

PARUL UNIVERSITY - Faculty of Engineering and Technology

Department of Computer Science & Engineering

SYLLABUS FOR 4th Sem BTech PROGRAMME

Database Management System (203105251)

Type of Course: BTech

Prerequisite: The students should have a good understanding of basic computer concepts such as Memory concepts, data, information and data structures.

Rationale: The purpose of this subject is to cover the underlying concepts and techniques used in creating a Data Base System. These techniques can be used in Software Developments. Data management involves both defining structures for storing information and providing mechanisms for manipulating the information. In addition, the database system must provide for the safety of the stored information, despite system crashes or attempts at unauthorized access. If data are to be shared among several users, the system must avoid possible anomalous results due to multiple users concurrently accessing the same data.

Teaching and Examination Scheme:

Teaching Scheme			Credit	Examination Scheme					Total
Lect Hrs/	Tut Hrs/	Lab Hrs/		External		Internal			
				T	P	T	CE	P	
3	0	0	3	60	-	20	20	-	100

Lect - Lecture, **Tut** - Tutorial, **Lab** - Lab, **T** - Theory, **P** - Practical, **CE** - CE, **T** - Theory, **P** - Practical

Contents:

Sr.	Topic	Weightage	Teaching Hrs.
1	Unit 1: Database system architecture: Data Abstraction, Data Independence, Data Definition Language (DDL), Data Manipulation Language (DML). Data models: Entity-relationship model, network model, relational and object oriented datamodels, integrity constraints, data manipulation operations.	15%	7
2	Unit 2: Relational query languages: Relational algebra, Tuple and domain relational calculus, SQL3, DDL and DML constructs, Open source and Commercial DBMS -MySQL, ORACLE, DB2, SQL server Relational database design: Domain and data dependency, Armstrong's axioms, Normal forms, Dependency preservation, Lossless design. Query processing and optimization: Evaluation of relational algebra expressions, Query equivalence, Join strategies, Query optimization algorithms.	30%	14
3	Unit 3: Storage strategies: Indices, B-trees, hashing.	10%	5

4	Unit 4: Transaction processing: Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery.	16%	8
5	Unit 5: Database Security: Authentication, Authorization and access control, DAC, MAC and RBAC models, Intrusion detection, SQL injection.	13%	6
6	Unit 6: Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining.	16%	8

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Reference Books:

1. Database System Concepts
Silberschatz, Korth, Sudarshan; McGraw Hill Publication; 4th Edition
2. Fundamentals of Database Systems
Elmsari, Navathe; Pearson Education (2008); 5th Edition
3. Fundamentals of Database Management Systems
Mark L. Gillenson; Wiley– Latest Edition
4. Database Management Systems
Raghu Ramkrishnan, Johannes Gehrke; McGraw Hill International; Second Edition

Course Outcome:

After Learning the course the students shall be able to:

1. For a given query write relational algebra expressions for that query and optimize the developed expressions
2. For a given specification of the requirement design the databases using E-R method and normalization.
3. For a given specification construct the SQL queries for Open source and Commercial DBMS -MYSQL, ORACLE, and DB2.
4. For a given query optimize its execution using Query optimization algorithms
5. For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
6. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.