

**SEMESTER-III**  
**COURSE 5: DATABASE MANAGEMENT SYSTEM**

Theory

Credits: 3

3 hrs/week

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**Course Objectives:**

- Graduates will have the expertise in analyzing real time problems and providing appropriate solutions related to Computer Science & Engineering.
- Graduates will have the knowledge of fundamental principles and innovative technologies to succeed in higher studies and research.
- Graduates will continue to learn and to adapt technology developments combined with deep awareness of ethical responsibilities in profession.

**Course Outcomes:**

- An ability to apply Knowledge of computing and mathematics in Computer Science & Engineering.
- An ability to analyze a problem, identify and define the computing requirements appropriate to its solution.
- An ability to design, implement and evaluate a computer-based system to meet desired needs with appropriate societal considerations.
- An ability to conduct investigations, interpret data and provide conclusions in investigating complex problems related to Computer Science & Engineering.
- An ability to engage in continuing professional development and life-long learning.

**UNIT- I**

**Overview of Database Systems: Introduction:** Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications.

**Data Models:** Introduction; types of data models, Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

**Case Study:**

1. Describe the differences between Database systems and File based systems
2. Study about database models and their advantages and dis-advantages

**UNIT- II**

**Relational Model:** Introduction to relational model, Codd's rules, concepts of domain, attribute, tuple, relation, constraints (Domain, Key constraints, integrity constraints) and their importance, concept of keys (super key, candidate key, primary key, surrogate key, foreign key), relational Algebra & relational calculus.

**Normalization:** Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), Boyce-codd normal form(BCNF)

**Case Study:**

Describe Relational model and normalization for database design

**UNIT - III:**

**Entity Relationship Model:** Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams,

**BASIC SQL:** Database schema, data types, DDL operations (create, alter, drop, rename), DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, aggregation, grouping, ordering.

**Case Study:**

1. Examine issues in data storage and query processing using SQL.
2. Create, maintain and manipulate a relational database using SQL

**UNIT - IV**

**SQL:** Nested queries/ sub queries, implementation of different types of joins, SQL functions(Date, Numeric, String, Conversion functions), Creating tables with relationship, implementation of key and integrity constraints, views, relational set operations , Transaction Control Language: commit, Rollback, Savepoint , DCL :Grant, Revoke

**Case Study:**

1. Try to convert some sample data to information and show how it can be used in decision making.

**UNIT -V**

**PL/SQL:** Introduction , Structure , Control Structures , Cursors , Procedure , Function , Packages , Exception Handling ,Triggers.

**Transaction processing Concepts :** Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, Failure Classification, Storage, Recovery and Atomicity, Recovery algorithm.

**Case Study:**

Outline the role and issues in Transaction management of data such as efficiency, privacy, security.  
Database management systems Text Books

- Database Management Systems, 3<sup>rd</sup> Edition , Raghurama Krishnan, Johannes Gehrke, TMH
- Database System Concepts,5<sup>th</sup> Edition , Silberschatz, Korth, TMH

**SEMESTER-III**  
**COURSE 5: DATABASE MANAGEMENT SYSTEM**

Practical

Credits: 1

2 hrs/week

**List of Experiments**

**SQL :**

**Cycle-I:** Aim: Marketing company wishes to computerize their operations by using following tables.

Table Name: Client- Master

Description: Used to store client information

Column Name	Data Type	Size	Attribute
CLIENT_NO	Varchar2	6	Primarykey
NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	
ADDRESSSS	Varchar2	30	
CITY	Varchar2	15	
PINCODE	Varchar2	8	
STATE	Varchar2	15	
BAL_DUE	Number	10,2	

Table Name: Product\_Master

Description: Used to store product information

ColumnName	Data Type	Size	Attribute
PRODUCT_NO	Varchar2	6	Primarykey
DESCRIPTION	Varchar2	15	Not null
PROFIT_PERCENT	Number	4,2	Not null
UNIT_MEASUE	Varchar2	10	
QTY_ON_HAND	Number	8	
REORDER_LVL	Number	8	
SELL_PRICE	Number	8,2	Not null, cannot be 0
COST_PRICE	Number	8,2	Not null,cannot be 0

Table Name: Salesman\_master

Description: Used to store salesman information working for the company.

ColumnName	Data Type	Size	Attribute
SALESMAN_NO	Varchar2	6	Primary key
SALESMAN_NAME	Varchar2	20	Not null
ADDRESS1	Varchar2	30	
ADDRESS2	Varchar2	30	
CITY	Varchar2	20	
PINCODE	Number	8	
STATE	Vachar2	20	
SAL_AMT	Number	8,2	Not null, cannot be 0
TGT_TO_GET	Number	6,2	Not null, cannot be 0
YTD_SALES	Number	6,2	Not null
REMARKS	Varchar2	20	

Table Name: SALES-

ORDER Description: Used to store client's orders

ColumnName	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key
CLIENT_NO	Varchar2	6	Foreign Key
ORDER_DATE	Date		
DELY_ADDRESS	Varchar2	25	
SALESMAN_NO	Varchar2	6	Foreign Key
DELY_TYPE	Char	1	Delivery: part(p)/full(f) and default 'F'
BILL_YN	Char	1	
DELY_DATE	Date		Can't be less than order date
ORDER_STATUS	Varchar2	10	Values ("In Process", "Fulfilled", "Back Order", "Cancelled).

Table Name: SALES\_ORDER\_DETAILS

Description:Used to store client's order with details of each product ordered.

ColumnName	Data Type	Size	Attribute
ORDER_NO	Varchar2	6	Primary key references SALES_ORDER table
PRODUCT_NO	Varchar2	6	Foreign Key references SALES_ORDER_table
QTY_ORDERED	Number	8	
QTY_DISP	Number	8	
PRODUCT_RATE	Number	10,2	Foreign Key

Solve the following queries by using above tables.

1. Retrieve the list of names, city and the state of all the clients.
2. List all the clients who are located in 'Mumbai' or 'Bangalore'.
3. List the various products available from the product\_master table.
4. Find the names of salesman who have a salary equal to Rs.3000.
5. List the names of all clients having 'a' as the second letter in their names.
6. List all clients whose Balance is greater than value 1000.
7. List the clients who stay in a city whose first letter is 'M'.
8. List all information from sales-order table for orders placed in the month of July.
9. List the products whose selling price is greater than 1000 and less than or equal to 3000.
10. Find the products whose selling price is greater than 1000 and also find the new selling price as original selling price 0.50.

## Cycle-II Supplier

Aim: A manufacturing company deals with various parts and various suppliers supply these parts. It consists of three tables to record its entire information. Those are as follows.

Supplier (Supplier\_No, Sname, City, status) Part(Part\_no, pname, color, weight, city, cost)

Shipment (supplier\_No, Part\_no, city) JX(project\_no, project\_name, city)

SPJX(Supplier\_no, part\_no, project\_no,city)

1. Get supplier numbers and status for suppliers in Chennai with status>20.
2. Get project names for projects supplied by supplier 'S'.
3. Get colors of parts supplied by supplier S.
4. Get part numbers for parts supplied to any project in Mumbai.
5. Find the id's of suppliers who supply a red or pink parts.

### Cycle-III Employee Database

Aim: An enterprise wishes to maintain a database to automate its operations. Enterprise divided into a certain departments and each department consists of employees. The following two tables describes the automation schemas.

Emp(Empno, Ename, Job, Mgr, Hiredate, Sal, Comm, Deptno)  
Dept(Deptno, Dname, Loc)

1. List the details of employees who have joined before the end of September '81.
2. List the name of the employee and designation of the employee, who does not report to anybody.
3. List the name, salary and PF amount of all the employees (PF is calculated as 10% of salary)
4. List the names of employees who are more than 2 years old in the organization.
5. Determine the number of employees, who are taking commission.
6. Update the employee salary by 20%, whose experience is greater than 12 years.
7. Determine the department does not contain any employees.
8. Create a view, which contains employee name and their manager names working in sales department.
9. Determine the employees, whose total salary is like the minimum salary of any department.
10. List the department numbers and number of employees in each department.

### PL/SQL PROGRAMS

1. Write a PL/SQL program to check the given string is palindrome or not.
2. The HRD manager has decided to raise the employee salary by 15% write a PL/SQL block to accept the employee number and update the salary of that employee. Display appropriate message based on the existence of the record in Emp table.
3. Write a PL/SQL program to display top 10 rows in Emp table based on their job and salary.
4. Write a PL/SQL program to raise the employee salary by 10% for department number 30 people and also maintain the raised details in the raise table.
5. Create a procedure to update the salaries of Employees by 20%, for those who are not getting commission
6. Write a PL/SQL procedure to prepare an electricity bill by using following table. Table used: Elect

Name	Null?	Type
MNNO	NOT NULL	NUMBER(3)
CNAME		VARCHAR2(20)
CUR_READ		NUMBER(5)
PREV_READ		NUMBER(5)
NO_UNITS		NUMBER(5)
AMOUNT		NUMBER(8,2)
SER_TAX		NUMBER(8,2)
NET_AMT		NUMBER(9,2)

7. Create a trigger to avoid any transactions (insert, update, delete) on EMP table on Saturday & Sunday.