

Branch Name:	MCA
Program Code:	CS201
Course Name:	Advanced Database Management System Practical
Course Code:	4CS2010102P
Pre-requisite Course:	Basic knowledge of Database Management System

Course Objectives:

1. To provide hands-on experience in implementing advanced database concepts such as normalization, indexing, and query optimization.
2. To enable students to design and develop complex database systems using advanced SQL and PL/SQL techniques.
3. To develop skills for managing distributed, object-oriented, and No SQL databases through practical exercises and tools.
4. To implement transaction management and concurrency control mechanisms in a simulated multi-user environment.
5. To use modern database tools and technologies for data warehousing, data mining, and big data applications.
6. To bridge the gap between theoretical concepts and real-world applications by solving practical problems using advanced database techniques.

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
-	-	4	2	-	-	25	25	50

Practical Experiment:

LAB/Practical

SQL QUERIES (Based on DDL statement, Constraints, DML statement, SELECT statement and Views)

Note: In all schemas, create the table with necessary constraints (PK, FK, Not Null, Unique and Check Constraints) on SQL prompt and then solve the given queries.

1 SQL Practical List:

CUST (Custno, Custname, Addln1, Addln2, City, State, Phone)

ITEM (Itemno, Itemname, Itemprice, Qty_On_Hand)

INVOICE (Invno, Invdate, Custno)

INV_ITEM (Invno, Itemno, Qty_Used)

Create the above four tables along with key constraints.

Write an Insert script for insertion of rows with substitution variables and insert Appropriate data.

Add a column – “colour” to the Item table.

Display the column Item name and Price in sentence form using concatenation.

Find the total value of each item (item price * qty).

Display the list of customers belonging to “Gujarat” state.

Display items with unit price between 100 and 500.

Find the customers from “Lalbaug” city of Ahmedabad and Baroda.

- Find all the customers whose name starts with the letter 'P'.
- Find the total, average, highest and lowest unit price of an item.

STUDENT (Rollno, Name, Class, Birthdate)

COURSE (Courseno, Coursename, Max_Marks, Pass_Marks)

SC (Rollno, Courseno, Marks)

Create the above three tables along with key constraints.

Write an Insert script for insertion of rows with substitution variables and insert Appropriate data.

- 2 Add a constraint that the marks entered should strictly be between 0 and 100.
Display details of students who take the 'Database Management System' course.
Display the average marks obtained by each student.
Select all courses where passing marks are more than 30% of average maximum mark.
Display details of students who were born in 1980 or 1982.
Create a view that displays student courseno and its corresponding marks.

3 HOSTEL (Hno, Hname, Haddress, Total_Capacity, Warden_Nm)

ROOM (Hno, Rno, Rtype, Location, No_Of_Students, Status)

CHARGES (Hno, Rtype, Charges)

STUDENT (Sid, Sname, Saddr, Faculty, Dept, Class, Hno, Rno)

FEES (Sid, Fdate, Famount)

The STATUS field tells us whether the room is occupied or vacant. The charges represent the term fees to be paid half yearly. A student can pay either the annual fees at one time or the half yearly fees twice a year.

Create the above five tables along with key constraints.

Write an Insert script for insertion of rows with substitution variables and insert appropriate data.

Display the total number of rooms that are presently vacant.

Display the number of students who are staying in 'double' seated room for each hostel.

Display the warden's name and hostel address of students of 'Computer Science' Department.

Display the hostel details where single seated or four-seated rooms are vacant.

Count the total number of 'medical' students who live in the hostel.

List details about students who are staying in the double-seated rooms of "Chanakya" Hostel.

Display the total number of students staying in each room type of each hostel.

- Display details about students who have paid the fees in the month of November 2011.

4 SCREEN (Screen_Id, Location, Seating_Capacity)

MOVIE (Movie_Id, Movie_Name, Date_Of_Release)

CURRENT (Screen_Id, Movie_Id, Date_Of_Arrival, Date_Of_Closure)

Value of screen_id must start with letters 'S'.

Attribute location can be any one of 'FF', 'SF', or 'TF' (First floor, second floor or third floor).

Date_of_arrival must be less than the date_of_closure.

Solve the following queries based on the above schema:

Extract the name of the movie which has run the longest in the multiplex so far.

Find the average duration of a movie on screen number 'S4'.

Get the details of the movie that closed on date 24-December-2011.

5 WORKER (Worker_Id, Name, Wage_Per_Hour, Specialised_In, Manager_Id)

. JOB (Job_Id, Type_Of_Job, Status)

JOB_ASSIGNED (Worker_Id, Job_Id, Starting_Date, Number_Of_Days)

Display the date on which each worker is going to end his presently assigned job.

Display how many days remain for each worker to finish his job.

Display the STARTING_DATE in the following format – ‘The fifth day of the month of October, 2011’.

Change the status to ‘Complete’ for all those jobs, which started in 2010.

Display details of all those jobs where at least 25 workers are working.

Display all those jobs that have already been completed.

Find all the jobs, which will begin within the next two weeks.

6 PUBLISHER (publ_id, publ_name, contact_person, contact_addr contact phone)

CATEGORY (cat_id, cat_details, max_books, duration)

BOOK_MASTER (book_id, bname, isbn_no, total_copies, publ_id)

MEMBER (member_id, mname, cat_id, mem_ship_dt)

ISSUE (ISSUE_id, member_id, book_id, issu_ret, issue_ret_dt)

In the above tables, duration is in years and it stores the membership duration for that category.

Change the table design of ISSUE table to add a constraint, which will allow only ‘I’ or ‘R’ to be entered in the ISSUE_RET column, which stores the action whether the book is being issued or returned.

Add a column to the MEMBER table, which will allow us to store the address of the member.

Create a table LIBRARY_USERS which has a structure similar to that of the MEMBER table but with no records.

Give details about members who have issued books, which contain the word ‘DATA’ somewhere in their titles.

Display the books that have been issued at the most three times in the year 2011.

Display the details of books issued right now that are published by “Pearson”.

Display the details of books whose all copies are issued.

7 APPLICANT (aid, aname, addr, abirth_dt)

. ENTRANCE_TEST (etid, etname, max_score, cut_score)

ETEST_CENTRE (etcid, location, incharge, capacity)

ETEST_DETAILS (aid, etid, etcid, etest_dt, score)

This database is for a common entrance test which can be conducted at a number of centers and can be taken by an applicant on any day except holidays.

Modify the APPLICANT table so that every applicant id has an ‘A’ before its value. For example, if the applicant id ‘1123’, it should now become ‘A1123’.

Display the test center details where no tests will be conducted.

Display the details about applicants who have the same score as that of “Jaydev” in “Oracle Fundamentals”.

Display the details of applicants who have appeared for all the tests.

Display those tests where no applicant has failed.

Display details of entrance test centers which had full attendance between 1st November and 15th November 2011.

Display the details of those applicants who have scored more than the cut-off score in the tests they have appeared in.

Display the average and the maximum score, test wise of the tests conducted at Mumbai.

Display the number of applicants who have appeared for each test, test center wise.

PL/SQL

1 PL/SQL Practical List:

Competition (Comp_code, Comp_name (Dancing, Painting, GK, etc.))

Participants (Part_no, Part_name, DOB, Address, EmailID, Contact_number)

Scorecard (Part_no, Comp_code, Judge_no [1, 2, 3], Marks)Implement the Following:

Create a PL/ SQL block to prepare a report in the following format.

Display the score card in the following format, for the Participant whose ID/ Name should be provided by the user.

Talent Winner 2011 ::: <Participant's Name>

Competition name	Judge1	Judge2	Judge3

1. Painting			
2. Dancing			

- 2 **Customer (Cust_Id, Cust_Name, Cust_Addr, Cust_City, EmailID,Contact_No)**
Magazine (Mag_Id, Mag_Name, Unit_Rate, Type_of_subscription [weekly, monthly, etc.])
Subscription (Cust_Id, Mag_Id, start_date, end_date)

Implement the following:

A)

1.Create a View that displays Customer name, Magazine name along with its rate which was Subscribed during 01-Sep-2010 to 01-Feb-2011.

2. Find the top three magazines having the highest sales during the last one month of time.

B)

1. Create a function to return No. of customers in city Gandhinagar who have subscribed the Magazine 'Outlook' after August 2010. If no such customer exists, throw a user defined Exception with appropriate message.

2 Create a trigger that is fired after an INSERT statement is executed for the Customer Table. The trigger writes the new customer's code, name and the sysdate in a table called Customer Log (create the table Customer Log)

3 Account (ac_no, ac_name, act_type)

Transaction (ac_no, trans_date, tran_type, tran_amount, balance)

Note: Act_type may be 'S' for saving or 'C' for current and tran_type may be 'D' for deposit or 'W' for withdrawal.

Implement the following:

1. Find out those saving transactions that took place between 10th January201120th

January 2011 have withdrawn an amount greater than Rs. 50,000.

2. Create a Sequence that can be used to enter new account number into the account Table. Add a new record into the Account table using the created sequence.

B)

1. Create a trigger not allowing insertion, deletion or updation on Saturday and before 8:00 AM & after 6:00 PM on the Account table.
2. Create a package for the following :
Create a function to return the current balance for a given account number.

4 Movie (movie_id, movie_name, date_of_release)

Screen (screen_id, location, max_capacity)

Current (movie_id, screen_id, date_of_arrival, date_of_closure)

Note:

Value of screen_id must be the letter 'S'.

Screen location can be any one of 'FF', 'SF', and 'TF'.

Date_of_arrival must be less than Date_of_closure.

Max_capacity attribute should have a value greater than 0.

Implement the following:

A)

1. Find the top three movies which have the highest screened record.
2. Create a View which displays the movie details along with the information about the screen on which it is currently screened.

B)

1. Create a trigger that is fired after an INSERT statement is executed for the Movie table. The trigger writes the new movie's code, movie name and the sysdate in a table called Movie_Log. (create the table Movie_Log)
2. Create a function that gets the Screen Code from the user and displays the movie name currently screened on it. If the given screen code does not exist, throw a user defined exception with appropriate message.

**5 Employee_master (EmpCode , Emp_Name , Dept_Id, Emp_Address , DOB , Basic_Salary
Department_master (Dept_Code , Dept_Name)**

Implement the following:

A)

Create a View that displays some Employee details such as Employee code, Employee name, Department Name and their Basic Salary.

Find those employees who do not belong to Department D102 or D105. (Note: Use set operator)

B)

Create a PL/ SQL block to prepare report in the following format:

Display the salary slip for the employee in the following format, who's Employee Code is provided by the user.

Salary Slip for the month March 2012.

Employee Code: <E102> Employee Name: <JohnSmith>

Department Name: <Finance>

Basic Salary	DA	HRA	Medical	P.F.
---------------------	-----------	------------	----------------	-------------

Deductions:

Total Salary: _____

Note:

HRA is 15% of basic salary

DA is 30% of basic salary

Medical is 1% of basic salary

P.F. is 10% of basic salary

6 **Book_catalog** (book_code, title, Publisher_Name, Category_Name, yr_of_release, total_copies)

Member (member_code, member_name, mem_ship_dt)

Issue (Issue_id, member_code, book_code, issu_ret, issue_date, issue_ret_dt)

Note:

Add a constraint to Issue table, which will allow only 'I' or 'R' to be entered in the ISSUE_RET column, which stores the action whether the book is being issued or returned.

Implement the following: A)

Find the book details which are currently issued to the members and have crossed the return date, get details starting with the current date.

2. How many members have registered in the last three months? Display their details.

B)

Create a function which provides the total number of copies available for the issue for a given book. Book Code to be provided by the user.

2. Create a package for the following:

Create a function to print the book title when Book code is supplied by the user.

Text Books:

1. Database System Concepts **Author:** Abraham Silberschatz, Henry F. Korth, and S. Sudarshan **Publisher:** McGraw-Hill **Year of Publication:** March 2022 (7th Edition) **ISBN:** 9780078022159
2. Advanced Database Management System **Author:** Dr. Sanjeev Sharma **Publisher:** Wiley India **Year of Publication:** 2024 **ISBN:** 9789351199380
3. Advanced Database Management Systems **Author:** Rini Chakrabarti, Shilbhadra Dasgupta **Publisher:** Wiley India **Year of Publication:** 2024 **ISBN:** 9788177228021
4. Database Programming Using SQL & PL/SQL (2nd Edition) **Author:** Dr. Sanjeev Sharma **Publisher:** Wiley India **Year of Publication:** 2024 **ISBN:** 9789351199380
5. SQL, PL/SQL: The Programming Language of Oracle **Author:** Ivan Bayross **Publisher:** BPB Publications **Year of Publication:** 2023(4th Edition) **ISBN:** 9788176569644

Reference Books:

1. Oracle SQL and PL/SQL **Author:** Joel Murach **Publisher:** Murach **Year of Publication:** September 2024 (3rd Edition) **ISBN:** 978-1943873197

2. Oracle Database 12c PL/SQL Programming **Authors:** Michael McLaughlin **Publisher:** McGraw-Hill Education **Year of Publication:** 2024(1st Edition) **ISBN:** 978-0071812443
3. Advanced Database Management System **Authors:** Dr. Sanjeev Sharma, Dr. Jitendra Agrawal, Dr. Shikha Agrawal **Publisher:** Wiley India **Year of Publication:** 2017(1st Edition) **ISBN:** 978-9351199380

List of Open-Source Software/learning website:

<https://www.oracle.com/tools/downloads/sqldev-downloads.html>
<https://www.w3schools.com>
<https://sqlitebrowser.org/>
<https://www.tutorialspoint.com>
<https://www.pgadmin.org/>
<https://dev.mysql.com/downloads/workbench/>

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Understand and explain fundamental database concepts including data, information, database systems, schema, instance, users, and advantages of DBMS over file systems.	2.Understand 1.Remember
CLO2	Apply database design techniques, transaction management, and SQL commands for creating and managing database objects and data.	3.Apply 2.Understand
CLO3	Implement and utilize database constraints and operators, Construct complex SQL queries, clauses and SQL functions	2.Understand 3.Apply 6.Create
CLO4	Perform different types of SQL joins, sub queries, indexing, and views to manage and retrieve data efficiently.	3.Apply 4. Analyze
CLO5	Explain and develop PL/SQL programs using block structures, cursors, procedures, functions, and triggers.	2.Understand 3. Apply 6.Create
CLO6	Understand and compare modern database technologies such as No SQL, New SQL, XML databases, and cloud-based data management systems	2.Understand 4.Analyze

Mapping of CLOs with Pos & PSOs

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes(PS Os)	
	P O 1	P O 2	P O 3	P O 4	P O 5	P O 6	P O 7	P O 8	P O 9	P O 10	P O 11	P O 12	PSO 1	PSO 2
CLO1	H	M	L	L	L	-	M	-	M	-	-	-	M	L
CLO2	H	H	H	M	H	-	M	-	M	-	-	-	H	M
CLO3	H	H	H	M	H	-	M	-	M	-	-	-	H	M
CLO4	H	H	H	M	H	-	M	-	M	-	-	-	H	M
CLO5	H	M	H	M	H	-	M	-	M	-	-	M	H	M
CLO6	H	M	M	M	H	-	H	-	M	M	-	M	H	H

H: High, M: Medium, L: Low