Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NCSC507	Advanced DBMS	3	1	0	4

Course Objective
This course is intended to provide the students with an understanding of the current theory and practice of database management systems. To help the students more fully appreciate their nature, the course provides a solid technical overview of database management systems, using a current database product as a case study.

Learning Outcomes
Students will be learning advanced database management strategies which will help them in building efficient & quality software.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Relational Databases: [Introduction of Database Management Systems, Designing Relational Databases, Integrity Constraints, Functional Dependency, Multi-valued Dependency, Concepts of Normalization, SQL.]	5+2	Understanding of the fundamentals & overview of Relational databases
2	Indexing & Hashing: [Introduction and need of Indexing and Hashing, Types of Indices (Dense, Sparse, Primary, Clustered, Secondary), Updation on Index, Creation and Updation of B & B+ Tree, Hashing methods, Handling hash collision.]	5+2	Understanding the various concept of indexing and hashing in databases. Knowing about the suitable methods for a specific purpose.
3	Query Processing and Optimization: [Evaluation of Relational Operations, Equivalence Rules, Transformation of Relational Expressions, Query Optimization & Cost Estimation, Data access from disk, Physical plan selection, Sort and Join Processing, Physical plan selection.]	5+2	To understand query processing enhancement techniques using indexing on relational models. Optimizing the queries for better cost.
4	Parallel Databases: [Introduction to parallel databases, Understanding the needs of parallelism in databases, Partitioning Techniques, Types of parallelism (Inter-query & Intra-query, Inter-operation & Intra-operation,	6+2	The student will learn the need of parallel databases and wok with its different types. Can understand the how quickly the result can be achieved through various operation.

	Pipeline & Independent), Parallel Sort and Join operations.]		
5	Distributed Databases: [Introduction to Distributed databases, Distributed Data Storage, Replication & Fragmentation, Data Transparency, Distributed Transactions, Commit protocols (2PC & 3PC) for distributed environment, Concurrency Control, Distributed Deadlock, Distributed Query Processing, and Parallel Query Evaluation.]	7+2	To understand fundamental knowledge about fragmentation and replication on various locations. Learn about the concept of distributed query processing and concurrency models.
6	Advanced Transaction Processing: [Nested and Multilevel Transactions, Compensating Transactions and Saga, Long Duration Transactions, Weak Levels of Consistency, Transaction Work Flows, Transaction Processing Monitors.]	4+1	To understand basic and advanced level of transaction processing mechanisms with various workflows.
7	Objected Oriented and Object Relational Databases: [Modelling Complex Data Semantics, Specialization, Generalization, Aggregation and Association, Objects, Object Identity, Equality and Object Reference, Architecture of Object Oriented and Object Relational Databases]	4+1	Understanding different type of relational databases and their need with required modalities.
8	NoSQL databases: [Cassandra, MongoDB, Neo4J.]	6+2	To understand the advanced level of cloud databases for practical importance
Total		**42+14 (T)**	

Text Books:

1. AviSilberschatz, Henry F. Korth& S. Sudarshan, "Database System Concepts", Tata Mc-Graw-Hill, 7thEdition.

Reference Books:

1. W. Kim, "Modern Database Systems - The Object Model, Interoperability, and Beyond", Addison Wesley, 1stEdition.
2. Dan Sullivan, "NoSQL for Mere Mortals", Addison Wesley.
3. W. Kim, "Introduction to Object Oriented Databases", MIT Press, Volume 1.
4. J. D. Ullman, "Principles of Database and Knowledge Base Systems", Computer Science Press, 2ndEdition.