



# **C. U. SHAH UNIVERSITY – WADHWAN CITY**

## **FACULTY OF TECHNOLOGY AND ENGINEERING DEPARTMENT OF INFORMATION TECHNOLOGY B. TECH. SEMESTER: - III**

**SUBJECT NAME: Database Management System (DMS)      SUBJECT CODE: 4TE03DMS1**

### **Teaching & Evaluation Scheme: -**

Subject Code	Subject Name	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
		Th	Tu	Pr	Total		Theory				Practical (Marks)			Total
							Sessional Exam		University Exam		Internal		University	
							Marks	Hours	Marks	Hours	Pr/Viva	TW	Pr	
4TE03DMS1	Database Management System	4	0	2	6	5	30	1.5	70	3.0	30	20	-	150

### **Objectives: -**

- To introduce how to represent data in a database for a given application and how to manage and use a database management system. Topics include: conceptual modeling of a database, relational data model, relational algebra, database language SQL and relational database design. In addition, hands-on DBMS experience is included.

### **Prerequisites: -**

- Business Information Systems
- Information Management Technology
- File Structure
- Set Theory

### **Course outline: -**

Sr. No.	Course Contents	Total Hours
1	<b>Introduction, Basic concepts:</b> Introduction and Applications of DBMS, Purpose of Data base, Data Independence, Architecture of a Database Management System. Advantages. Storage structures; indexing techniques; use Of hashing, Database Users and DBA	04
2	<b>Database structure:</b> Relational, hierarchical & network models. Data dictionary. Examples using simple database. Higher level operations.	04

3	<b>Entity-Relationship model:</b> Basic concepts, Design process, constraints, Keys, Design issues, E-R diagrams, weak entity sets, extended E-R features – generalization, specialization, aggregation, reduction to E-R database schema	04
4	<b>Relational model:</b> Relations; domains and attributes; keys; integrity rules. Examples Based on available relational DBMS, Relational algebra –fundamental operators and syntax, relational algebra	07
5	<b>Structured Query Language (SQL):</b> Overview of SQL , Data Definition Commands, Set operations , aggregate function , null values , Data Manipulation commands, Data Control commands , Views in SQL, Nested, Functions, Procedures, Cursors	07
6	<b>Introduction to database design:</b> Modeling real-world data using the relational model Consistency of data. Functional Dependency – definition, trivial and non-trivial FD, closure of FD set, closure of attributes, irreducible set of FD, Normalization – 1NF, 2NF, 3NF, Decomposition using FD-dependency preservation, BCNF, Multi-valued dependency, 4NF, Join dependency and 5NF	09
7	<b>Integrity and Security in Database:</b> Domain Constraints, Referential integrity, Assertions, Trigger, Security, and authorization in SQL	09
8	<b>Transaction and Concurrency Management :</b> Transaction concepts, properties of transactions, serializability of transactions, testing for serializability, System recovery, Two- Phase Commit protocol, Recovery and Atomicity, Log-based recovery, concurrent executions of transactions and related problems, Locking mechanism, solution to concurrency related problems, deadlock, two-phase locking protocol, Isolation, Intent locking	07
9	<b>Query Processing and Optimization:</b> Overview, Issues in Query Optimization ,Steps in Query Processing , System Catalog or Metadata, Query Parsing , Query Optimization, Access Paths , Query Code Generation , Query Execution , Algorithms for Computing Selection and Projection , Algorithms for Computing a Join , Computing Aggregation Functions , Cost Based Query Optimization .	07

### Learning Outcomes: -

At the end of the course unit the student...

1. knows the structure and functions of a database management system
2. understands the rules and is able to use the relational data model
3. knows and uses the database schema normalization rules and techniques
4. knows the different techniques of modeling data and can create a database ERD diagram
5. knows the different types of physical implementation of databases and can use adequate data types from those available for storage in databases
6. can choose the database management system suitable for a specific project and knows its structure and functions
7. knows the SQL language clauses and functions and can write optimal queries in SQL (Populate and query a database using SQL DML/DDl commands )
8. knows how to effectively back up data from the database

**Books Recommended: -**

1. Database System Concepts by **Abraham Silberschatz, Henry F. Korth, Sudarshan**. Tata Macgraw Hill, 6<sup>th</sup> Edition,2011.
2. An Introduction to Database Systems by **C. J. Date**, Pearson Education/Addison-Wesley, 8<sup>th</sup> Editon,2004.
3. Principles of Database Systems by **J. D. Ullman**, Galgotia Publication, 2<sup>nd</sup> Edition
4. SQL- PL/SQL, **Ivan bayross**, Bpb Publications, 2<sup>nd</sup> Edition,2002
5. Database Management Systems by **G. K. Gupta**, McGraw – Hill,2011.
6. Fundamentals of Database Systems by **Ramez Elmasri and Shamkant B Navathe**, , Pearson Education, 5<sup>th</sup> Edition,2008.
7. Database Systems Design, Implementation and Management by **Peter Rob and Carlos Coronel**, Thomson Learning, 5<sup>th</sup> Edition.