



Computer Science Paper II
Relational Database Management System
[CORE COURSE]

Semester II	Credits: 2	Subject Code: BS22002	Lectures: 40
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Course Outcomes:

At the end of this course, the learner will be able to:

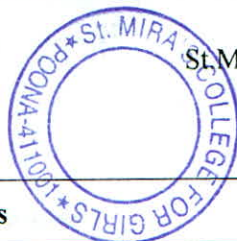
- Perform database management operations
- Apply the fundamental concepts of RDBMS (PL/PgSQL)
- Analyze the basic issues of transaction processing and concurrency control
- Apply their mind to implement data security.

Unit 1: Relational Database Design Using PLSQL	8
<ul style="list-style-type: none">• Introduction to PLSQL• PL/PgSQL: Datatypes, Language structure• Controlling the program flow, conditional statements, loops• Stored Functions• Handling Errors and Exceptions• Cursors• Triggers	

Unit 2: Transaction Concepts and concurrency control	15
<ul style="list-style-type: none">• Transaction, properties of transaction-ACID, state of the transaction.• Executing transactions concurrently associated problem in concurrent execution.• Schedules, types of schedules, concept of Serializability, Precedence graph for Serializability.• Ensuring Serializability by locks, different lock modes, 2PL and its variations.• Basic timestamp method for concurrency, Thomas Write Rule.• Locks with multiple granularity, dynamic database concurrency (Phantom Problem).• Timestamps versus locking.• Deadlock and deadlock handling - Deadlock Avoidance(wait-die, wound-wait), Deadlock Detection and Recovery (Wait for graph).	

Unit 3:Crash Recovery	7
<ul style="list-style-type: none">• Failure classification• Recovery concepts• Log base recovery techniques (Deferred and Immediate update)• Checkpoints, Relationship between database manager and buffer cache. Aries recovery algorithm.• Recovery with concurrent transactions (Rollback, checkpoints, commit)• Database backup and recovery from catastrophic failure	

Board of studies	Name	Signature
Chairperson	Ms. Ashwini Kulkarni	



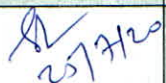

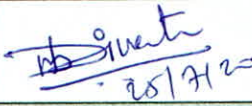
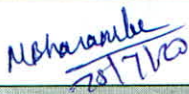
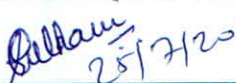
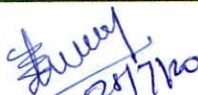


Unit 4: Database Integrity and Security Concepts	5
<ul style="list-style-type: none"> • Domain constraints • Referential Integrity • Introduction to database security concepts • Methods for database security <ul style="list-style-type: none"> ◦ Discretionary access control method ◦ Mandatory access control ◦ Role base access control for multilevel security. • Use of views in security enforcement. • Overview of encryption technique for security. • Statistical database security. 	

***Contact hours – 5 hours**

Reference Books:

- AviSilberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts-6th edition*- McGraw-Hill
- RaghuRamakrishnan, *Database Management Systems*, Mcgraw-hill higher Education, ISBN:9780071254342
- Raghu Ramakrishnan and Johannes Gehrke, *Database Management Systems*, McGraw-Hill Science/Engineering/Math; 3 edition, ISBN: 9780072465631
- Elmasri, Navathe, *Fundamentals of Database Systems* -5th edition –Pearson.
- Joshua D. Drake, John C Worsley, *Practical Postgresql* ,(O'Reilly publications)

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