

GUJARAT TECHNOLOGICAL UNIVERSITY

Master in Computer Application (Integrated MCA)

Year II – (Semester-III) (W.E.F. July 2014)

Subject Name: Database Management Systems (DBMS-II)

Subject Code: 4430604

Learning Objectives:

This course is intended to give students advanced concepts about RDBMS. This will give conceptual insight about how query optimization, transaction management and concurrency controls. Also, gives insight about relational database recovery and security operations of databases.

Pre-requisites: Basic knowledge of Database Management System and SQL

Sr No	Contents	No of Lectures
1	Query Processing and Optimization Overview, measures of query cost, selection operation, sorting, join, evaluation of expressions, transformation of relational expressions, estimating statistics of expression results, evaluation plans, materialized views	10
2	Transaction Management Transaction Concept (Transaction State, Basic Definitions, ACID Property), Implementation of Atomicity and Durability (Shadow Paging Concept), Concurrent Execution (Reasons of Concurrent Execution, Serial and Concurrent Schedule), Serializability (Conflict and View Serializability), Recoverability of Schedules (Recoverable Schedule and Cascade-less Schedule)	8
3	Concurrency Controls Lock-based Protocol (Types of Lock and Deadlock Concept), Two-Phase Locking Protocol, Deadlock Handling (Deadlock Prevention Techniques like Wait-Die, Wound-Wait), Recovery of Deadlock (Selection of Victim, Rollback, Starvation), Insert and Delete Operations (Delete, Insertion, Phantom Phenomenon), Transaction Failure	8
4	Database Recovery Database Recovery Concepts, Types of Failures and Log-Based	6

	Recovery (Deferred Database Modification, Immediate Database Modifications), Shadow Paging and Checkpoints, Forward , Backward and Media Recovery	
5	Database Security Overview, Goals of Database Security, Discretionary Access Control (DAC), Mandatory Access Control, Firewall, Statistical Database Security, Data Encryption	4
6	Introduction to Advance Databases Object Oriented Database, Distributed Database Systems, Object Relational Database, Parallel Database Systems	8
7	Group Projects :Study of Contemporary Databases Each group should collectively identify most popular RDBMS (like ORACLE, MYSQL, etc.) and Prepare presentation of 10-15 minutes for class covering the following key topics: <ul style="list-style-type: none"> • Query Tuning • Database Recovery and Locking Mechanism • Database Security • Comparison of it with other (Key challenges) Prepare a 10-15 minute presentation for the last class meeting	4

Main Reference Book:

- 1) Silberschatz, Korth, Sudarshan, “Database System Concepts” 5th Edition, McGraw Hill
- 2) S. K. Singh, “Database Systems : Concepts, Design and Applications”, Pearson Education

Suggested Additional Reading:

- 1) C. J. Date, A. Kannan, S. Swamynathan, “An Introduction to Database Systems” 8th Edition (2006), Pearson Education
- 2) Ramakrishnan, Gehrke, “Database Management Systems” 3rd Edition, McGraw Hill
- 3) Peter Rob, Carlos Coronel, “Database Systems : Design, Implementation and Management”, 7th Edition (2007), Cengage Learning

Chapter wise Coverage from the Text Book:

Unit No	Book No	Topics
1	1	Chapter 13 & 14
2	1	Chapter 15.1 to 15.6
3	1	Chapter 16.1, 16.6, 16.7
4	2	Chapter 13
5	2	Chapter 14
6	2	Chapter 15, 16,17 and 18 (Overview of each type with features advantages and disadvantages)

Practical : PL/SQL Concepts

Objectives: This course is intended to give students basic fundamental knowledge about PL/SQL.

After completion of this course student will be able to know:

- Introduction to PL/SQL, Advantages of using PL/SQL
- The generic PL/SQL Block.
- Cursor Management
- Building and managing of database Objects (Stored procedure and function, Packages)
- Building of database triggers

Sr #	Contents
1	Introduction to PL/SQL Overview, PL/SQL Variables and Data types, Variable attribute (%type, %rowtype), PL/SQL Block, Control Structure (looping)
2	PL/SQL Cursor Management Overview, Types of cursor (Implicit & Explicit) , Cursor Management
3	PL/SQL : Exception Handling Predefined, user defined Error handling, SQLCODE, SQLERRM, Raise_application_error
4	PL/SQL Sub programs : Stored procedures & Functions
5	Packages
6	Triggers

Reference Books:

- 1) Ivan Bayross, “SQL, PL/SQL – The Programming Language Oracle”
- 2) “Oracle 9i PL/SQL Programming”, Oracle Press
