ADVANCED DATABASES

PE – VI: CSE / IT

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
ACSB26	Elective	3	-	-	3	30	70	100
Contact Classes: 45	Tutorial Classes: Nil	Practical Classes: Nil				Total Classes: 45		

OBJECTIVES:

The students will try to learn:

I. Query languages to support temporal and object databases
II. Internals of database management system.
III. Data processing paradigms
IV. Research and usage of emerging technologies for solving existing database problems

COURSE OUTCOMES:

After successful completion of the course, Students will be able to:

CO 1 Compare different database techniques for constructing a database.

CO 2 Model the real world database systems for open problems from the requirement specification for optimal real world databases.

CO 3 Define the concept of Time domain and associating facts with time for representing queries.

CO 4 Build queries in transact-SQL for retrieving desired information

CO 5 Implement recursive queries in SQL for querying hierarchical data

CO 6 Analyze query optimization techniques for faster data retrieval.

CO 7 Describe spatial data access methods for effective data retrieval.

CO 8 Apply different data processing techniques for satisfying the exact need of the user.

CO 9 Compare different lattice based and probabilistic based approaches for efficient relational databases

CO 10 Analyze a full real size database system for an industry or business scenario.

MODULE -I	ACTIVE DATABASES:	Classes: 10

Syntax and Semantics (Starburst, Oracle, DB2): Taxonomy, applications, integrity management, workflow management, business rules, design principles, properties, rule modularization, rule debugging, IDEA methodology, open problems.

MODULE -II	TEMPORIAL AND OBJECT DATABASES:	Classes: 10

Overview: Time domain, data types, associating facts with time, temporal query language; Transact-SQL (T-SQL): Time ontology, data model, language constructs; Implementation: System architecture, temporal support, support for TSQL2.

MODULE -III	COMPLEX QUERIES AND REASONING:	Classes: 09
Logic of Query Languages: Relational calculi, relational algebra, recursive rules, syntax and semantics of data log, fix point semantics. Implementation Rules and Recursion: Rule rewriting methods, compilation and optimization, recursive queries in SQL, open issues.		
MODULE -IV	**SPATIAL, TEXT AND MULTIMEDIA DATABASES:**	**Classes: 08**
Traditional Indexing Methods: Secondary keys, spatial access methods, text retrieval; Multimedia indexing: 1D time series, 2D color images, sub pattern matching		
MODULE-V	**UNCERTAINITY IN DATABASES AND KNOWLEDGE BASES:**	**Classes: 08**
Introduction: Uncertainty in image database, uncertainty in temporal database, uncertainty in null value; Models of uncertainty; Uncertainty in relational databases: Lattice based relational databases, probabilistic relational databases.		

Text Books:

1. Carlo Zaniolo, Stefano Ceri, "Advanced Database Systems", Morgan Kauffmann Publishers, VLDB Journal, 1st Edition, 1997
2. Abraham Silberschatz, Henry F. Korth And S. Sudharshan, ―Database System Concepts‖, Tata McGraw Hill, 6th Edition, 2011

Reference Books:

1. Raghu Ramakrishnan, "Database Management System", McGraw-Hill Publications, 3rd Edition, 2000.
2. Abraham Silberschatz, Henry F. Korth and S.Sudharshan, "Database System Concepts", Tata McGraw-Hill, 6th Edition, 2010.
3. Silberschatz A, ―Database Systems Concepts‖ McGraw-Hill Publications, 6th Edition, 2000.

Web References:

1. web.cs.wpi.edu/~cs561/s12/Lectures/activeDB/ActiveDB.pdf
2. www.cs.bu.edu/fac/gkollios/ada05/LectNotes/lect13-05.ppt
3. web.cs.ucla.edu/classes/cs240a/winter98/notes/node3.html
4. user.it.uu.se/~torer/kurser/mdb/2007/TermPapers/ErikZeitler.pdf
5. booksite.elsevier.com/9781558604438/slides/zanitem5.htm

E-Text Books:

1. http://www.faadooengineers.com/threads/3854
2. http://codex.cs.yale.edu/avi/db-book/db5/slide-dir/
3. https://mitpress.mit.edu/books/advanced-database-techniques
4. https://www.amazon.com/Database-System-Concepts-Abraham-Silberschatz/dp/0073523321