FACULTY OF COMPUTER APPLICATIONS
B.Sc. (Data Science)

- **Sem.** : 1
- **Subject Code** : 05DS0104
- **Subject** : Database Management System – 1 (DBMS-1)
- **Course Objectives** :
    1. To get familiarize with basic concepts of Database Management System.
    2. To create and represent database design using E-R Diagram
    3. To formulate and execute simple SQL queries.
    4. To execute and analyze advanced SQL queries.
    5. To create and manage different SQL objects.
- **Prerequisites** :

Basics and elementary knowledge of working with the computer.

Unit No	Topics Covered	No of lectures required
1	**DBMS Essentials:** Basics of Database Management System, Data, Information, Database, Database Management System, DBMS Characteristics, Advantages of DBMS, Applications of DBMS, Schema and Instance, Data Independence, Database Models, Database ANSI-SPARC Architecture.	10
2	**Database Design using E-R Diagram:** History of E-R Model, E-R Diagram, Use of E-R Diagram, Components of the ER Diagram, Entity & Entity Set, Attributes and Relationship, Binary and Ternary relationship, E-R Diagram Example (Library), Types of Attributes with E-R Diagram Example, Mapping Cardinality (Cardinality Constraints), Different Types of Relationships, Weak Entity Set, Summery of Symbols used in E-R diagram, Integrity Constraints	10

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3	**SQL Basics:** Introduction to SQL, Oracle Data Types, 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)	**10**
4	**Advanced SQL:** SQL Operators, Range Searching, Pattern Matching, Order By Clause, Group By and Having Clause, Dual Table, Oracle inbuilt functions, Set Operators, Sub Queries, Join.	**12**
5	**Other SQL Objects:** View, Index, Sequence, Synonym, User.	**08**

Course Outcomes :

1. Student will be able to get familiarize with basic concepts of Database Management System.
2. Student will be able to create and represent database design using E-R Diagram
3. Student will be able to formulate and execute simple SQL queries.
4. Student will be able to execute and analyze advanced SQL queries.
5. Student will be able to create and manage different SQL objects.

Course Outcomes – Program Outcomes Mapping Table :

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

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.**

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Reference Books :

1. **"Database Systems : Design, Implementation and Management", Peter Rob, Carlos Coronel, 7th Edition, Cengage Learning (2007)**
2. **"Database System Concepts, Design & Applications", S. K. Singh, Pearson Education.**
3. **"An Introduction to Database Systems", C J Date, A Kannan, S Swaminathan, Pearson Education, 8th Edition.**
4. **"Oracle Database 11g: The Complete Reference", Kevin Loney, Oracle Press.**

Web References:

1. **https://www.w3resource.com/oracle/index.php**
2. **https://www.guru99.com/sql.html**
3. **https://www.techonthenet.com/oracle/index.php**

App References:

1. **https://apex.oracle.com/en/**
2. **https://livesql.oracle.com/apex/**
3. **https://play.google.com/store/apps/details?id=in.ajaykhatri.learndbms&hl=en_IN**

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
3	Book – 2: Chapter 7, 8
4	Book – 2: Chapter 9, 10
5	Book – 2: Chapter 11

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PRACTICALS

Tool: Oracle 10g or above

Unit No 1

Branch_id	Branch_name	Branch_Address	Branch_City	Branch_State	Branch_Open_Date
B001	BOI	Jagnath Road	Rajkot	Gujarat	22-mar-2015
B002	SBI	Boriwali Road	Mumbai	Maharashtr	12-jan-2000
B003	HDFC	Agra Road	Agra	U.P	04-feb-1998
B004	Dena Bank	CG Road	Ahmedab	Gujarat	20-sep-2012
B005	ICICI	Majavdi Road	Junagadh	Gujarat	07-may-2011

1. Create above table with name Bank_Branch.
2. Insert given information into a table.
3. Display all information of Bank_Branch.
4. Display Branch_id of branch.
5. Display Branch_name of Branch table.
6. Display Branch_address of branch.
7. Display Branch_city of branch.
8. Display Branch_state of branch.
9. Display Branch_open_date of branch.
10. Display Branch_name and Branch_open_date of branch.
11. Display Branch_id and Branch_address from Branch.
12. Display Branch_name, Branch_addess and Branch_city from branch table.
13. Display Branch_city, Branch_state and Branch_open_date from Branch.
14. Sort table by Branch_id.
15. Sort table by Branch_name.
16. Sort table by Branch_city.
17. Sort table by Branch_state.
18. Change the size of Branch_state column.
19. Change the branch_name='Union' where id=B003.
20. Change the state='Delhi' of BOI branch.
21. Change the branch_open_date=04-nov-2015 of Union branch.
22. Add column Pincode in branch.
23. Insert pincode=360006 of Dena Bank.
24. Insert pincode=360005 of state Delhi.
25. Delete information of ICICI.
26. Delete information of Branch having branch_open_date=07-may-2011.
27. Rename table Bank_Branch to Branch_master.

28. Display structure of Branch_master.
29. Create Banch_info from Branch_master.
30. Create Branch_detail from Branchg_info.

2

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.

3

(A) Create the following tables.

CREATE TABLE DEPOSIT (ACTNO VARCHAR2(5) ,CNAME VARCHAR2(18) , BNAME VARCHAR2(18) , AMOUNT NUMBER(8,2) ,ADATE DATE);

CREATE TABLE BRANCH(BNAME VARCHAR2(18),CITY VARCHAR2(18));

CREATE TABLE CUSTOMERS(CNAME VARCHAR2(19) ,CITY VARCHAR2(18));

CREATE TABLE BORROW(LOANNO VARCHAR2(5), CNAME VARCHAR2(18), BNAME VARCHAR2(18), AMOUNT NUMBER (8,2));

(B) Insert the following data inside the tables.

ACTNO	CNAME	BNAME	AMOUNT	ADATE

100	ANIL	VRCE	1000.00	1-MAR-95
101	SUNIL	AJNI	5000.00	4-JAN-96
102	MEHUL	KAROLBAGH	3500.00	17-NOV-95
104	MADHURI	CHANDI	1200.00	17-DEC-95
105	PRMOD	M.G.ROAD	3000.00	27-MAR-96
106	SANDIP	ANDHERI	2000.00	31-MAR-96
107	SHIVANI	VIRAR	1000.00	5-SEP-95
108	KRANTI	NEHRU PLACE	5000.00	2-JUL-95
109	MINU	POWAI	7000.00	10-AUG-95

Data for DEPOSIT table:

Data for BRANCH table:

BNAME	CITY
VRCE	NAGPUR
AJNI	NAGPUR
KAROLBAGH	DELHI
CHANDI	DELHI
DHARAMPETH	NAGPUR
M.G.ROAD	BANGLORE
ANDHERI	BOMBAY
VIRAR	BOMBAY
NEHRU PLACE	DELHI
POWAI	BOMBAY

Data for CUSTOMERS table:

CNAME	CITY
ANIL	CALCUTTA
SUNIL	DELHI
MEHUL	BARODA
MANDAR	PATNA
MADHURI	NAGPUR
PRAMOD	NAGPUR
SANDIP	SURAT
SHIVANI	BOMBAY
KRANTI	BOMBAY
NAREN	BOMBAY

Data for BORROW table:

LOANNO	CNAME	BNAME	AMOUNT
201	ANIL	VRCE	1000.00
206	MEHUL	AJNI	5000.00
311	SUNIL	DHARAMPETH	3000.00
321	MADHURI	ANDHERI	2000.00
375	PRMOD	VIRAR	8000.00
481	KRANTI	NEHRU PLACE	3000.00

(C) On the give tables perform the following queries.

(1) Describe deposit, branch.
(2) Describe borrow, customers.
(3) List all data from table DEPOSIT.
(4) List all data from table BORROW.
(5) List all data from table CUSTOMERS.
(6) List all data from table BRANCH.
(7) Give account no and amount of depositors.
(8) Give name of depositors having amount greater than 4000.
(9) Give name of customers who opened account after date '1-12-96'.
(10) List total deposit from deposit.
(11) List total loan from karolbagh branch.
(12) Give maximum loan from branch vrce.
(13) Count total number of customers.
(14) Count total number of customer's cities.
(15) Give name of customer depositors and having living city Nagpur.
(16) List total deposit of customers living in city Nagpur.
(17) List maximum deposit of customers living in Bombay.

(18) Give name of customers who are depositors having same branch city of mr. sunil.
(19) Give names of depositors having same living city as mr. anil and having deposit amount greater than 2000.
(20) Give 10% interest to all depositors having branch vrce.

4 **(A) Create the following tables**.

Create Table Job (job_id, job_title, min_sal, max_sal)

COLUMN NAME	DATA TYPE
job_id	Varchar2(15)
job_title	Varchar2(30)
min_sal	Number(7,2)
max_sal	Number(7,2)

Create table Employee (emp_no, emp_name, emp_sal, emp_comm, dept_no)

COLUMN NAME	DATA TYPE
emp_no	Number(3)
emp_name	Varchar2(30)
emp_sal	Number(8,2)
emp_comm	Number(6,1)
dept_no	Number(3)

Create table deposit(a_no,cname,bname,amount,a_date)

COLUMN NAME	DATA TYPE
a_no	Varchar2(5)
cname	Varchar2(15)
bname	Varchar2(10)
amount	Number(7,2)
a_date	Date

(B) Insert the following data inside the tables.

Data for JOB table:

job_id	job_name	min_sal	max_sal
IT_PROG	Programmer	4000	10000
MK_MGR	Marketing manager	9000	15000
FI_MGR	Finance manager	8200	12000
FI_ACC	Account	4200	9000
LEC	Lecturer	6000	17000
COMP_OP	Computer Operator	1500	3000

Data for EMPLOYEE table:

emp_no	emp_name	emp_sal	emp_comm	dept_no
101	Smith	800		20
102	Snehal	1600	300	25
103	Adama	1100	0	20
104	Aman	3000		15
105	Anita	5000	50,000	10
106	Sneha	2450	24,500	10
107	Anamika	2975		30

Data for DEPOSIT table:

A_no	cname	Bname	Amount	date
101	Anil	andheri	7000	01-jan-06
102	sunil	virar	5000	15-jul-06
103	jay	villeparle	6500	12-mar-06
104	vijay	andheri	8000	17-sep-06
105	keyur	dadar	7500	19-nov-06
106	mayur	borivali	5500	21-dec-06

(C) On the give tables perform the following queries.

(1) Retrieve all data from employee, jobs and deposit.

(2) Give details of account no. and deposited rupees of customers having account opened between dates 01-01-06 and 25-07-06.

(3) Display all jobs with minimum salary is greater than 4000.

(4) Display name and salary of employee whose department no is 20.

(5) Display employee no,name and department details of those

	employee whose department lies in(10,20) (6) Display all employee whose name start with 'A' and third character is 'a'. (7) Display name, number and salary of those employees whose name is 5 characters long and first three characters are 'Ani'. (8) Display the details of employee whose name second character should be 'n' and string should be 5 characters long. (9) Create table supplier from employee with all the columns. (10) Create table sup1 from employee with first two columns. (11) Create table sup2 from employee with no data. (12) Delete all the rows from sup1. (13) Delete the detail of supplier whose sup_no is 103. (14) Rename the table sup2. (15) Destroy table sup1 with all the data. (16) Update the value dept_no to 10 where second character of emp. name is 'm'. (17) Update the value of employee name whose employee number is 103. (18) For each employee, display the employee number, job, salary, and salary increased by 15% and expressed as a whole number. Label the column New Salary (19) Write a query that displays the employee's names with the first letter capitalized and all other letters lowercase, and the length of the names, for all employees whose name starts with J, A, or M. (20) Write a query that produces the following for each employee: <employee last name> earns <salary> monthly. (21) Display the hiredate of emp in a format that appears as Seventh of June 1994 12:00:00 AM. (22) Write a query to calculate the annual compensation of all employees (sal+comm.). (23) Write a query to display the last name, department number, and department name for all employees. (25) Display the highest, lowest, sum, and average salary of all employees. Label the columns Maximum, Minimum, Sum, and Average, respectively. Round your results to the nearest whole number. (26) Write a query that displays the difference between the highest and lowest salaries. Label the column DIFFERENCE. (27) Create a query to display the employee numbers and last names of all employees who earn more than the average salary. (28) Display the department number, name, and job for every employee in the Accounting department (29) List the name of branch having highest number of depositors. (30) Give 10% interest to all depositors.

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5 - Create following tables:

(a) DEPOSIT

Column Name	Datatype(Size)
ACTNO	VARCHAR2(5)
CNAME	VARCHAR2(15)
BNAME	VARCHAR2(15)
AMOUNT	NUMBER(9,2)
ADATE	DATE

(b) BRANCH

Column Name	Datatype(Size)
BNAME	VARCHAR2(15)
CITY	VARCHAR2(15)

(c) CUSTOMERS

Column Name	Datatype(Size)
CNAME	VARCHAR2(15)
CITY	VARCHAR2(15)

(d) BORROW

Column Name	Datatype(Size)
LOANNO	VARCHAR2(5)
CNAME	VARCHAR2(15)
BNAME	VARCHAR2(15)
AMOUNT	NUMBER(9,2)

- Insert the following data inside the tables:

(a) DEPOSIT

ACTNO	CNAME	BNAME	AMOUNT	ADATE
100	ANIL	VRCE	1000.00	01-MAR-95
101	SUNIL	AJNI	5000.00	04-JAN-96
102	MEHUL	KAROLBAGH	3500.00	17-NOV-95
104	MADHURI	CHANDI	1200.00	17-DEC-95
105	PRMOD	M G ROAD	3000.00	27-MAR-96
106	SANDIP	ANDHERI	2000.00	31-MAR-96
107	SHIVANI	VIRAR	1000.00	05-SEP-95
108	KRANTI	NEHRU PLACE	5000.00	02-JUL-95
109	MINU	POWAI	7000.00	10-AUG-95

(b) BRANCH

BNAME	CITY
VRCE	NAGPUR
AJNI	NAGPUR
KAROLBAGH	DELHI
CHANDI	DELHI
DHARAMPETH	NAGPUR
M G ROAD	BANGLORE
ANDHERI	BOMBAY
VIRAR	BOMBAY
NEHRU PLACE	DELHI
POWAI	BOMBAY

(c) CUSTOMERS

CNAME	CITY
ANIL	CALCUTTA
SUNIL	DELHI
MEHUL	BARODA
MANDAR	PATNA
MADHURI	NAGPUR
PRAMOD	NAGPUR
SANDIP	SURAT
SHIVANI	BOMBAY
KRANTI	BOMBAY
NAREN	BOMBAY

(d) BORROW

LOANNO	CNAME	BNAME	AMOUNT
201	ANIL	VRCE	1000.00
206	MEHUL	AJNI	5000.00
311	SUNIL	DHARAMPETH	3000.00
321	MADHURI	ANDHERI	2000.00
375	PRMOD	VIRAR	8000.00
481	KRANTI	NEHRU PLACE	3000.00
201	ANIL	VRCE	1000.00
206	MEHUL	AJNI	5000.00
311	SUNIL	DHARAMPETH	3000.00
321	MADHURI	ANDHERI	2000.00

- Perform the following queries on the above tables:

1. Describe deposit, branch from deposit table.
2. Describe borrow, customers tables.
3. List all data from table DEPOSIT.
4. List all data from table BORROW.
5. List all data from table CUSTOMERS.
6. List all data from table BRANCH.
7. Give account no and amount of depositors.
8. Give name of depositors having amount greater than Rs. 4000.
9. Give name of customers who opened account after date '01-DEC-96'.
10. List all the customers from Bombay city.

- Practical queries to create and manage objects such as views, indexes, sequences and synonyms.

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CASE STUDY