

COURSE TITLE : **DATABASE MANAGEMENT SYSTEMS**
CORUSE CODE : **4070**
COURSE CATEGORY : **A**
PERIODS/WEEK : **4**
PERIODS/SEMESTER : **72**
CREDITS : **4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Database systems	17
	Test I	1
2	Database Design	17
	Test II	1
3	Relational database design	17
	Test III	1
4	Understand SQL	17
	Test IV	1
	Total	72

OBJECTIVES

MODULE I

- 1.1.0 Database systems
 - 1.1.1 Define data, information, field, record, file, and database
 - 1.1.2 Distinguish between physical record and logical record.
 - 1.1.3 Define Attribute, Entity, Table.
- 1.2.0 Database management system.
 - 1.2.1 Define DBMS.
 - 1.2.2 Advantages and disadvantages of DBMS
 - 1.2.3 Application areas of dbms.
 - 1.2.4 Database Users.
- 1.3.0 Three Schema Architecture.
 - 1.3.1 Understand schema, subschema.
 - 1.3.2 Explain Schema architecture with diagram.
 - 1.3.3 Define Data Independence.
 - 1.3.4 Distinguish between Physical and logical data independence.
- 1.4.0 Database Models.
 - 1.4.1 Discuss Conceptual Model, representation and physical model
 - 1.4.2 Compare hierarchical, network and relational models.
- 1.5.0 DBMS Architecture.
 - 1.5.1 Diagram with Component modules.
 - 1.5.2 Functions of storage manager, query processor, data dictionary, Query optimizer.
- 1.6.0 Database Languages.
 - 1.6.1 Define DDL, DML and DCL.
- 1.7.0 Classification of DBMS.
 - 1.7.1 Explain Centralised, two tier and three-tier architecture.

1.7.2 Discuss Parallel and Distributed databases.

MODULE – II.

- 2.1.0 Database Design.
 - 2.1.1 Understand E-R Model.
 - 2.1.2 Define Attribute types, Entity Type, Entity Set, Weak Entity and Strong entity.
 - 2.1.3 Relationship Types, Relationship sets.
- 2.2.0 E-R Diagram.
 - 2.2.1 E-R Diagram Notations.
 - 2.2.2 Explain E-R Diagram with example.
- 2.3.0 Enhanced E-R diagram.
 - 2.3.1 Define Subclass, Super class.
 - 2.3.2 Understand Inheritance, specialization and generalization.
 - 2.3.3 UML – Class diagram.
- 2.4.0 Relational Model.
 - 2.4.1 Relational model concepts.
 - 2.4.2 Domains, Attributes, Tuples , Instances, relations and relational schema.
 - 2.4.3 Keys, super key, candidate key and primary key.
- 2.5.0 Relational Algebra.
 - 2.5.1 Unary relational operations : select and project.
 - 2.5.2 Sequence of operations and the rename operation.
 - 2.5.3 Operations from set theory : Union, Intersection, Minus.
 - 2.5.4 Cartesian Product
 - 2.5.5 Binary relational Operations : Join and Division.
 - 2.5.6 Variations of join : equijoin and natural join.

MODULE III

- 3.1.0 Relational database design.
 - 3.1.1 Mapping E-R model to relational model.
 - 3.1.2 Constraints : Domain constraints, entity integrity, referential integrity and Foreign Keys.
- 3.2.0 Functional Dependency.
 - 3.2.1 Explain functional dependency.
 - 3.2.2 Define Normalisation..
 - 3.2.3 Explain Normal forms : 1NF, 2NF, 3NF, BCNF.
 - 3.3.4 Explain decomposition , dependency preservation, multi valued dependencies.
 - 3.3.5 Explain 4NF with example.
 - 3.3.6 Understand join dependencies and define 5NF.
- 3.3.0 Transaction Management.
 - 3.3.1 Define Transaction
 - 3.3.2 Explain transaction concepts
 - 3.3.3 Understand Properties of transactions, Transaction States
 - 3.3.4 Explain Concurrent Executions
 - 3.3.5 Explain Serializability

MODULE – 4

4.1.0 Understand SQL

- 4.1.1 Explain features of SQL
- 4.1.2 Explain Data types in SQL
- 4.1.3 Explain CREATE TABLE command
- 4.1.4 Explain Constraints: NULL, DEFAULT, CHECK, PRIMARY KEY, UNIQUE, referential Integrity
- 4.1.5 Understand DROP TABLE ALTER TABLE command
- 4.1.6 Understand commands for creating and dropping indexes CREATE INDEX, CREATE UNIQUE INDEX, DROP INDEX
- 4.1.7 Explain SELECT statements with WHERE, ORDER BY clause with examples
- 4.1.8 Explain UPDATE Statement, INSERT, DELETE with example
- 4.1.9 Explain Nested queries,
- 4.1.10 Explain Joining tables – aggregate functions
- 4.1.11 Explain grouping: GROUP BY, HAVING clauses
- 4.1.12 Explain BEGIN TRANS, COMMIT, ROLL BACK, SAVE POINT
- 4.1.13 Explain Views.

4.2.0 Understand advanced SQL

- 4.2.1 Study triggers and cursors
 - 4.2.2 Explain stored procedures and functions
 - 4.2.3 Understand Embedded SQL and dynamic SQL.
 - 4.2.4 Explain retrieving single tuples with embedded SQL
 - 4.2.5 Explain retrieving multiple tuples with embedded SQL using cursor.
- 4.3.0 Database connectivity.
- 4.3.1 Discuss Open Database Connectivity-ODBC and Java Database Connectivity – JDBC
 - 4.3.3 Explain Establishing the connection to database using ODBC.

CONTENT DETAILS

MODULE I

Database Systems– Data – Information - Record – Field -Table – Database - Physical record – Logical Record –Attribute – Entity.
DBMS – Advantages and Disadvantages –application Areas – database Users – Three schema – Architecture – Schema - subschema , Data independence – Physical and logical data independence -
Data models – DBMS Architecture - Database Languages – Classification.

MODULE II

Database Design - ER model – Entity – Attribute – Keys – Relationship types – Sets – Keys
ER diagram – Weak entity set – strong entity — Relation ship types - sets - Enhanced ER – sub class – super class –inheritance – UML – Class diagram.
Relational model – Concepts – Keys -- Relational algebra operations –Unary & Binary relational operations

MODULE III

Relational Database Design – Mapping E-R Model to Relational Model – Constraints – Domain Constraints - Key constraints – Referential integrity – Foreign keys - Functional dependency – Normalization – 1NF – 2NF – 3NF– Boyce Codd Normal Form – Decomposition – Dependency preservation – Multivalued dependencies – 4NF – Join dependencies – 5NF.
Transaction management-Transaction concepts -Properties of transactions-States-Concurrent Executions-Serializability

MODULE IV

SQL – Features of SQL – Data types in SQL , , CREATE TABLE command, Constraints – NULL, DEFAULT,CHECK, PRIMARY KEY, UNIQUE, , referential Integrity –DROP TABLE Command , ALTER TABLE , CREATE INDEX, CREATE UNIQUE INDEX, DROP INDEX
SELECT statements with WHERE, ORDER BY, UPDATE Statement, INSERT, DELETE, nested Queries - functions in SQL- L, Joining tables –aggregate functions, Grouping - GROUP BY, HAVING clauses
— Transaction commands – Views.
Triggers, and cursers – stored procedures and functions , embedded SQL, Retrieving single tuples with embedded SQL -Dynamic SQL – database connectivity- ODBC – JDBC.

TEXT BOOK

1. Introduction to Database Systems – IITL Education Solutions Ltd - PEARSON

REFERENCE BOOKS

1. Fundamentals of database systems – Elmasri, Navathe, Somarajulu, and Gupta. (Pearson)
2. Database system concepts - Silberschatz, Korth, and Sudarshan (TMH)
3. Oracle 7 the complete reference - Ivan Bay Ross
4. SQL for professional - Swapne & Rajesh Naik