

**CSE324 DATABASE SYSTEMS**

**L T P C**  
**3 0 2 4**

**Version No.**

**Course**

**Prerequisites :** Data Structures and Algorithms

**Objectives**

1. To train the fundamental concepts of database management system, database modeling and design, SQL, PL/SQL, system implementation techniques.
2. To enable students to model ER diagram for any customized applications
3. To provide knowledge on distributed databases, concurrency techniques, federated systems and active databases.

**Expected Outcome**

Students will be able to

1. Perform project planning, analysis, design, implementation and testing in group / as an individual for any real time information system with all realistic constraints.
2. Solve issues of information systems using the learnt database principles.
3. Construct database application using current tools and techniques

**Unit I                    DATABASE SYSTEMS                    9 hours**

History and motivation for database systems – characteristics of database approach - components of database systems; database architecture and data independence.

**Unit II                    DATA MODELING                    9 hours**

ER Model – Relational Model – Mapping ER model to a relational schema – entity and referential integrity - Database query languages: Overview of database languages; Relational Algebra –SQL

**Unit III                    RELATIONAL DATABASE DESIGN                    9 hours**

Guidelines for Relational Schema - functional dependency; normal forms; multi-valued dependency; join dependency

**Unit IV                    QUERY PROCESSING AND TRANSACTION PROCESSING                    9 hours**

SQL queries into Relational Algebra – heuristic query optimization – Introduction to Transaction Processing – Transaction and System concepts - Desirable properties of Transactions - Concurrency Control : concepts and Two-Phase Locking

**Unit V                    PHYSICAL DATABASE DESIGN                    9 hours**

Storage and file structure: indexed files; hashed files; signature files; b+-trees; files with dense index; files with variable length records.

**Text / Reference Books**

1. R. Elmasri & S. B. Navathe, Fundamentals of Database Systems, Addison Wesley, 6<sup>th</sup> Edition, 2011

2. A. Silberschatz, H. F. Korth & S. Sudershan, Database System Concepts, McGraw Hill, 6<sup>th</sup> Edition 2010
3. C. J. Date, An Introduction to Database Systems, Addison Wesley, 8<sup>th</sup> edition, 2003
4. H. Garcia et al., Database System Implementation, Prentice Hall, 2000

**Mode of Evaluation** : Tests, Assignments, Seminars.

**Recommended by the Board of Studies on** :  
**Date of Approval by the Academic Council** :

#### **Sample list of exercises**

1. a) Create a table EMP with the following fields.  
EName  
Eno.  
Salary  
DeptNo  
Address  
Dname  
b) Insert 5 records into EMP  
c) ALTER EMP table i) varying size of Eno field  
                 ii) adding a new field job  
d) Delete the table EMP
2. Create a table EMP with the above mentioned fields.  
i) Insert 5 records into EMP  
ii) Update the salary of the Employees by 10% hike  
iii) Delete the employees whose name is 'AAA'
3. Create a table ORDER with the following fields and constraints.  
**ORDER**

Column Name	Constraint Name	Constraint Type
Order-no	pk-order-no	PRIMARY KEY
Item-name	itn	UNIQUE
Qty	ck-aty (25<QTY<50)	CHECK
rate-unit	Nn-rate	NOT NULL
4. Using Ex 3.
  1. Drop unique constraint for item-name
  2. Disable the constraint Nn-rate
  3. Insert a record with NULL values for rate unit
  4. Enable the constraint with NULL value existing on rate-unit
5. Create a table EMP mentioned above and test all the arithmetic functions and character functions

6. Add a field date-of-birth to EMP table and test all the date functions.
7. i) Modify EMP table adding a new field BONUS, update it using NVL  
ii) Retrieve the employees whose name starts with S.  
iii) Select all the employees who are working in IT department.
8. i) Using EMP table find the employee getting maximum salary  
ii) Find the employee whose salary is minimum  
iii) Find the sum of salaries of all the employees working in 'ACCOUNTS' department.
9. Create a table DEPT with the following fields  

DNo.	Primary Key
DName	

Modify EMP table adding a foreign key constraint on DeptNo.

  - i) Insert 6 records into Dept.
  - ii) Implement the following Join operations
    - a) Self Join
    - b) Equi Join
    - c) Non Equi Join
    - d) Outer Join
    - e) Natural Join
10. Using EMP and DEPT, implement all type of view techniques.
  - a) Row subset view
  - b) Column subset view
  - c) Row column subset view
  - d) Grouped view
  - e) Joined view
  - f) With check option
11. Using EMP and DEPT
  - a) Create a sequence to insert the empno in EMP table
  - b) Create a synonym for the above two tables

### PART - B

1. Create a cursor to update the salary of employees in EMP table
2. a) Write a PL/SQL program to raise an Exception
  - i) When the bonus exceeds salary
  - b) Write a PL/SQL program to test the built-in Exceptions
3. Write a procedure to insert a record into ORDER table by validating qty limit of the item and also check whether that item exists.
4. Write a function to find substring.  
Create a trigger which checks whether employee with Emp\_no is present in the Employee table before inserting into EMP.

### PART - C

Development of mini-projects with VB as front-end.