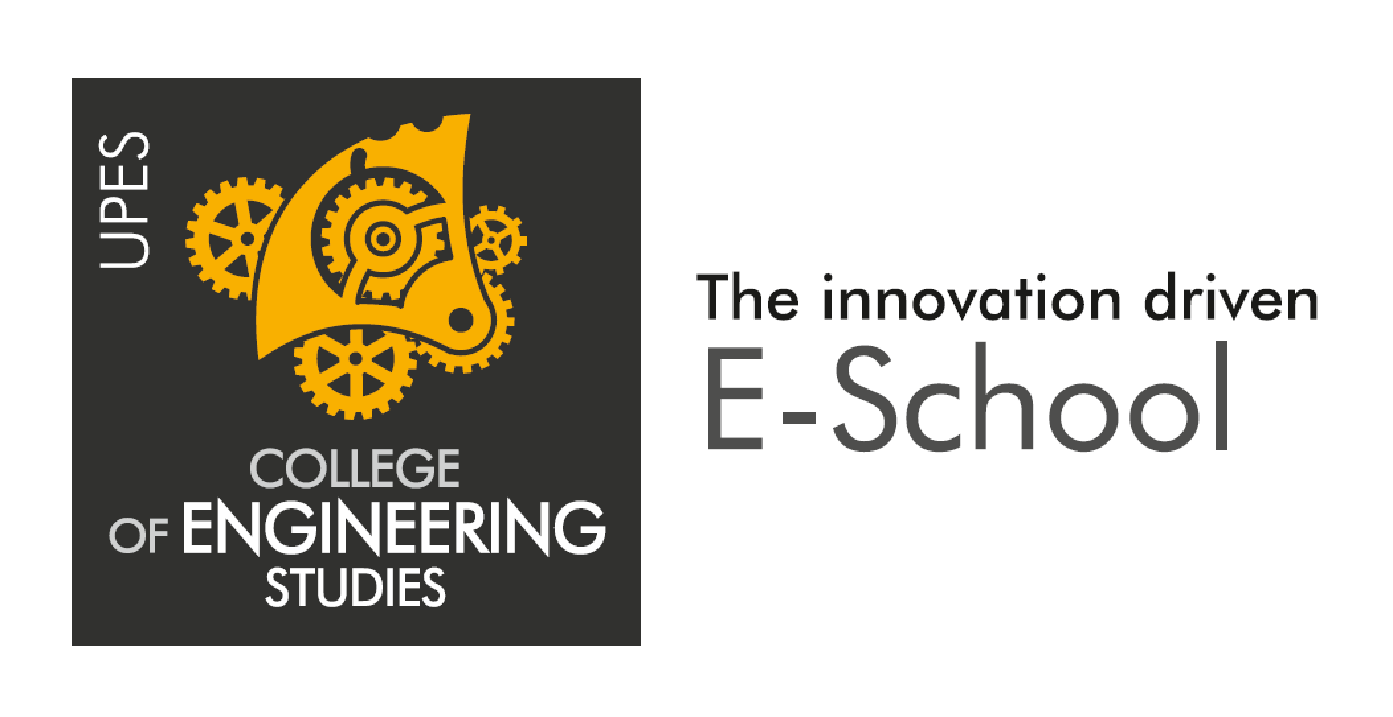
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**UNIVERSITY OF PETROLEUM & ENERGY STUDIES**

**College of Engineering Studies**

**Dehradun**

**COURSE PLAN**

Programme : B. Tech (CSE) - Dept. of IT Infrastructure

Course : Database Management Systems Lab.

Subject Code : CSEG 1105

No. of credits : 1

Semester : II

Session : (Jan 2018- May 2018)

Batch : 2017-2021

Prepared by : Prashant Rawat

Email : prashant.rawat@ddn.upes.ac.in

**Approved By**

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**COURSE PLAN**

1. **PREREQUISITE:**
   1. Basic Knowledge Data Structure
   2. Basic Knowledge of File Processing System
2. **PROGRAM OUTCOMES (POs) and PROGRAM SPECIFIC OUTCOMES (PSOs):**

**B1. PROGRAM OUTCOMES (POs)**

**PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**B2. Program Specific Outcomes (PSOs)**

**PSO13:** Perform system and application programming using computer system concepts, concepts of Data Structures, algorithm development, problem solving and optimizing techniques.

**PSO14:** Apply software development and project management methodologies using concepts of front-end and back-end development and emerging technologies and platforms.

**PSO15:** Ability to design, develop and manage scalable IT Infrastructure.

**B.3 OBJECTIVES OF COURSE:-**

The objectives of this course are to:

(a) The overall objective of the module is that the student should be able to appreciate the use of relational databases to store, manage and query the data. The student should get fair idea of designing database through modeling and should know normal forms and the reason for normalizing.

(b) The student should be able to design Simple query statements by the use of Oracle interface. The student should be able to design queries with phrases like “where”, “order by” statements etc. The student should be able to understand the use of views, and design them.

(c) The student should be able to understand the background working of Oracle, by learning Oracle Architecture and its background processes. Overall the student should appreciate the use of DBMS systems for effective data management.

1. **COURSE OUTCOMES FOR Database Management Systems Lab:**

The objectives of this course are to:

* 1. Understand, appreciate and effectively explain the underlying concepts of database technologies.
  2. Design and implement a database schema for a given problem-domain.
  3. Populate and query a database using SQL DML/DDL commands.
  4. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS.
  5. Understand and use of aggregate functions with group by and having clause.
  6. Retrieval of records from multiple relations using join and nested query.

**Table: Mapping of POs and PSOs v/s COs**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PO / CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO 12 | PSO 13 | PSO 14 | PSO  15 |
| CO1 | - | - | 1 | - | 1 | 1 | - | - | - | - | - | - | - | 1 | - |
| CO2 | - | 1 | 1 | - | 1 | - | - | - | - | - | - | - | - | 1 | - |
| CO3 | - | 1 | 1 | - | 1 | 1 | - | - | - | - | 1 | - | - | 1 | - |
| CO4 | - | 1 | 1 | - | 1 | 1 | - | - | - | - | 1 | - | - | 1 | - |
| CO5 | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 1 | 1 | - |
| CO6 | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 1 | 1 | - |

**D. COURSE OUTLINE**

|  |  |  |
| --- | --- | --- |
| **S.No** | **Lab Exercise** | **Contents** |
| 1. | Lab. Exercise 1 | Data retrieval and DDL commands |
| 2. | Lab. Exercise 2 | DML commands with constraints |
| 3. | Lab. Exercise 3 | DDL commands with data Constraints |
| 4. | Lab. Exercise 4 | DDL commands with data Constraints |
| 5. | Lab. Exercise 5 | Use of Inbuilt functions and relational algebra operations part-I |
| 6. | Lab. Exercise  6 | Use of Inbuilt functions and relational algebra operations part-II |
| 7. | Lab. Exercise  7 | Nested Sql queries or subqueries part-I |
| 8. | Lab. Exercise  8 | Nested Sql queries or subqueries part-II |
| 9. | Lab. Exercise  9 | Aggregate functions |
| 10. | Lab. Exercise  10 | Joins |

**E. PEDAGOGY**

Knowledge about the basic terminology used in structured query language, have a clear idea about fundaments as well as Practical concept of database.

**F. COURSE COMPLETION PLAN**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| S.no | No. of experiments planned | No. of experiments completed | No .of internal lab tests planned | No .of internal lab tests conducted | No. of internal viva planned | No. of internal viva conducted |
| 1 | 10 |  | 2 |  | 3 |  |

No. of lab classes per batch planned: 12

No. of lab classes per batch taken:

Percentage of experiment covered:

**G. EVALUATION & GRADING**

|  |  |  |
| --- | --- | --- |
| **Description** | **Weight age** | **Schedule** |
| 1. Performance Records | 50% | During Lab Sessions |
| 1. Viva Voice or Quiz | 50% | Minimum three times in a Semester |

**Performance Records: Marks 100(50% weightage)**

|  |  |
| --- | --- |
| **Example ( 10 Marks for each Practical )** | |
| Problem Understanding | 3 Marks |
| Query Syntax | 2 Marks |
| Execution /Bug Finding | 2 Marks |
| Records | 3 Marks |
|  |  |

**GENERAL DISCIPLINE:** Based on student’s regularity, punctuality, sincerity, behavior and dress code/sense in the lab.

The marks obtained by the students will be displayed on blackboard at the end of semester.

**Viva voce / Quiz (50%)**

External lab examination shall be of 2 hours duration. The lab examination will be based on the lab classes and practical oriented problems.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Viva of 10-15 students in one lab session So one complete viva is in 3 Lab Sessions. | | | | | | | |
| 3 Viva Means 9-10 sessions as continuous evaluations in a semester. | | | | | |  |  |
|  |  |  |  |  |  |  |  |

**H. DETAILED SESSION PLAN**

**Experiment 1**

**TITLE:** **DDL (Data Definition Language) commands**

**Objective:** To understand the concept of designing issue related to the database with creating, populating the tables.

1. **Create the tables described below:**

**Table name: CLIENT\_MASTER Description:** used to store client information.

|  |  |  |
| --- | --- | --- |
| **Column name** | **data type** | **Size** |
| CLIENTNO | Varchar | 6 |
| NAME | Varchar | 20 |
| ADDRESS 1 | Varchar | 30 |
| ADDRESS 2 | Varchar | 30 |
| CITY | Varchar | 15 |
| PINCODE | Integer |  |
| STATE | Varchar | 15 |
| BALDUE | decimal | 10,2 |

**Table Name: PRODUCT\_MASTER Description:** used to store product information

|  |  |  |
| --- | --- | --- |
| **Column name** | **data type** | **Size** |
| PRODUCTNO | Varchar | 6 |
| DESCRIPTION | Varchar | 15 |
| PROFITPERCENT | Decimal | 4,2 |
| UNIT MEASURE | Varchar | 10 |
| QTYONHAND | Integer |  |
| REORDERL VL | Integer |  |
| SELLPRICE | Decimal | 8,2 |
| COSTPRICE | Decimal | 8,2 |

**Table Name: SALESMAN\_MASTER**

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

|  |  |  |
| --- | --- | --- |
| **Column name** | **data type** | **Size** |
| SALESMANNO | Varchar | 6 |
| SALESMANNAME | Varchar | 20 |
| ADDRESS 1 | Varchar | 30 |
| ADDRESS 2 | Varchar | 30 |
| CITY | Varchar | 20 |
| PINCODE | Integer |  |
| STATE | Varchar | 20 |
| SALAMT | Real |  |
| TGTTOGET | Decimal |  |
| YTDSALES | Double | 6,2 |
| REMARKS | Varchar | 60 |

1. **Insert the following data into their respective tables:**
2. Data for **CLIENT\_MASTER** table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Client no | Name | city | Pincode | state | BalDue |
| C00001 | Ivan bayross | Mumbai | 400054 | Maharashtra | 15000 |
| C00002 | Mamta muzumdar | Madras | 780001 | Tamil nadu | 0 |
| C00003 | Chhaya bankar | Mumbai | 400057 | Maharashtra | 5000 |
| C00004 | Ashwini joshi | Bangalore | 560001 | Karnataka | 0 |
| C00005 | Hansel colaco | Mumbai | 400060 | Maharashtra | 2000 |
| C00006 | Deepak sharma | Mangalore | 560050 | Karnataka | 0 |

1. Data for **PRODUCT**\_**MASTER** table:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ProductNo | Description | Profit percent | Unit measure | Qtyonhand | RecorderLvl | SellPrice | CostPrice |
| P00001 | T-Shirt | 5 | Piece | 200 | 50 | 350 | 250 |
| P0345 | Shirts | 6 | Piece | 150 | 50 | 500 | 350 |
| P06734 | Cotton jeans | 5 | Piece | 100 | 20 | 600 | 450 |
| P07865 | Jeans | 5 | Piece | 100 | 20 | 750 | 500 |
| P07868 | Trousers | 2 | Piece | 150 | 50 | 850 | 550 |
| P07885 | Pull Overs | 2.5 | Piece | 80 | 30 | 700 | 450 |
| P07965 | Denim jeans | 4 | Piece | 100 | 40 | 350 | 250 |
| P07975 | Lycra tops | 5 | Piece | 70 | 30 | 300 | 175 |
| P08865 | Skirts | 5 | Piece | 75 | 30 | 450 | 300 |

1. Data for **SALESMAN\_MASTER**  table:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SalesmanNo** | **Name** | **Address1** | **Address2** | **City** | **PinCode** | **State** |
| S00001 | Aman | A/14 | Worli | Mumbai | 400002 | Maharashtra |
| S00002 | Omkar | 65 | Nariman | Mumbai | 400001 | Maharashtra |
| S00003 | Raj | P-7 | Bandra | Mumbai | 400032 | Maharashtra |
| S00004 | Ashish | A/5 | Juhu | Mumbai | 400044 | Maharashtr(a |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SalesmanNo** | **SalAmt** | **TgtToGet** | | **YtdSales** | | **Remarks** |
| S00001 | 3000 | 100 | 50 | | Good | |
| S00002 | 3000 | 200 | 100 | | Good | |
| S00003 | 3000 | 200 | 100 | | Good | |
| S00004 | 3500 | 200 | 150 | | Good | |

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*** **Experiment 2**

**Title: DML commands with constraints**

**Objective: -** To understand the concept of different DML commands.

Exercise on retrieving records from a table.  
a. Find out the names of all the clients.  
b. Retrieve the entire contents of the Client\_Master table.  
c. Retrieve the list of names,city and the state of all the clients.  
d. List the various products available from the Product\_Master table.  
e. List all the clients who are located in Mumbai.  
f. Find the names of salesman who have a salary equal to Rs.3000.

1. Exercise on updating records in a table  
   a. Change the city of ClientNo ‘C00005’ to ‘Bangalore’.  
   b. Change the BalDue of ClientNo ‘C00001’ to Rs.1000.  
   c. Change the cost price of ‘Trousers’ to rs.950.00.  
   d. Change the city of the salesman to Pune.
2. Exercise on deleting records in a table  
   a. Delete all salesman from the Salesman\_Master whose salaries are equal to Rs.3500.
3. b. Delete all products from Product\_Master where the quantity on hand is equal to 100.  
   c. Delete from Client\_Master where the column state holds the value ‘Tamil Nadu’.
4. Exercise on altering the table structure  
   a. Add a column called ‘Telephone’ of data type integer to the Client\_Master table.  
   b. Change the size off SellPrice column in Product \_Master to 10, 2.
5. Exercise on deleting the table structure along with the data  
   a. Destroy the table Client\_Master along with its data.
6. Exercise on renaming the table  
   a. Change the name of the Salesman\_Master to sman\_mast.

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**EXPERIMENT-3**

**TITLE:** **DDL (Data Definition Language) commands with Data Constraints**

**Objective:** To understand the concept of data constraints that is enforced on data being stored in the table. Focus on Primary Key and the Foreign Key

**Create the tables described below:**

**Table name: CLIENT\_MASTER\_1 Description:** used to store client information.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column name** | **data type** | **Size** | **Constraints** |
| CLIENTNO | Varchar | 6 | Primary key / first letter must start with ‘C’ |
| NAME | Varchar | 20 | Not Null |
| ADDRESS 1 | Varchar | 30 |  |
| ADDRESS 2 | Varchar | 30 |  |
| CITY | Varchar | 15 |  |
| PINCODE | Integer | 8 |  |
| STATE | Varchar | 15 |  |
| BALDUE | Decimal | 10,2 |  |

**Table Name: PRODUCT\_MASTER\_1 Description:** used to store product information

|  |  |  |  |
| --- | --- | --- | --- |
| **Column name** | **data type** | **Size** | **Attributes** |
| PRODUCTNO | Varchar | 6 | Primary Key/ first letter must start with ‘P’ |
| DESCRIPTION | Varchar | 15 | Not Null |
| PROFITPERCENT | Decimal | 4,2 | Not Null |
| UNIT MEASURE | Varchar | 10 | Not Null |
| QTYONHAND | Integer | 8 | Not Null |
| REORDERL VL | Integer | 8 | Not Null |
| SELLPRICE | Decimal | 8,2 | Not Null |
| COSTPRICE | Decimal | 8,2 | Not Null |

**Table Name: SALESMAN\_MASTER \_1**

**Description:**  used to store salesman information working for the company.

|  |  |  |  |
| --- | --- | --- | --- |
| **Column name** | **data type** | **Size** | **Attributes** |
| SALESMANNO | Varchar | 6 | Primary Key/ first letter must start with ‘S’ |
| SALESMANNAME | Varchar | 20 | Not Null |
| ADDRESS 1 | Varchar | 30 | Not Null |
| ADDRESS 2 | Varchar | 30 |  |
| CITY | Varchar | 20 |  |
| PINCODE | Integer | 8 |  |
| STATE | Varchar | 20 |  |
| SALAMT | Real | 8,2 | Not Null , Cannot be 0 |
| TGTTOGET | Decimal | 6,2 | Not Null , Cannot be 0 |
| YTDSALES | Double | 6,2 | Not Null |
| REMARKS | Varchar | 60 |  |

1. **Reinsert the data in these two tables based upon Lab 2.**
2. **Display the contents of each table.**

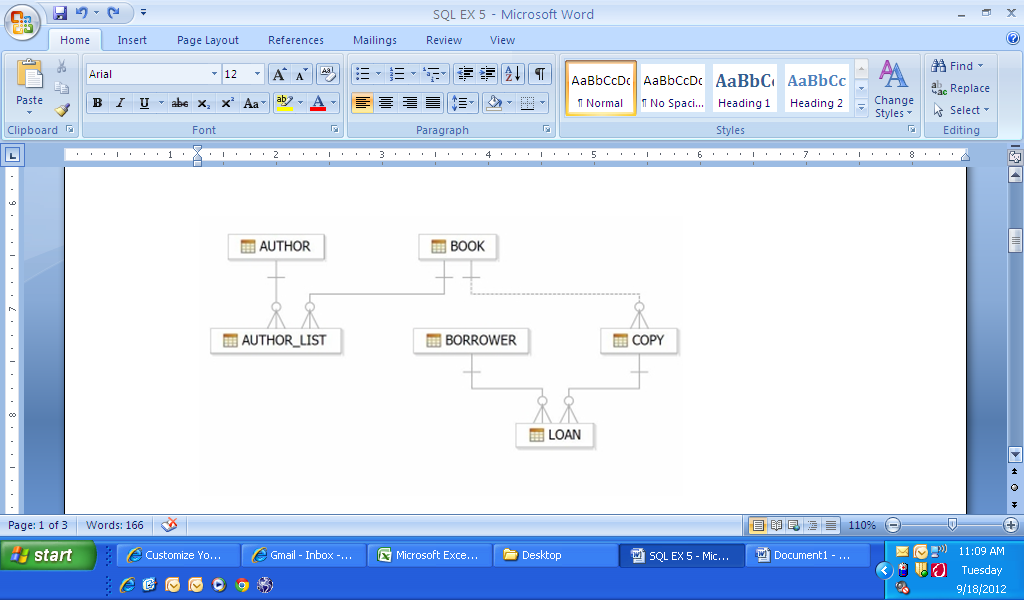
**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**EXPERIMENT-4**

**TITLE:** **DDL (Data Definition Language) commands with Data Constraints**

**Objective:** To understand the concept of data constraints that is enforced on data being stored in the table. Focus on Primary Key, The Foreign Key and constraints.

Review this diagram



1. Create table AUTHOR = {Author\_ID , Lastname, Firstname, Email, City, Country}

Where:

Author\_ID – text data type, 5 characters, primary key

Lastname – text data type, 15 characters, not null

Firstname – text data type, 15 characters, not null

Email – text data type, 40 characters,

City – text data type, 15 characters,

Country – text data type, 15 characters,

1. Create Table BOOK={ Book\_ID, Book\_Title, Copies)

Where :

Book\_ID – text data type, 5 characters Primary Key Start With Character **B**

Book\_Title - Text data Type Not Null

Copies- No.of copies Data Type int always greater the 2

1. Create table AUTHOR\_LIST = {Author\_ID , Book\_ID , Role}

Where:

Author\_ID – text data type, 5 characters, referenced by Author\_ID from AUTHOR

table

Book\_ID – text data type, 5 characters

Role – text data type, 15 characters

and primary key is: Author\_ID, Book\_ID

1. Add four records in each tables AUTHOR, BOOK, BOOK\_LIST.
2. Alter structure of table AUTHOR\_LIST add the field Publisher data type of 30 Character.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**EXPERIMENT- 5,6**

**Title:** Use of Inbuilt functions and relational algebra operation

**Objective:** To understand the use of inbuilt function and relational algebra with sql query.

1. Consider the following table structure and attempt.

Supplier-(scode,sname,scity,turnover)

Part-(pcode,weigh,color,cost,sellingprice)

Supplier\_Part-(scode,pcode,qty)

a) Create tables

b) Populate the table.

2. Write appropriate SQL Statement for the following:

1. Get the supplier number and part number in ascending order of supplier number.

2. Get the details of supplier who operate from Bombay with turnover 50.

3. Get the total number of supplier.

4. Get the part number weighing between 25 and 35.

5. Get the supplier number whose turnover is null.

6. Get the part number that cost 20, 30 or 40 rupees.

7. Get the total quantity of part 2 that is supplied.

8. Get the name of supplier who supply part 2.

9. Get the part number whose cost is greater than the average cost.

10. Get the supplier number and turnover in descending order of turnover.

**EXPERIMENT-7,8**

**TITLE:** Nested sql queries or Subquries

**Objective:** To understand the use **SQL Subquery**

**1.Create the following two tables (EMP and DEPT)**

**EMP TABLE**

EMPNO ENAME JOB MGR HIREDATE SAL COMM DEPTNO

---------- ---------- --------- ---------- --------- ---------- ---------- ----------

7369 SMITH CLERK 7902 17-DEC-80 500 800 20

7499 ALLEN SALESMAN 7698 20-FEB-81 1600 300 30

7521 WARD SALESMAN 7698 22-FEB-81 1250 500 30

7566 JONES MANAGER 7839 02-APR-81 2975 20

7654 MARTIN SALESMAN 7698 28-SEP-81 1250 1400 30

7698 BLAKE MANAGER 7839 01-MAY-81 2850 30

7782 CLARK MANAGER 7839 09-JUN-81 2450 10

7788 SCOTT ANALYST 7566 09-DEC-82 3000 20

7839 KING PRESIDENT 17-NOV-81 5000 10

7844 TURNER SALESMAN 7698 08-SEP-81 1500 0 30

7876 ADAMS CLERK 7788 12-JAN-83 1100 20

7900 JAMES CLERK 7698 03-DEC-81 950 30

7902 FORD ANALYST 7566 03-DEC-81 3000 20

7934 MILLER CLERK 7782 23-JAN-82 1300 10

**DEPT TABLE**

DEPTNO DNAME LOC

---------- -------------- -------------

10 ACCOUNTING NEW YORK

20 RESEARCH DALLAS

30 SALES CHICAGO

40 OPERATIONS BOSTON

Write the Nested Queries for the following queries.

1. List the details of the emps whose Salaries more than the employee BLAKE.
2. List the emps whose Jobs are same as ALLEN.
3. List the Emps whose Sal is same as FORD or SMITH in desc order of Names.
4. List the emps Whose Jobs are same as MILLER or Sal is more than ALLEN.
5. Find the highest paid employee of sales department.
6. List the employees who are senior to most recently hired employee working under king.
7. List the names of the emps who are getting the highest sal dept wise.
8. List the emps whose sal is equal to the average of max and minimum
9. List the emps who joined in the company on the same date.

10. Find out the emps who joined in the company before their Managers.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

**EXPERIMENT-9**

**TITLE: Group by & having clause**

**Objective:** To understand the use of group by and having clause.

Write the SQL Queries for the following queries (use EMP and DEPT table of Exp 8).

1. List the Deptno where there are no emps.
2. List the No.of emp’s and Avg salary within each department for each job.
3. Find the maximum average salary drawn for each job except for ‘President’.
4. List the department details where at least two emps are working.
5. List the no. of emps in each department where the no. is more than 3.
6. List the names of the emps who are getting the highest sal dept wise.
7. List the Deptno and their average salaries for dept with the average salary less than the averages for all departments.

**EXPERIMENT-10**

**TITLE: Joins in SQL**

AIM: To execute and verify the SQL commands using Join.

OBJECTIVE: SQL joins are used to query data from two or more tables, based on a relationship between certain columns in these tables.

Refer Experiment 7 & 8 and execute the same questions by using join.

**F. SUGGESTED READINGS:**

Ref. 1: SQL, PL/SQL, The programming language of Oracle by Ivan Bayross, BPB Publication.

Ref. 2: Introduction to Oracle SQL-Volume 1

**F-1: VIDEO RESOURCES (URL LINK) AND NPTEL LECTURES:**

Link 1: <http://www.youtube.com/watch?v=64szTfLNu3o&list=PL52484DF04A264E59&index=5>

Link 2: <http://www.youtube.com/watch?v=TB5T2O8Hwm8&list=PL52484DF04A264E59&index=6>

**GUIDELINES**

***Cell Phones and other Electronic Communication Devices*:** Cell phones and other electronic communication devices (such as Blackberries/Laptops) are not permitted in classes during Tests or the Mid/Final Examination. Such devices MUST be turned off in the lab classes

***E-Mail and blackboard:*** Each student in the class should have an e-mail id and a pass word to access the blackboard system regularly. Regularly, important information – Date of conducting class tests, guest lectures, via blackboard. The best way to arrange meetings with us or ask specific questions is by email and prior appointment. All the assignments preferably should be uploaded on blackboard. Various research papers/reference material will be mailed/uploaded on blackboard time to time.

***Attendance:*** Students are required to have **minimum attendance of 75%** in each subject. Students with less than said percentage shall **NOT** be allowed to appear in the end semester examination.

***Passing criterion:*** Student has to secure minimum 40% marks of the “highest marks in the class scored by a student in that subject (in that class/group class)” individually in both the ‘End-Semester examination’ and ‘Total Marks’ in order to pass in that paper.

* Passing Criterion for B. Tech: minimum 40% of the highest marks in the class
* Passing Criterion for M. Tech: minimum 40% of the highest marks in the class