

Module	Unit No.	Unit Content	Hours (Hrs)	Module Weightage (Mark)
I	—	<b>Database System - Concept (Total)</b>	<b>10</b>	<b>15</b>
	1	Introduction, Characteristics of the Database Approach	2	
	2	Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach, File system vs Database	2	
	3	Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence	3	
	4	Database Languages and Interfaces	2	
	5	Structured, Semi Structured and Unstructured Database	1	
II	—	<b>Database Design (Total)</b>	<b>14</b>	<b>20</b>
	6	ER Model- Basic concepts, entity, set & attributes, notabins	2	

	7	Relationships and constraints, cardinality, participation, notations, weak entities	2	
	8	Relational Model Concepts-Domains, Attributes, Tuples, and Relations, Values and NULLs in the Tuple	2	
	9	Relational Model Constraints and Relational Database Schemas	2	
	10	Relational Database Design- Atomic Domain and Normalization- 1NF, 2NF, 3NF, BCNF	4	
	11	4NF, 5NF	2	
III	—	<b>Query Languages (Total)</b>	<b>11</b>	<b>20</b>
	12	SQL- introduction to Structured Query Language (SQL)	2	
	13	Data Definition Language (DDL), Table definitions and operations	2	
	14	SQL DML (Data Manipulation Language) - SQL queries on single and multiple tables	4	
	15	Nested queries (correlated and non-correlated), Aggregation and grouping, Views, transactions, triggers, SQL data types	<i>Not explicitly listed</i>	

<b>IV</b>	<b>—</b>	<b>Transaction Processing Concurrency Control (Total)</b>	<b>10</b>	<b>15</b>
	16	Introduction to NoSQL Database	2	
	17	Basic Characteristics of Key-value DB (examples from Redis), Document DB(example from MongoDB)	2	
	18	Transaction Process Concepts, Transaction and System Concepts	3	
	19	Desirable Properties of Transactions	2	
	20	Characterizing Schedules Based on Recoverability & Serializability	2	
	21	Transaction Support in SQL	1	
	22	Introduction to Concurrency Control Two-Phase Locking Techniques	2	
<b>V</b>	<b>—</b>	<b>DBMS LAB (Total)</b>	<b>30</b>	<i>Not explicitly listed</i>
	1	Students should decide on a case study and formulate the problem statement	3	

	2	Based on identified problem statement, Design ER Diagram representing entities, attributes, keys and relationships between entities, examining generalization, specialization etc., Convert the ER Diagram to relational schema	2	
	3	Convert ER Model to Relational Model (Represent entities and relationships in tabular form, Represent attributes as columns, identifying key, 'No'/'Side' is required to submit a document showing the database table created from ER model)	2	
	4	Normalization- To remove the redundancy and anomalies in the chosen relational schema, normalize it to third normal form	3	
	5	Creation of tables using SQL - Overview of using SQL, Data types, SQL, Creating Tables using views, Primary and Foreign keys, Altering Tables and Dropping Tables	3	
	6	Practicing DML commands such as Select, Update, Delete	3	
	7	Experience in practicing Queries using ANY, ALL, IN, EXISTS, NO EXISTS, UNION, INTERSECT, CONSTRAINTS etc	2	

	8	Practicing SQL Queries (Nested, Correlated) and Joins (Inner, Outer and Equi)	2	
	9	Practise queries using COUNT, SUM, AVG, MAX, MIN, GROUP BY, HAVING, VIEWS, Creation and Dropping	3	
	10	Install and Configure MongoDB to execute NoSQL Commands	6	