

**COURSE TITLE** : **RELATIONAL DATABASE MANAGEMENT SYSTEM**  
**COURSE CODE** : **4255**  
**SEMESTER** : **4**  
**COURSE CATEGORY** : **A**  
**PERIODS/WEEK** : **5**  
**PERIODS/SEMESTER** : **75**  
**CREDITS** : **5**

**TIME SCHEDULE**

MODULE	TOPICS	PERIODS
1	INTRODUCTION TO DATABASE	20
2	RELATIONAL MODEL	15
3	FEATURES OF SQL	20
4	ADVANCED SQL	20

**Course General Outcomes:**

Sl.	G.O	On completion of this course the student will be able :
1	1	To understand the concept of database
	2	To know database system structure
2	1	To understand the concept of relational model
	2	To know relational algebra operations
3	1	To understand SQL
4	1	To know about advance SQL & embedded SQL

**SPECIFIC OUTCOMES**

**MODULE – 1**

**1.1.0 Understand Database**

- 1.1.1 Define Field, Record, Database
- 1.1.2 Distinguish between Physical record –and Logical Record
- 1.1.3 Explain Advantages of DBMS
- 1.1.4 Understand Schema, Subschema, - Instances, Three schema architecture
- 1.1.5 Define data independence.
- 1.1.6 Distinguish between Logical data independence and Physical data independence

**1.2.0 Know Database system structure(Architecture)**

- 1.2.1 Explain Storage manager, Query processor, Disk storage, Database Users
- 1.2.2 Distinguish Database Languages – DDL , DML,DCL
- 1.2.3 Explain various Database system application architectures like

Centralized DBMS architecture, Basic client/server architecture, Two tier client/server architectures, and three tier client/server architectures

**1.3.0 Understand Data models**

- 1.3.1 Explain ER model
- 1.3.2 Define Entity, Attribute, Keys, Relationship types, Relationship set
- 1.3.3 Define Primary key, Candidate key, Super key
- 1.3.4 Explain ER diagram, Weak entity set
- 1.3.5 Compare ER Model and Enhanced ER Model
- 1.3.6 Describe EER Model: Subclasses – Super classes – Inheritance – Specialisation – Generalisation
- 1.3.7 Define Unified Modelling Language– Class diagram

**MODULE – 2**

**2.1.0 Understand Relational model Concepts**

- 2.1.1 Define Domains, Attributes, Tuples
- 2.1.2 Explain Mapping ER model to Relational model
- 2.1.3 Explain Constraints: Domain constraints, Key constraints, Entity integrity, Referential integrity, Foreign keys

**2.2.0 Understand Relational algebra operations**

- 2.2.1 Explain the following operations with examples: Select, Project, Rename, Union, Intersection, Difference, Cartesian Product, Division, Join, Equijoin, Natural join

**2.3.0 Understand Relational database design**

- 2.3.1 Explain design guidelines for relation schema
- 2.3.2 Define Functional dependency
- 2.3.3 Explain normal forms: 1NF – 2NF – 3NF – Boyce Codd Normal Form
- 2.3.4 Explain Decomposition, Dependency preservation, Multi-valued dependencies
- 2.3.5 Explain 4NF with example
- 2.3.6 Explain Join dependencies and define 5NF

**MODULE - 3**

**3.1.0 Understand SQL**

- 3.1.1 Explain features of SQL
- 3.1.2 Explain Data types in SQL
- 3.1.3 Differentiate Domains, attributes, and tuples

**3.2.0 Creation of Table**

- 3.2.1 Explain CREATE TABLE command

- 3.2.2 Explain Constraints: NULL, DEFAULT,CHECK, PRIMARY KEY, UNIQUE, referential Integrity
- 3.2.3 Explain DROP TABLE Command , ALTER TABLE
- 3.2.4 Explain commands for creating and roping indexes CREATE INDEX, CREATE UNIQUE INDEX, DROP INDEX
- 3.2.5 Explain SELECT statements with WHERE, ORDER BY clause with examples
- 3.2.6 Describe UPDATE Statement, INSERT, DELETE with example
- 3.2.7 Explain Nested queries, tuples and multi set comparison, Correlated nested queries
- 3.2.8 Explain EXISTS and UNIQUE functions
- 3.2.9 Explain explicit sets and renaming of attributes
- 3.2.10 Explain Joining tables – aggregate functions
- 3.2.11 Explain grouping: GROUP BY, HAVING clauses
- 3.2.12 Explain BEGIN TRANS, COMMIT, ROLL BACK, SAVE POINT
- 3.2.13 Explain Views: Advantages, Creation and Updation
- 3.2.14 Explain Query optimization

## **MODULE - 4**

### **4.1.0 Understand advanced SQL**

- 4.1.1 Define triggers and cursors
- 4.1.2 Explain reports and forms
- 4.1.3 Explain stored procedures and functions
- 4.1.4 Explain how Procedures are invoked from Interface

### **4.2.0 Understand Embedded SQL**

- 4.2.1 Understand about Embedded SQL statements and its application
- 4.2.2 Explain retrieving single tuples with embedded SQL
- 4.2.3 Explain retrieving multiple tuples with embedded SQL using cursor
- 4.2.4 Explain dynamic SQL by specifying queries at run time

### **4.3.0 Understand Transaction management**

- 4.3.1 Define Transaction
- 4.3.2 Explain transaction concepts
- 4.3.3 Differentiate Properties of transactions, , Transaction Sates
- 4.3.4 Explain Concurrent Executions
- 4.3.5 Explain Serializability

## **CONTENT DETAILS**

**MODULE – I** : Understand Database – Field – Record – Table – Database - Physical record – Logical Record – DBMS – Advantages Schema – Subschema, Data independence – Instances Database system structure – Users –Languages- Database system application architecture Data models – ER model – Entity –

Attribute – Keys – Relationship types – Sets – Keys ER diagram – Weak entity set — Enhanced ER – UML – Class diagram

**MODULE – II** : Relational model – Concepts – Constraints – Key constraints – Referential integrity – Foreign keys Relational algebra operations –Unary & Binary relational operations Relational database design –Guidelines- Functional dependency – Normalization – 1NF – 2NF – 3NF – Boyce Codd Normal Form – Decomposition – Dependency preservation – Multivalued dependencies – 4NF – Join dependencies – 5NF

**MODULE - III** : SQL – Features of SQL – Data types in SQL , Domains 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, tuples and multi set comparison , Correlated nested queries – EXISTS and UNIQUE functions in SQL IN Clause, Explicit sets and renaming of attributes in SQL, Joining tables – aggregate functions, Grouping - GROUP BY, HAVING clauses – Views – Query optimization

**MODULE – IV:** Triggers, cursers – stored procedures and functions, embedded SQL, Retrieving single tuples with embedded SQL Dynamic SQL – specifying queries at run time using dynamic SQL Transaction management-Transaction concepts -Properties of transactions-Sates-Concurrent Executions- Serializability

#### **BOOKS RECOMMENDED**

1. Elmasri, Navathe, Somarajulu, and Gupta, Fundamentals of database systems,. (Pearson)
2. Silberschatz, Korth and Sudarshan, Database system concept (TMH)