

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
COM-402	Database System	PCC	4	3	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to	
CO1	Understand the basics of databases and data management.
CO2	Understand various theoretical and practical principles involved in the design and use of databases systems with the help of database
CO3	Design queries using Structured Query Language (SQL) for database definition and database manipulation.
CO4	Design and implement databases for various scenarios.
CO5	Design an AI based secured and privacy protected database for big data.

Detailed Syllabus**Section-A**

Unit 1: Introduction Characteristics and fundamental concepts of Databases, Types of Data Models and Data Modelling, Elements of Database Systems, Classification and comparison of Database Management Systems (Regular and NoSQL Page), concurrency control, Lock based concurrency control, Time stamping methods.

(8 Hrs)

Unit 2: Structured and semi-structured data management Structured data, relational databases, Relational model, Functional Dependencies, normal forms, algorithms for query optimization, Semi-structured data, document-databases, semi-structured data abstraction, representation, and search.

(12 Hrs)

Unit 3: Transactions: Introduction to transaction and system concept, transaction state, desirable properties of transactions (ACID properties), Concurrent executions, Serializability, Recoverability, implementation of isolation, transaction definition in SQL. Concurrency Control: Lock based protocols, Timestamp-based protocols, Validation-based protocols, Multiple Granularity, Multiversion Schemes, Deadlock Handling, Insert and Delete operations.

(8 Hrs)**Section-B**

Unit 4: Unstructured Data Management Unstructured text, Information retrieval systems, document retrieval and ranking.

(12 Hrs)

Unit 5: Big Data Management Platforms for Big Data, algorithms for Map-Reduce & Hadoop, Platforms for Big Graphs, algorithms for large graphs, Overview of data privacy and security concerns in AI databases, Techniques for privacy-preserving data analysis, Secure data sharing and access control mechanisms.

(8 Hrs)**Text Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Database System Concepts	Korth, Silberchatz	Mcgraw Hill Education	6 th (2013)
2	Data on the Web: From Relations to Semi structured Data and XML	Serge Abiteboul, Peter Buneman, Dan Suciu	Morgan Kaufmann Publishers Inc.	1 st (1999)

Reference Book

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Fundamentals of Database System	Elmasri Rame, Navathe Shamkant	Pearson Education	7 th (2015)