Paper Name: DATABASE MANAGEMENT SYSTEM

1. **Learning Outcome:**
   - Learn database concepts and its architectural components.
   - Describe different data models used for designing a database.
   - To create a database using relational models and entity relationships concepts
   - Normalize a database into various normal forms
   - Design SQL queries to handle a relational database.
2. **Prerequisite:** NIL
3. **Semester: II**
4. **Course Type: Compulsory**
5. **Course Level: 100-199**
6. **Theory Credit:** 3
7. **Practical Credit:** 1
8. **Number of required hours:**
   d) Theory: 45 hrs
   e) Practical: 30 hrs
   f) Non Contact: 5 hrs

9. List of reference books

a) Dr. Satinder Bal Gupta and Aditya Mittal, *Introduction to Database Management System*, University Science Press

b) A. Silberschatz, H.F. Korth, S. Sudarshan, *Database System Concepts*, McGraw Hill

c) R. Elmasri, S.B. Navathe, *Fundamentals of Database Systems*, Pearson Education

d) Dr. Rajive Chopra, *Database Management System (DBMS): A Practical Approach*, S. Chand Publication

10. Detailed Syllabus

Unit no.	Unit content	No.of classes
1	**Introduction to Database Management Systems** Data and Information, Concepts of Fields, Records and Files, Definition of DBMS, Traditional File approach, Traditional file approach versus database management system approach, Disadvantages of Traditional File System, Need of a DBMS, Components of a DBMS, Advantages of DBMS, Disadvantages of Database Systems, Various uses of database System Applications, Database Users: *end users or naive users*, *Online users*, *Application Programmers*, *Database Administrator(DBA)*, Responsibilities of DBA	7
2	**Database Management System Architecture**	4

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	Data Independence and Three-tier architecture of DBMS, basic concept of data model, Database Languages (Data Definition Languages, Data Manipulation Languages),	
3	**E-R Model** Entity, Strong and weak entities, Entity Sets, Attributes, various attribute types: *Simple and Composite Attributes, Single Valued and Multi-valued Attributes, Derived Attributes and Stored Attributes,* Domain of an attribute, Concept of Relationship, Types of Relationship: One-to-One, One-to-Many, Many-to-One and Many-to Many, Various Symbols used in ER Diagram, Mapping constraints: *Mapping Cardinalities* and *Participation Constraints* in ER diagram	7
4	**Relational Model** Database Schema, sub schema and Instances, Attributes, Attribute domains, Relations, Tuples, Relational Schema, Column, Properties of Relations, Degree of a Relation, Constraints in Relational Model: *Domain Constraints, Key Integrity, Referential Integrity*. Keys: Primary keys, Foreign keys, Candidate Keys, Super Keys, Alternative Keys, Advantages of relational model	8
5	**Normalization for Relational Databases** Definition of Functional Dependency, Armstrong's Axioms in Functional Dependency, Types of Functional Dependency: *Partial Dependency, Full Functional Dependency, Transitive and Non-transitive Functional Dependency*, anomalies In relational database: *Insertion*, *Deletion* and *Update* anomalies, Concepts of Normalization, benefits of Normalization, Types of Normal Forms: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF) and Boyce–Codd Normal Form (BCNF)	7
6	**SQL queries** Characteristics of SQL, Basic data types in SQL, Data-definition language (DDL) commands: *Create Database, Create Table, Drop Table, Alter Table*. SQL Constraints: *Primary Key, Foreign Key, Not Null, Unique, Check, Defaul,*. Data Manipulation Language (DML) commands: *Insert Into*, Delete, *Select, Update*. SQL clauses: *Where, Order By, Having, Group By* and *Like*. SQL join operations: *Inner Join, Left Outer Join, Right Outer Join* and *Full Join*. SQL aggregate functions: *sum(), count(), max(), min()* and *avg()*	12

1. **Lab Content**

Practical / Lab work to be performed:

Lab No	Topics to be of the Laboratory work	No of contact Classes (1 Class=2 hours)
1	Implementation of SQL DDL statements in MySQL DBMS: CREATE DATABASE, CREATE TABLE, ALTER TABLE, RENAME, DROP DATABASE/TABLE	3

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2	Use of SQL DML statements in MySQL DBMS: INSERT, SELECT, UPDATE, DELETE SQL commands	3
3	Implementing following constraints in MySQL DBMS: PRIMARY KEY, FOREIGN KEY, NOT NULL, UNIQUE and DEFAULT	3
4	Handling following SQL clauses in MySQL DBMS: WHERE, GROUP BY, ORDER BY, HAVING, IN, BETWEEN, LIKE	3
5	Working with following aggregate functions in MySQL DBMS: COUNT, AVG, MAX, MIN and SUM	3
	Total Contact Classes:	15

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