D. Syllabus Detailing and Learning objectives

Module	Chapter	Detailed Content	Syllabus Detailing	Learning Objectives
Module 1	Introduction Database Concepts	Introduction, Characteristics of databases, File system V/s Database system, Users of a Database system Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Administrator (DBA), Role of a DBA	**Purpose**: To make students understand and develops the fundamental understanding of Database Management System. It gives an idea of types of Database user, Applications, Characteristics and advantages over Traditional File processing System. **Scope –** **1. Academic Aspects-** Understanding fundamental of data, information , knowledge and its characteristics along with advantages and disadvantages. **2. Technology Aspect-** Understand Database recent Trends. **3. Application Aspect-** Application of Database in all domains with their future. **Students Evaluation** – 1. Theory Questions to be asked on DBMS fundamentals. 2. Case study to be given to differentiate between File Processing System and DBMS.	1. To describe the characteristics of DBMS**(R)** 2.To explain Database Users and their Roles and Responsibility **(U)** 3. To Differentiate Between File processing system and Database Management System. **(A)** 4. To identify Schema and it's type with respect to database architecture .**(AN)**
	Entity–Relationship Data Model	Conceptual Modeling of a database, The Entity-Relationship (ER) Model, Entity Types, Entity Sets, Attributes, and Keys, Relationship Types,	**Purpose** – This chapter gives fundamental understanding of Entity relationship model and EER model. It gives an idea of how to design ER diagram for given case study. Apart from this it also introduces the concept of EER like Generalization and Specialization and Aggregation.	1.To categorize various Entity , Attributes and Relation **[A]** 2.To identify mapping Cardinality. [**A]** 3. To describe rules to draw a ER diagram.**[R]**

Module 2		Relationship Sets, Weak Entity Types Generalization, Specialization and Aggregation, Extended Entity-Relationship (EER) Model.	**Scope –** **1. Academic Aspects-** Learning the ER and EER concepts with their Symbols **2. Technology Aspect-**Design ER diagram using any available software . **3. Application Aspect-** Application of ER model in real life scenario. **Students Evaluation** 1. Questions on number system and arithmetic can be asked. 2. Implementation of arithmetic circuit can be evaluated in lab. 3. Students can apply complement number to solve problems on binary substratction.	4.To design and draw a ER and EER diagram for given Case study. **(C)** 5. To explain Relation, attribute and keys. **(A)** 6.Compare ER and EER diagram . **[U]**
Module 3	Relational Model and Relational Algebra	Introduction to Relational Model, Relational Model Constraints and Relational Database Schemas, Concept of Keys: Primary Kay, Secondary key, Foreign Key, Mapping the ER and	**Purpose-** This chapter is focused on the basis of Relational model with all constrains. Conversion of ER model to Relational model. Relational Algebra operators and queries. Relational Calculus **Scope –** **1. Academic Aspects-** Understanding the operation of various logic gates , Boolean algebra and solving logic expressions using Boolean algebra. **2. Technology Aspect-** Design logic circuits using basic and universal gates for both SOP and POS forms. **3. Application Aspect-** Students should understand to minimize logic circuits to reduce IC count and complexity.	1. Minimize logic expression using Boolean algebra theorems . **(R)** 2. List the Boolean theorems and explain their roles. **(U)** 3. Draw the four variable K-map structure and list possible grouping of 1's. **(R)** 4. Illustrate the use of don't care condition in K-map.**(AN)**

		EER Model to the Relational Model, Introduction to Relational Algebra, Relational Algebra expressions for • Unary Relational Operations, • Set Theory operations, • Binary Relational operation Relational Algebra Queries	**Students Evaluation –** 1. Theory Questions to be asked on Boolean algebra and reduction of logic function using K-map. 2. Lab experiments for design of Boolean expressions for various devices.	5.Compare minterm and maxterms.**(AN)** 6. Differentiate SOP and POS from of logic function **(U)** 7. Design a control unit using microcode **(C)**
Module 4	Structured Query Language (SQL)	Overview of SQL , Data Definition Commands, Set operations , aggregate function , null values, , Data Manipulation commands, Data Control commands , Views in SQL, Complex Retrieval Queries using Group By, Recursive	**Purpose-** This chapter develops the fundamental understanding and design of SQL queries under three categories like DDL, DML and DCL. **Scope -** **1. Academic Aspects-** Understanding the characteristics of combinational circuits , different examples of combinational circuits . **2. Technology Aspect-** Design of combinational circuits using basic logic gates **3. Application Aspect-** Students should understand how to design combinational circuits. **Students Evaluation –** 1. Theory Questions to be asked on DDL, DML and DCL commands.	1. Describe Combinational circuit. **(R)** 2. Classify the multiplexers and show their usage in computer. **(A**) 3. Draw the logic diagram of 2 bit BCD adder using 7483.**(AN)** 4. Describe comparator and classify their types. **(U)** 5. Estimate the hit ratio of cache memory while mapping with main memory. **(E)** 6. Design multiplexer using basic logic gates. **(C)**

		Queries, nested Queries ; Referential integrity in SQL. Event Condition Action (ECA) model (Triggers) in SQL; Database Programming with JDBC, Security and authorization in SQL Functions and Procedures in SQL and cursors.	2. Lab experiments for implementation of DDL, DML , DCL, Aggragate functions , nested query , join operation. 3. Lab experiments for implementation of procedure , trigger , cursor and functions.	7. Explain the concept of combinational circuits and show how can be implemented practically. **(A)**
Module 5	Relational–Database Design	Design guidelines for relational schema, Functional Dependencies, Definition of Normal Forms- 1NF, 2NF, 3NF, BCNF, Converting Relational Schema to higher normal forms.	**Purpose –** This module focus on normalization, functional dependencies and how we can remove Insert , update and delete anomalies. **Scope –** **1. Academic Aspects-** Understanding problems without normalization **2. Technology Aspect-** Understand basics FD and Normalization . **3. Application Aspect-** Understand use of normalization. **Student Evaluation -** 1. Theory Questions to be asked on FD , anomalies , types of Normalization 2. case study should be given to covert relational schema to higher normal form.	1. To describe the fundamental guidelines for relational schema **(R)** 2. To list and explain different types of Functional Dependency.**(U)** 3. To design and explain the types of normalization for give case study. **(C)** 4. Compare number of relations before and after Normalization. **[AN]** 5. Discuss the 4nf and 5 nf with their use.**(U)**

Module 6	Storage and Indexing	Operation on Files; hashing Techniques; Types of Indexes: Single-Level Ordered Indexes; Multilevel Indexes; Overview of B-Trees and B+-Trees; Indexes on Multiple Keys.	**Purpose –** This module focus which operations are possible on file, hashing searching technique, types of Indexes: Single-Level Ordered Indexes; Multilevel Indexes; Overview of B-Trees and B+-Trees **Scope –** **1. Academic Aspects-** Understanding hashing techniques. **2. Application Aspect-** Operations on files and Indexs. **Student Evaluation -** 1. Theory Questions to be asked on indexes. 2. Example on hashing technique and B tree .	1. To describe and identify different operation on files. **(AN)** 2 Describe Types of Indexes with example. **(U)** 3. List the features B and B+ tree **(R)** 4.Explain various architectures of hashing Technique.**[U]**