Course Code: BCA302 Course Title: Advanced Relational Database Management System
Total Contact Hours: 48 hrs. Total Credits: 04 Total Marks: 100 (60 Lectures)

Teaching Scheme: Theory-05 Lectures/ Week

Course Objective:

- To study fundamental concepts of RDBMS (PL/Pgsql)
- To study database management operations
- To study data security and its importance
- To study client server architecture

Unit No.	Content	No. of Lectures
1	**Relational Database Design** 1.1. PL/Pgsql: Language structure 1.2. Controlling the program flow, conditional statements, loops 1.3. Views 1.4. Functions 1.5. Handling errors and exceptions 1.6. Cursors 1.7. Triggers	**16**
2	**Transaction Concepts and Concurrency Control** 2.1 Transaction, properties of transaction, states of transactions 2.2 Concurrent execution of transactions and conflicting operations 2.3 Schedules, types of schedules, concept of Serializability, precedence graph for Serializability 2.4 Ensuring Serializability by locks, different lock modes, 2PLand its variations 2.5 Multigranularity locking protocol 2.6 Basic timestamp method for concurrency, Thomas Write Rule 2.7 Locks with multiple granularity, dynamic database concurrency (Phantom Problem) 2.8 Timestamps versus locking 2.9 Optimistic concurrency control algorithm, multi version concurrency control 2.10 Deadlock handling methods 2.10.1 Detection and Recovery (Wait for graph). 2.10.2 Prevention algorithms (Wound-wait, Wait-die)	**16**

3	**Crash Recovery** 3.1 Transaction Failure classification 3.2 Recovery concepts 3.3 Checkpoints 3.4 Recovery with concurrent transactions (Rollback, checkpoints, commit) 3.5 Log base recovery techniques (Deferred and Immediate update) 3.6 Buffer Management 3.7 Relationship between Recovery management and Buffer management 3.8 Aries algorithm 3.9 Database backup and recovery from catastrophic failure 3.10 Shadow paging	**16**
4	**Database Security** 4.1 Introduction to database security concepts 4.2 Methods for database security 4.3 Discretionary access control method 4.4 Mandatory access control and role based access control for multilevel security 4.5 Use of views in security enforcement 4.6 Overview of encryption technique for security 4.7 Statistical database security	**6**
5	**Client-Server Technology** 5.1 Client-server computing 5.2 Evolution of Client-Server information systems 5.3 Client– Server Architecture benefits 5.4 Client Server Architecture (2 tier and 3 tier) 5.5 Components, Principles, Client Components 5.6 Communication middleware components 5.7 Database middleware components 5.8 Client Server Databases	**6**

Reference Books:

1. Database System Concepts – Avi Silberschatz, Henry F. Korth, S. Sudarshan, 6thedition-McGraw-Hill

2. Fundamentals of Database Systems-RamezElmasri, ShamkantNavathe, 5th edition–Pearson.

3. Practical Postgresql, JoshuaD. Drake, John C Worsley, O'Reilly Publications.

4. Database Management Systems -Raghu Ramakrishnan, 3rdEdition, Tata McGraw Hill

5. Database Management System- Bipin Desai