# Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058-India
(Autonomous Institute Affiliated to University of Mumbai)

| Course Code | Course Name | Teaching Scheme (Hrs/week) | | | Credits Assigned | | | |
|---|---|---|---|---|---|---|---|---|
| | | L | T | P | L | T | P | Total |
| IT43 | Database management System | 3 | - | - | 3 | - | - | 3 |
| | | Examination Scheme | | | | | | |
| | | ISE | | MSE | | ESE | | |
| | | 10 | | 30 | | 100 (60%weightage) | | |

| Pre-requisite Course Codes | | |
|---|---|---|
| After successful completion of the course, student will be able to: | | |
| Course Outcomes | CO1 | Design effective database systems, leading to development of elegant Information System. |
| | CO2 | Analyze the real world problem and construct a relational database. |
| | CO3 | Construct a secure database. |
| | CO4 | Design a relation database using concept of functional dependencies. |
| | CO5 | Analyze the effect of concurrency control for transaction processing. |

| Module No. | Unit No. | Topics | Ref. | Hrs. |
|---|---|---|---|---|
| 1 | | **Introduction Database Concepts and ER Modeling** | | |
| 1 | 1.1 | **Introduction Database Concepts**<br>**I**ntroduction, Characteristics of databases, File system V/s Database system, Users of Database system, Database Administrator, Concerns when using an enterprise database, Data Independence, codd's Rule, DBMS system architecture, | 1,2,3 | 04 |
| | 1.2 | **ER Modeling** | | |
| | | Introduction to ER model, Benefits of Data Modeling, Types of data Models, Phases of Database Modeling, The Entity-Relationship (ER) Model, Generalization, Specialization and Aggregation, Extended Entity-Relationship (EER) Model. | | 04 |
| 2 | | **Relational Algebra and SQL** | 1,2,3 | 05 |
| | 2.1 | **Relational Algebra** | | |
| | | Introduction , Mapping the ER and EER Model to the Relational Model , Data Manipulation , Data Integrity , Relational Algebra , Relational Algebra Queries, Relational Calculus. | | |
| | 2.2 | **SQL** | | |

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|---|---|---|---|---|
| | | Overview of SQL, Data Definition Commands, Set operations, aggregate function, null values, , Data Manipulation commands, Data Control commands , Views in SQL, Nested and complex queries ,PL/SQL | | 10 |
| **3** | | **Relational database design** | 1,2,3 | 03 |
| | **3.1** | **Integrity and Security in Database** | | |
| | | Domain Constraints, Referential integrity, Assertions, Trigger, Security, and authorization in SQL, | | |
| | | **Normalization** | | 05 |
| | **3.2** | Design guidelines for relational schema, Functional dependencies, Normal Forms- 1NF, 2 NF, 3NF, BCNF and 4NF | | |
| **4** | | **Transaction Processing** | 1,2,3 | |
| | **4.1** | **Transactions Management** | | |
| | | Transaction concept, Transaction states, ACID properties, Implementation of atomicity and durability, Concurrent Executions, Serializability , Recoverability, Implementation of isolation, Concurrency Control: Lock-based ,Timestamp-based , Validation-based protocols, Deadlock handling, | | 05 |
| | **4.2** | Recovery System | | |
| | | Failure Classification, Storage structure, Recovery and atomicity, Log based recovery, Shadow paging. | | 03 |
| | | | **Total** | **39** |

**References:**


1. Korth, Slberchatz, Sudarshan, "*Database System Concepts",* 6th edition, McGraw – Hill
2. Elmasri and Navathe, "*Fundamentals of Database Systems*", 5th edition, PEARSON Education.
3. G. K. Gupta, "*Database Management Systems",* McGraw – Hill.
4. Peter Rob and Carlos Coronel, "*Database systems Design, Implementation and Management*", 5th edition, Thomson Learning.
5. Raghu Ramkrishnan and Johannes Gehrke , "*Database Management Systems*", TMH