

Programme Name	M. Tech. Computer Engineering		
Course Code	COCE5061S		
Course Title	Database Management Systems		
Course Type	Open Elective		
Prerequisites: Nil.			
Course Outcomes: At the end of the course student will be able to: CO1. Differentiate various database architectures. CO2. Design and implement relational databases. CO3. Execute MongoDB commands to manipulate data. CO4. Use advanced XML queries on database. CO5. Apply practices of implementing database security. CO6. Perform transaction processing and achieve concurrency control.			
	Course Contents	Hrs.	CO
1.	Introduction to Database Management Systems and Enhanced Data Models for Advanced Applications: Characteristics of database, Database users, Advantages of DBMS, Data Models, Schema and Instances, Three schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client / Server Architecture for DBMS. Introduction to Temporal Database and Multimedia Databases.	4	CO1
2	Relational-Database Design and SQL: Functional dependencies, Normalisation forms, Decomposition, Overall database design process. SQL: DDL: Create, Modify, Alter, Drop, View definition, etc.DML: SELECT, INSERT, DELETE, Update, Nested Query, SQL with SET operations: Union, Intersect, Except, etc, Aggregate Functions: Group By, Having, SUM, etc, SQL with Logical operations, Nested and Complex Queries, Join Queries. DCL : GRANT, REVOKE, etc DBA level query. Cursors and Triggers, Procedures and Functions, Partitions, SQL Backup and Recovery.	8	CO2
3.	Introduction to NoSQL Databases: Introduction, Design of parallel systems, Parallel query processing. Avenues for parallelism, Array and vector processors. Multiprocessor architecture: taxonomy of parallel architectures, Parallel Query Evaluation. Advanced Transaction Processing Non-relational DBMS: consistency and availability trade-offs, NoSQL DBMS (key-value, document, and graph), MongoDB: CRUD operations.	8	CO3

4.	XML Databases: Introduction to XML Documents and Databases, XML schemas, tree structure, and DOM, XML Query.	6	CO4
5.	Database Security: Introduction to major database attacks: SQL Injection, DoS/DDoS etc. Encryption and Public Key Infrastructures.	4	CO5
6.	Transaction Processing and Concurrency Control: Schedules and serializability, Lock management, Compensation and Databases, Deadlock Handling, Multiple granularity, validation protocols, multi-version protocols, snapshot isolation, predicate locking, Weak Levels of Consistency in Practice.	8	CO6
Text Books			
1.	Elmasri, Navathe. Fundamentals of Database Management systems, Pearson Education, 2008.		
2.	Avi Silberschatz, Henry F. Korth, S. Sudarshan. Database System Concepts, Seventh Edition, McGraw-Hill, 2010.		
3.	P. Sadalage and M. Fowler, NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence, Addison Wesley, 2012.		
Reference Books			
1.	Thomas Connolly and Carolyn Begg, “Database Systems” 3rd Edition, Addison-Wesley, 2005.		
2.	V.S. Subrahmanian, “Multimedia database systems”, Springer, 1996.		