



## Database Management System BEG276CO

Year: II

Semester: IV

Teaching Schedule Hours/Week			Examination Scheme				
Theory	Tutorial	Practical	Internal Assessment		Final		Total
3	-	3	Theory Marks	Practical Marks	Theory Marks	Practical Marks	150
			20	50	80	-	

**Course Objective:** The course objective is to provide fundamental concept, theory and practices in design of database and implementation of database management system.

**Course Contents:**

- 1. Introduction (5 hrs)**
  - 1.1 Data, Database and DBMS
  - 1.2 Objectives of Database
  - 1.3 Needs of DBMS for organization and others.
  - 1.4 Data abstraction, Data Independence
  - 1.5 Schema and Instances
  - 1.6 Three schema Approach
  - 1.7 Database administrator and Users
  - 1.8 DBMS Languages
- 2. Data Models (4 hrs)**
  - 2.1 Conceptual, Logical and Physical model
  - 2.2 Hierarchical, Network and Relational Data Models
  - 2.3 Object-Based Model, Entity Relationship Model(ER Model)
  - 2.4 Components of ER diagram
  - 2.5 Role of ER diagram
  - 2.6 Entity Relationship diagram Methodology
  - 2.7 Converting ER model into relations.
- 3. Relational Model (5 hrs)**
  - 3.1 Definitions and terminology
  - 3.2 Structure of Relational databases
  - 3.3 Relational Algebra and calculus
  - 3.4 Pitfalls of relational Model
- 4. Structured Query Language (SQL) (5 hrs)**
  - 4.1 Overview
  - 4.2 DDL (create, alter, drop)
  - 4.3 DML (insert, delete, update, select)
  - 4.4 TCL (commit, rollback, save point)
  - 4.5 DCL (grant, revoke)
  - 4.6 Aggregate Queries
  - 4.7 Set operations and joins
  - 4.8 Triggers and Views
- 5. Relational Database Design and Normalization (8 hrs)**
  - 5.1 Integrity Constraints: Domain constraint, Entity Integrity, Referential Integrity
  - 5.2 Functional dependency
  - 5.3 Inference rules for functional dependency



- 5.4 Decomposition of Relation
- 5.5 Closure Set of Functional Dependency and attributes
- 5.6 Dependency preservation
- 5.7 Normalization, Role of Normalization
- 5.8 Normal Forms (1NF, 2NF, 3NF)
- 5.9 BCNF and 3NF
- 5.10 Multi-valued Dependency and 4NF
- 5.11 Join dependency and 5NF
- 6. Database Security (3 hrs)**
  - 6.1 Importance of database security
  - 6.2 Different levels of security
  - 6.3 Confidentiality, Authentication, Authorization, Non-Repudiation
  - 6.4 Security and Views
  - 6.5 Access control: Discretionary and Mandatory
  - 6.6 Encryption and Decryption
- 7. Query Processing (2 hrs)**
  - 7.1 Introduction to Query Processing
  - 7.2 Query Cost
  - 7.3 Representing Queries using query tree
  - 7.4 Query Optimization
  - 7.5 Query Decomposition
- 8. Filing and File Structure (3hrs)**
  - 8.1 Storage devices
  - 8.2 Buffer Management
  - 8.3 File Organization (sequential, indexed sequential, hashed file)
  - 8.4 Hash Collision: Detection and Resolution
  - 8.5 Data Dictionary Storage
- 9. Concurrency Control (5hrs)**
  - 9.1 Database transaction, transaction properties and states
  - 9.2 Needs of Concurrency Control
  - 9.3 Scheduling
  - 9.4 Characterizing Schedule : Based on Serializability and Recoverability
  - 9.5 Concurrency Control Techniques : Lock based, Two-phase locking and Time-stamp based protocols
  - 9.6 Multiple granularity locking
  - 9.7 Deadlock Handling
- 10. Database Recovery (3 hrs)**
  - 10.1 Importance of database recovery
  - 10.2 Failure Classification
  - 10.3 Log based recovery: Deferred & Immediate In Single/Multi User Environment
  - 10.4 Write Ahead Logging Protocol
  - 10.5 Shadow paging
  - 10.6 Backup-recovery
  - 10.7 Dumping
- 11. Advanced Database Models (2 hrs)**
  - 11.1 Distributed Model
  - 11.2 Multimedia model
  - 11.3 ORDBMS (Object Relational Database Management Systems)