III Year-I Semester		**T**	**P**	**C**
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DATABASE MANAGEMENT SYSTEMS (RT31054)

Course Description and Objectives:

Provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications. The logical design, physical design and implementation of relational databases are covered.

Course Outcomes:

Upon completion of the course, the student will be able to achieve the following outcomes.

COs	Course Outcomes	POs
1	**Define** a Database Management System and give a description of the Database Management system structure.	3
2	Explain basic SQL and Relational model.	8
3	Outline Entity Relationship model and develop PL/SQL queries.	8
4	Explain various Normal Forms	7
5	Discuss about Transaction management and concurrency control	7
6	Describe the storage structures and indexing techniques	8

Syllabus:

Unit – I:

INTRODUCTION Database system, Characteristics (Database Vs File System), Database Users(Actors on Scene, Workers behind the scene), Advantages of Data base systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

Unit – II:

RELATIONAL MODEL: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints)

and their importance BASIC SQL : Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).

Unit – III:

Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams. SQL : Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view(updatable and non-updatable), relational set operations.

Unit – IV:

SCHEMA REFINEMENT (NORMALIZATION) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

Unit – V:

TRANSACTION MANAGEMENT AND CONCURRENCY CONTROL : Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint.

Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods : lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery. SQL constructs that grant access or revoke access from user or user groups. Basic PL/SQL procedures, functions and triggers.

UNIT – VI:

STORAGE AND INDEXING : Database file organization, file organization on disk, heap files and sorted files, hashing, single and multi-level indexes, dynamic multilevel indexing using B-Tree and B+ tree, index on multiple keys.

Text Books:

1. Database Management Systems, 3/e Raghuram Krishnan, Johannes Gehrke, TMH 2

2. Database Management System, 6/e Ramez Elmasri, Shamkant B. Navathe, PEA

3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

Reference Books :

1. Database System Concepts. 5/e Silberschatz, Korth, TMH

2. Introduction to Database Systems, 8/e C J Date, PEA

3. The Database book principles & practice using Oracle/MySql Narain Gehani, University Press