: Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms. Storage strategies: Indices, B-trees, B+-trees, hashing, File System,Disk Organization, Physical Storage, Buffer management.	9
Unit-V: Case Studies : Standalone (Example)/ Mobile/ Web Application DB: Transaction processing: Failure, Recovery from Failure, Different States of Transaction, Transaction Isolation,ACID property, Serializability of scheduling, Multi-version and optimistic Concurrency Control schemes. Concurrency control: Locking and timestamp-based schedulers, 2-Phase Locking Protocol, Dead Lock, DatabaseSecurity: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection. Advanced topics: Distributed databases, Data warehousing and data mining.	9

Modes of Evaluation:

1 = Weakly Mapped 2 = Moderately Mapped 3 = Strongly Mapped