FACULTY OF COMPUTER APPLICATIONS
Master of Computer Applications

- **Sem.** : 1
- **Subject Code** : 05MC0105
- **Subject** : Relational Database Management Systems
- **Course Objectives** :
  1. To be able to understand the fundamentals of SQL.
  2. To depict a database system using E-R diagram and to be able to carry out for normalization process.
  3. To get familiarize with concepts of transaction processing and database security.
  4. To implement and execute SQL Queries.
  5. To write and execute PL/SQL scripts.
- **Prerequisites:**
  1. Basics and elementary knowledge of working with the computer.

Unit No	Topics Covered	No of lectures required
1	**Fundamentals of DBMS:** Overview of Database Management systems, RDBMS, DBMS vs RDBMS, Characteristics of Database, Benefits of DBMS, Applications of DBMS, Database Users (Actors & Workers), Schema vs Instance, Data Independence, Brief overview of Database Models, Database System Architecture.	10
2	**Database Design:** The Entity Relationship Model: The basics of E-R Model, Components of E-R Diagram, Entity, Attribute and Relationships, Mapping Cardinality, Binary and Ternary relationship, E-R Diagram Notations, The concept of weak entity set, E-R diagram illustrations. Extended E-R features – specialization & generalization. Normalization Process:	10

	Overview of functional dependency, types of functional dependencies, decomposition process for a relation, Normalization – 1NF, 2NF and 3NF.	
3	**Transaction Processing and Database Security:** Transaction Processing Concepts: Overview of Transaction Processing, Transaction States with State Transition Diagram, ACID properties. Security Mechanism: Introduction, Discretionary Access Control (DAC), Mandatory Access Control (MAC), Public Key Encryption.	**10**
4	**SQL Essentials:** Overview of SQL, Categories of SQL Commands: DDL(Create, Alter, Truncate, Drop, Rename), DML (Insert, Update, Delete), DCL (Grant, Revoke), TCL (Commit, Rollback, Savepoint), DQL(Select), Constraints (Unique, Not Null, Primary Key, Foreign Key, Check, Default), SQL Operators, Group By and Having, Order By, Types of Joins, Built-in Functions.	**10**
5	**PL/SQL Objects:** Fundamentals of PL/SQL, PL/SQL block structure, Stored Functions and Procedures, Triggers.	**10**

Course Outcomes:

1. Student will be able to understand the various fundamental concept of SQL.
2. Student will be able to represent database design through E-R diagram and will be able to perform normalization process.
3. Student will be able to conceptualize the concepts of transaction processing and database security.
4. Student will be able to implement and execute SQL Queries.
5. Students will develop an ability to write and execute PL/SQL scripts.

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Course Outcomes – Program Outcomes Mapping Table:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1		L		M		L		M	L		H
CO2	L		H				M			M	
CO3		H		L		M	L		H		L
CO4	L		M		M			H			L
CO5		M		H		M			H		

Text Book:

1. **"Fundamentals of Database Systems", Ramez Elmsari,Shamkant B Navathe, Pearson Education, 4th Edition.**
2. **"SQL, PL/SQL the programming Language of Oracle", Ivan Byross, BPB Publication, 4th Edition.**

Reference Books:

1. **"Database System Concepts", Silberschatz, Korth, Sudarshan, McGraw Hill Publication, 4th Edition.**
2. **"Database Systems Concepts, Design & Applications", S. K. Singh, Pearson Education.**
3. **"SQL and PL/SQL for Oracle 11g" Black Book, P.S.Deshpande, Dreamtech Publication.**
4. **"Oracle Database 11g: The Complete Reference", Kevin Loney, Oracle Press.**

Web References:

1. https://www.oracletutorial.com/
2. https://www.guru99.com/sql.html
3. https://www.plsqltutorial.com/
4. https://www.guru99.com/pl-sql-tutorials.html
5. https://www.tutorialspoint.com/plsql/index.htm

App References:

1. https://play.google.com/store/apps/details?id=in.ajaykhatri.learndbms&hl=en_IN

2. https://play.google.com/store/apps/details?id=com.msh.plsqllearning&hl=en_IN&gl=US
3. https://www.oracle.com/database/technologies/appdev/plsql.html
4. https://livesql.oracle.com/apex/
5. https://apex.oracle.com/en/

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Chapter Numbers
1	Book – 1: Chapter 1: (1.1 to 1.6), Chapter 2: (2.1 to 2.2)
2	Book – 1: Chapter 3, Chapter 4: (4.1 to 4.2), Chapter 10(10.2 to 10.5)
3	Book – 1: Chapter 17 (17.1 to 17.3), Chapter 23: (23.1 to 23.3, 23.6)
4	Book – 2: Chapter 7, 8, 9, 10
5	Book – 2: Chapter 15, 18

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PRACTICALS

Tool: Oracle 10g or above

<table>
<tr><th>Sr.No</th><th>Unit : 1</th></tr>
<tr><td>1</td><td>Identify and define structure of at least 3 tables of student related information with attributes, data type ,size and constraints.</td></tr>
<tr><td>2</td><td>Identify and define structure of at least 3 tables of Employee related information with attributes, data type ,size and constraints.</td></tr>
<tr><th colspan="2">Unit : 2</th></tr>
<tr><td>1</td><td>Design ER diagram of Students database (As per above question: 1) with appropriate relationship.</td></tr>
<tr><td>2</td><td>Design ER diagram of Employee database (As per above question: 2) with appropriate relationship.</td></tr>
<tr><th colspan="2">Unit : 3</th></tr>
<tr><td>1</td><td>Insert appropriate records in student database tables with verification of various constraints. Also perform record updation process.</td></tr>
<tr><td>2</td><td>Insert appropriate records in Employee database tables with verification of various constraints. Also perform record updation process.</td></tr>
<tr><th colspan="2">Unit : 4</th></tr>
<tr><td>1</td><td>
<table>
<tr><th>Person_Id</th><th>Fname</th><th>Lname</th><th>City</th><th>Salary</th></tr>
<tr><td>1</td><td>Sneha</td><td>Sheth</td><td>Rajkot</td><td>10000</td></tr>
<tr><td>2</td><td>Puja</td><td>Parmar</td><td>Ahmedabad</td><td>2000</td></tr>
<tr><td>3</td><td>Riya</td><td>Gajar</td><td>Pune</td><td>8000</td></tr>
</table>
</td></tr>
</table>

4	Sandip	Jadeja	Pune	5000
5	Alpesh	Prajapati	Mumbai	20000

1. Create above Table name as Person.
2. Insert data shown in table.
3. Select information about Person_Id, Fname of the person.
4. Display the list of person.
5. Sort the person by salary.
6. Display city from table with distinct values.
7. Change the city of sandip from pune to kolkata.
8. Display person whose Lname is "Prajapati".
9. Add new columns state, Birthdate and pincode into table.
10. Display all information of person having salary more than 6000.
11. Delete the person having salary less than 3000.
12. Rename table from person to person_master.

2

Cust_no	**Cust_name**	**Address1**	**Address2**	**City**	**State**	**Ph_no**
C1	Priya	Ring Road	Puja Park	Ahmedabad	Gujarat	8989878548
C2	Puja	Lajpat Nager	Shyamal Colony	Banaras	UP	7898456213
C3	Ankit	Borivali	Panchayat Nager	Mumbai	Maharashtra	7885984251
C4	Ravi	Vajdi Road	Nandbhoomi Colony	Delhi	Delhi	7898452034
C5	Alpa	Jamanager Road	Railway colony	Ahmedabad	Gujarat	7465241589

1. Create above Table name as Cust_master.
2. Insert Data shown in table.
3. Select information about all customers.
4. Display the list of customers belonging to "Gujarat" state.
5. Sort the customer by their customer name.
6. Display city from table with distinct values.
7. Change the address1 of priya from "Ring Road" to "CG Road".
8. Display city of customer whose state is Gujarat.
9. Add new column pin_code into cust_master table.
10. Drop column pin_code from table.
11. Delete the customer having ph_no value '7898452034'.
12. Rename table from cust_master to customer_detail.

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3

Id	Name	Type	Price	Quality	Item_pack_date
I1	Dairymilk	Chocolate	500	Good	12-aug-2000
I2	Kajukatri	Mithai	1000	Verygood	15-jan-2016
I3	Pizza	Fastfood	350	Average	20-Feb-2015
I4	Orange juice	Juice	50	Best	05-feb-2016
I5	Vanilla_cack	Bakery Item	2000	Good	01-jan-2016

1. Create above Table name as item_master.
2. Insert Data shown in table.
3. Select information about price,quality and item_pack_date of the item.
4. Display information about item.
5. Sort the item by its quality.
6. Display quality from table with distinct values.
7. Change the quality of item from Good to Verygood.
8. Display item having quality Verygood.
9. Add new columns item_pur_date into table.
10. Display all information of items having price more than Rs. 500.
11. Delete the item having price of Rs. 50.
12. Rename table from person to Item_detail.

4

1. Create the following table named table as CUSTOMER:

COLUMN NAME	DATATYPES	SIZE	DESCIPTION
CUST_NO	NUMBER	4	PRIMARY KEY
FIRST_NAME	VARCHAR2	20	NOT NULL
LAST_NAME	VARCHAR2	20	-
ADDRESS	VARCHAR2	20	-
CITY	VARCHAR2	8	-
STATE	VARCHAR2	20	-
PIN	NUMBER	6	-
B_DATE	DATE	-	-
STATUS	CHAR	1	VALUES MUST BE IN ('V','I','A') – Check Constraint

2. Insert the following data into the CUSTOMER table:

1003	RAJ	BAHADUR	SHANTI VILLA	UDP	KARNATAKA	576101	1-AUG-70	V
1004	FELIX	SIMON	M-J-56	PJM	GOA	403002	12-FEB-71	A
1005	RAJAN	KUTTY	A1 TRADERS	KNR	KERALA	670001	09-JUN-71	A
1006	SHILPA	PAI	12/4B	MNG	KARNATAKA	574154	11-DEC-70	I
1007	BOSCO	RAKSHIT	R.K. PLAZA	BNG	KARNATAKA	576201	01-JAN-71	A

3. Display all the records from the table.
4. Display all the records from the table where state is KARNATAKA.
5. Delete the row from the table where PIN CODE is 576201.
6. Set the PIN CODE equal 476001 where CUST_NO=1004.
7. Change the ADDRESS as "KAVI MUDDANNA MARG" AND PIN=576104 where CUST_NO=1003.
8. Delete the records of GOA state from the table and then retrieve all the records back.
9. List all the records for INVALID ('I') persons.
10. Select all the records with single occurrence (without duplication) of state from the table.
11. Sort and display the customer data, in the alphabetic order of state.
12. Sort and display the state field in the in descending order.
13. Select the records of KARNATAKA customers who are valid ('V').
14. Retrieve records of Karnataka / Kerala customers.
15. Retrieve records of Karnataka / Kerala customers who are ACTIVE ('A').
16. Retrieve records of Karnataka customers with pin code 576201.
17. Display all the rows from the table except for customer number 1005.
18. Retrieve rows where the state name begins with K and following by any other character.
19. Retrieve rows where name contains the word RAJ embedded it.
20. Display all the row who's CUST_NO is in the range from 1003 to 1005.
21. Display all the rows whose dates are in the range of 10-JAN-71 and 31-DEC-71.
22. Retrieve all the rows where city column equals to UDP or MNG or BNG or PGN.
23. Rename customer table to CUST.

Unit : 5	
1	Write a program to calculate the AREA of a circle and store that value in the table. C_AREA (RADIUS NUMBER (5), AREA NUMBER (14,2)).
2	Write a program to calculate the square and cube of the given number. Write a program that accepts a value from the user then print that value with and without using third variable.
3	Write a program of mark sheet with displays the SEAT_NO, NAME OF STUDENT, marks of 5 subjects, total of 5 subjects and percentage, also display the class of student based on the value of percentage.

4	Write a program that prints value 1 to 100 numbers using FOR LOOP. Write a program that prints value 1 to 100 number using LOOP Command. Write a program that prints value 1 to 100 number using WHILE LOOP Command.
5	Write a program that displays the use of %TYPE variable. This program stores the values of the columns in the memory variables using %TYPE and %ROWTYPE variables.
6	Write a simple procedure without any parameter that updates the values in the EMP table.
7	Write a simple procedure that increases by the salary of employees for the given department no by percentage inputted by the user using IN parameter.
8	Write a procedure that search's whether the given employee number is present or not in the table. (Use both IN and OUT mode variables) and also Write a PL/SQL block to call the SEARCH_EMP procedure.
9	Write a function that returns the square of the given number. Execute this function using separate PL/SQL block and also without using PL/SQL block on command line.
10	Write a function that returns balance for given account number.
11	Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is deleted from EMP table.
12	Write a trigger to insert the existing values of the EMP table into NEWEMP table when the record is updated in EMP table.
13	Write a trigger to insert the values into the NEWEMP table when the records are inserted into the EMP table.
14	Write a trigger that restricts the entry of record if salary is greater than Rs.50000.
15	Write a trigger that identifies the gender of the employee and according to the gender sets MR. in front of MALE employees and MS. in front of FEMALE employee.
16	Write a trigger to restrict user form using the table on Sunday.

CASE STUDY

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