DATABASE SYSTEM ASSISTANT (DMSA)

Core Qualification File Syllabus

Learning Outcome *Will be able to*	Theory	Hrs	Practical	Hrs
1) learn features and functions of computers. 2) learn characteristics, advantages and disadvantages of Database Management System. 3) learn various Database languages and models. 4) learn role of Database users and functions of Database Administrators.	**Unit 1: Introduction to Database** **1.1 Introduction** Features of Computers, Functions of Computers, Characteristics of Database Approach, Abacus, Napier's Bone, Pascaline, The Babbage Machine, Concept of Stored Program, Von Neumann Architecture **1.2 Database System Concepts** Data Abstraction - Physical, Logical and view level Abstraction, Instances and Schema, Data Independence, Advantages and disadvantages of DBMS, Database Languages - DDL, DML, DCL, Various Data Models - ER Model, Hierarchical Model, Network Model, Relational Model, Data Dictionary, Metadata, Database Administrator (Definition and Functions), Database User.	5 + 15 = 20	• Creating Table and Inserting data into the Table • Updating Table and modifying data into the Table • Creating & Executing DDL in SQL. • Creating & Executing Integrity constraints in SQL. • Creating & Executing DML in SQL. • Executing relational, logical and mathematical set operators using SQL. • Executing group functions • Executing string operators & string functions. • Executing Date & Time functions. • Executing Data Conversion functions. • Executing DCL in SQL. • Executing different types of simple SQL queries (using operators, functions, clauses, join concepts	72
1) learn various concepts (entities, attributes, cardinalities, relationships, different types of keys, etc.) related to Data Modeling. 2) learn to design E-R diagrams. 3) learn database constraints, functional dependency and database anomalies. 4) learn definitions of various normal forms.	**Unit 2: Data Modeling using ER Model and Relational Model** **2.1 Concepts related to Data Modeling** Concept of Entities, Entity sets. Concept of Relations, Attributes, Tuples, Degree, Cardinality. Concept of Relationship and Relationship sets. Concept of Keys - Key, Superkey, Candidate key, Primary key, Alternate key, Foreign key. Concept of mapping constraints - One-to-One, One-to-Many, Many-to-One and Many-to-Many. **2.2 E-R Diagram** Naming, Conventions, Notations, Examples of Design of Simple E-R Diagrams with relationships for different databases. **2.3 Database Constraints** Equity Integrity Constraint, Domain Constraint, Referential Integrity Constraint, Concept of Foreign Key. **2.4 Functional Dependency** Full, Partial, Transitive and Trivial Dependency **2.5 Database Anomalies** Insertion, Deletion and Updating Anomalies **2.6 Normalization** 1NF ,2NF, 3NF and BCNF (Definition only)	10 + 5 + 4 + 4 + 4 + 5 = 32		

1) learn different operators of relational algebra. 2) learn to create & execute DDL in SQL. 3) learn to create & execute Integrity constraints in SQL. 4) learn to create & execute DML in SQL. 5) learn to execute relational, logical and mathematical set operators using SQL. 6) learn to execute group functions 7) learn to execute string operators & string functions. 8) learn to execute Date & Time functions. 9) learn to execute Data Conversion functions. 10) learn to execute DCL in SQL. 11) learn to execute different types of simple SQL queries (using operators, functions, clauses, join concepts	**Unit 3: Relational Algebra and Introduction to SQL** **3.1 Introduction to Relational Algebra** Introduction, Fundamental Operators of Relational Algebra, Select, Project and Rename Operations, Other Operations - Set Operation, Cartesian Product, Natural Join Operation **3.2 SQL** CREATE TABLE and ALTER TABLE Statements. INSERT, DELETE and UPDATE Commands. Aggregate Functions, DATE and TIME Functions. Simple SELECT Queries (SELECT, FROM , WHERE, DISTINCT, AND< OR, IN, NOT IN, BETWEEN, LIKE, ORDER BY, HAVING, GROUP BY)	**8 + 12 =20**	

Learning Outcome *Will be able to*	Project : Design following Projects using Access/ SQL / VB	Hours
1) get experiences to develop a project from scratch (designing E-R diagram, dataflow diagram, choosing a technology and learning and implementing the project) in a given time frame, with given conditions and constraints and safety rules. 2) get experience to work in a team with distributed responsibility among all with proper team discussion. 3) carry out a job with effective communication with other team members. 4) prepare project report and project presentation.	Design Calculator with facility of mathematical operations , factorial, power functions etc.	24 (8 hrs each)
	Design Payroll System of a School (With the facilities of Insertion of Employees, Deletion of Employees, Salary according to the Modified pay scale)	
	Design Admission Procedure(Counselling) in Higher Secondary Vocational Education System (With the facilities of Insertion, Deletion an Upgradation)	

OUTCOMES

Outcomes to be assessed/NOSs to be assessed	Assessment criteria for the outcome
1.1 Explain programming concept and architecture	1.1.1 Able to explain functions and characteristics of computers. 1.1.2 Able to explain programming concept 1.1.3 Able to explain Von Neumann architecture
1.2. Explain Database System Concepts and installation of Software by safe working practices	1.2.1 Able to explain data abstraction and data independence 1.2.2 Able to state the advantages and disadvantages of DBMS 1.2.3 Able to illustrate various database languages – DDL,DML,DCL with examples 1.2.4 Able to explain the concept of various data models and database users 1.1.4 Practice on installation of Windows 7,8,10,Linux and application software in safe working environment
2.1 Explain Concepts related to Data Modeling	2.1.1 Able to explain concept of Entity, Entity set, Attribute, Tuples 2.1.2 Able to explain Concept of relationship and relationship sets 2.1.3 Able to explain the Concept of different types of keys 2.1.4 Able to explain the Concept of Different types of mapping constraints
2.2 Illustrate E-R Diagram	2.2.1 Able to Describe the concept of E-R Diagram and its advantages 2.2.2 Able to identify naming and notations for drawing ERD 2.2.3 Able to illustrate some examples of design of simple ER diagrams with relationships for different databases
2.3 Illustrate Database Constraints	2.3.1 Able to explain the concept of different types of database constraints 2.3.2 Able to illustrate with some examples using database constraints during the design of database
2.4 Illustrate Functional Dependency	2.4.1 Able to identify different types of functional dependencies 2.4.2 Able to illustrate examples using functional dependencies during database design
2.5 Illustrate Database Anomalies	2.5.1 Able to explain different anomalies - insertion, deletion and updation. 2.5.1 Able to illustrate examples to understand anomalies.

2.6 Illustrate Normalization	2.6.1 Able to explain the concept of different types of Normal forms – 1NF, 2NF , 3NF and BCNF
	2.6.1 Able to illustrate with examples using using normal forms during database design
3.1 Illustrate fundamental and secondary operators of Relational Algebra	3.1.1 Able to explain fundamental and secondary operators of Relation Algebra
	3.1.2 Able to illustrate with examples using these operators for concept
3.2 Use basic commands and functions in SQL	3.2.1 Able to Create table, alter table
	3.2.2 Able to show the Use of INSERT , DELETE and UPDATE command
	3.2.3 Able to show the Use of DATE , TIME and aggregate functions
	3.2.4 Working with simple select queries using different SQL commands
4.1 Develop Database Management System with SQL	4.1.1 Able to Work with tables using SQL
5.1 Design Projects using Access/ SQL	Able to Design Calculator, Payroll system of a School, Admission Procedure etc. using Access/ SQL.