M.Sc. (CA) SEMESTER - I
M.Sc. (CA) PAPER - IV
TITLE: DATABASE MANAGEMEMENT SYSTEMS
PAPER CODE: CSA4104
[CREDITS - 4]

Learning Objectives:

1. To understand the difference between File system and Database system
2. To know basic E-R Concepts
3. To know the fundamentals of Normalization
4. To study basics and features of SQL

	Title and Contents	No. of Lectures
Unit - I	**Introduction to Database Systems** 1.1 Introduction 1.2 Basic Concepts and Definition: Data, Information, Data versus Information, Data Warehouse, Metadata, Data Item or Field, Records, Data Dictionary, Database, Database System 1.3 Database Users and Database Administrator 1.4 Functions and Responsibilities of DBA 1.5 File System versus Database System 1.6 View of Data 1.7 Database Languages 1.8 Schemas, Sub-schemas and Instances 1.9 3-Level Architecture: Internal Level, Conceptual Level, External Level 1.10 Data Independence: Physical Data Independence, Logical Data Independence 1.11 Structure of a DBMS 1.12 Functions of DBMS 1.13 Data Models	**4**
Unit - II	**Relational Model** 2.1 Introduction 2.2 Structure of Relational Database 2.3 Relational Algebra: Selection Operation, Projection Operation, Union Operation, Cartesian Product Operation, Difference Operation, Intersection Operation, Division Operation, Rename Operation, Join Operation	**6**
Unit - III	**Database and Relational Database Design** 3.1 Introduction 3.2 Basic E-R Concepts 3.3 Keys 3.4 Constraints 3.5 Entity Set 3.6 Strong Entity Set	**9**

	3.7 Weak Entity Set 3.8 E-R Diagram Symbol 3.9 E-R Diagram 3.10 Extended E-R Features 3.11 Conversion of E-R Model into Relations 3.12 Functional Dependency 3.13 Full Functional Dependency 3.14 Armstrong's Axioms 3.15 Redundant Functional Dependencies 3.16 Closure of a set of Functional Dependencies 3.17 Decomposition 3.18 Normalization 3.19 Normal Forms: First Normal Form, Second Normal Form, Third Normal Form, Boyce - Codd Normal Form (BCNF), Fourth Normal Form, Fifth Normal Form	
Unit - IV	**SQL** 4.1 Introduction 4.2 Data definition 4.3 Basic structure of SQL queries 4.4 Data types 4.5 Integrity constraints 4.6 Set operations 4.7 Aggregate Functions 4.8 Null values 4.9 Nested sub-queries 4.10 Complex queries 4.11 Modification of database 4.12 Integrity and Security Constraints 4.13 Join relations 4.14 Stored Functions 4.15 Cursors 4.16 Triggers 4.17 Views 4.18 Security and Authorization 4.19 Embedded SQL 4.20 Dynamic SQL	**12**
Unit - V	**Transaction Management** 5.1 Transaction Concepts 5.2 Transaction Properties 5.3 Transaction States 5.4 Concurrent Execution 5.5 Serializability 5.6 Recoverability	**7**
Unit - VI	**Concurrency Control & Database Recovery System** 6.1 Introduction 6.2 Lock Based Protocols 6.3 Locks	**10**

	6.4 Granting of Locks 6.5 Two Phase Locking Protocol 6.6 Time Stamp-Based Protocol 6.7 Thomas Write Rule 6.8 Multiple Granularity 6.9 Deadlock Handling 6.10 Database Recovery Concepts 6.11 Types of Database Recovery 6.12 Recovery Technique 6.13 Deferred Update 6.14 Immediate Update 6.15 Buffer Management	

References:

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2. Raghu Ramakrishnan, Johannes Gehrke, ISBN: 9780072465631, Database Management Systems, Tata McGraw IIill
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