Course code: Course Title	Course Structure			Pre-Requisite
SE316: Advanced Database Management Systems	L	T	P	Database Management Systems
	3	1	0	

Course Objective: To highlight the features of advanced SQL, parallel and distributed databases and architecture of modern database systems.

S. NO	Course Outcomes (CO)
CO1	Demonstrate deep understanding of advanced SQL features, object-based databases, and XML.
CO2	Apply query processing and optimization techniques to improve database performance.
CO3	Analyze various recovery mechanisms to ensure data integrity and consistency in database systems.
CO4	Evaluate various database system architecture with parallel and distributed database.
CO5	Design and implement advanced database applications using real-time transaction systems, and distributed transaction processing techniques.

S. NO	Contents	Contact Hours
UNIT 1	**Advanced SQL**: SQL Data Types and Schemas, Integrity Constraints, Authorization, Embedded SQL, Dynamic SQL, Functions and Procedural Constructs, Recursive Queries, Advanced SQL Features. **Object-Based Databases and XML:** Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R Features, Persistent Programming Languages, Object-Oriented versus Object-Relational, Structure of XML Data, XML Document Schema, Querying and Transformation, Application Program Interfaces to XML, Storage of XML Data, XML Applications.	8
UNIT 2	**Query Processing and Query Optimization:** Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions, Transformation of Relational Expressions, Estimating Statistics of Expression Results, Choice of Evaluation Plans, Materialized Views.	6
UNIT 3	**Recovery System:** Failure Classification, Storage Structure, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions, Buffer Management, Failure with Loss of Nonvolatile Storage, Advanced Recovery Techniques, Remote Backup Systems.	6
UNIT 4	**Database-System Architectures:** Centralized and Client –Server Architectures, Server System Architectures, Parallel Systems, Distributed Systems, Network Types, Parallel Databases, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism, Design of Parallel Systems.	8
UNIT 5	**Distributed Databases:** Homogeneous and Heterogeneous Databases, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases.	6
UNIT 6	**Advanced Transaction Processing**: Transaction-Processing Monitors, Transactional Workflows, E-Commerce, Main-Memory Databases, Real-Time Transaction Systems, Long-Duration Transactions, Transaction Management in Multi-databases.	8

	TOTAL	**42**

REFERENCES

S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Abraham Silberschatz, Henry F. Korth, "Database System Concepts", MCGRAWHILL, 7th Edition.	**2021**
2	Elmasri Ramez, Navathe Shamkant, "Fundamentals of Database System", Pearson Education, 7th Edition.	**2017**
3	Raghu Ramakrishnan, Johannes Gehrke, "Database Management Systems", McGraw Hill Education, 3rd Edition.	**2002**
4	M. Tamer Ozsu, Patrick Valduriez, "Principles of Distributed Database Systems", Pearson Education, 2nd Edition.	**2005**