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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

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COURSE PLAN

A. PREREQUISITE:

- a. Basic Knowledge Data Structure
- b. Basic Knowledge of File Processing System

B. 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.



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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.

C. COURSE OUTCOMES FOR Database Management Systems Lab:

The objectives of this course are to:

CO1. Understand, appreciate and effectively explain the underlying concepts of database technologies.

CO2. Design and implement a database schema for a given problem-domain.

CO3. Populate and query a database using SQL DML/DDI commands.

CO4. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS.

CO5. Understand and use of aggregate functions with group by and having clause.

CO6. Retrieval of records from multiple relations using join and nested query.

Table: Mapping of POs and PSOs v/s COs

PO / CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	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 fundamentals as well as Practical concept of database.

F. COURSE COMPLETION PLAN

<u>S.no</u>	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
<u>1</u>	<u>10</u>		2		3	

No. of lab classes per batch planned: 12

No. of lab classes per batch taken:

Percentage of experiment covered:

G. EVALUATION & GRADING



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Description	Weight age	Schedule
1. Performance Records	50%	During Lab Sessions
2. 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

2. Insert the following data into their respective tables:

a) 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



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C00005	Hansel colaco	Mumbai	400060	Maharashtra	2000
C00006	Deepak sharma	Mangalore	560050	Karnataka	0

b) 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

c) 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



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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.

- Find out the names of all the clients.
- Retrieve the entire contents of the Client_Master table.
- Retrieve the list of names,city and the state of all the clients.
- List the various products available from the Product_Master table.
- List all the clients who are located in Mumbai.
- Find the names of salesman who have a salary equal to Rs.3000.

1. Exercise on updating records in a table

- Change the city of ClientNo 'C00005' to 'Bangalore'.
- Change the BalDue of ClientNo 'C00001' to Rs.1000.
- Change the cost price of 'Trousers' to rs.950.00.
- Change the city of the salesman to Pune.

2. Exercise on deleting records in a table

- 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.
- Delete from Client_Master where the column state holds the value 'Tamil Nadu'.



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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.

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
TGTTGET	Decimal	6,2	Not Null , Cannot be 0
YTDSALES	Double	6,2	Not Null
REMARKS	Varchar	60	

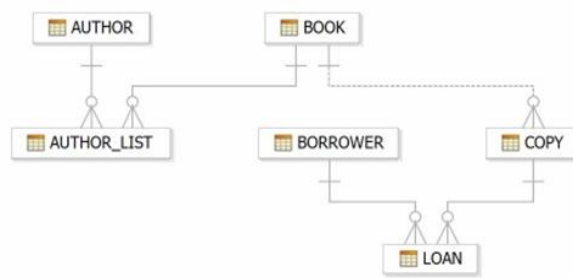
3. Reinsert the data in these two tables based upon Lab 2.
4. Display the contents of each table.

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,

2. 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

3. Create table AUTHOR_LIST = { Author_ID , Book_ID , Role }

Where:



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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

4. Add four records in each tables AUTHOR, BOOK, BOOK_LIST.

5. 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.

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EXPERIMENT-7,8

TITLE: Nested sql queries or Subqueries

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



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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).



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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>



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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