Integrated MCA II Semester 3

Subject Name: Advanced Relational Database Management System-Practical

Subject Code: IMCA13304

Type of course: Professional Core Course

Prerequisite (if any):

- Basic knowledge of database concepts such as tables, rows, columns, primary keys, foreign keys, and relationships.

List of Courses where this course will be prerequisite:

- Big Data and Analytics
- Distributed Database Systems
- NoSQL Databases

Rationale:

Advanced Relational Database Management System helps students to learn structured data management, transaction management, Concurrency Control, Normalization, Query Optimization, advanced SQL covering all aspects of PL/SQL and Database Security preparing learners for developing scalable, high-performance applications in data-driven industries.

Teaching and Examination Scheme:

TEACHING SCHEME				Theory Marks		Practical Marks		Total
L	T	P	C	TEE	CAT	TEP	CAP	
0	0	4	2	-	-	30	20	50

CAT: Continuous Assessment Theory comprised of CA1 and CA2 **CA1:** Continuous Assessment (assignments/projects/open book tests/closed book tests **CA2:** Sincerity in attending classes/class tests/ timely submissions of assignments/self-learning attitude/solving advanced problems **TEE:** Term End Examination **TEP:** Term End Practical Exam (Performance and viva on practical skills learned in course) **CAP:** Regular submission of Lab work/Quality of work submitted/Active participation in lab sessions/viva on practical skills learned in course

List of Practicals:

Sr. No.	Problem Statement
Set 1	**Consider the following Schema:** Supplier(SID, Sname, branch, city, phone) Part(PID, Pname, color, price) Supplies (SID, PID, qty, date_supplied) Create the above tables with Primary Key Constraint and Foreign key Constraint. Also apply other constraints: 1. Update Part table with Pname as UNIQUE Constraint. 2. Add Check Constraint on address should be in Delhi, Ahmedabad, Surat, Vapi, and Bharuch in supplier table. 3. Update Supplies table with Default Constraint on date_suppiled as sysdate.
	Solve the following Queries: 1. Add a new attribute state in the supplier table. 2. Remove attribute city from supplier table. 3. Modify the data type of phone attribute. 4. Change the name of the attribute city to address. 5. Use truncate to delete the contents of the supplies table. 6. Remove the part table from database 7. Display all suppliers who supply parts in Vapi city. 8. Display Parts within the price range 5000 rs to 10000 rs. 9. Display the PID, SID for today's date. 10. Delete the record of the supplier whose SID is 104. 11. Update branch ='Textile' and city= Pune of the SID 105 12. Find the supplier name where 'R' is in the second position. 13. Change the city of all suppliers to 'BOMBAY'. 14. Change the city of supplier 'Vandana' to 'Goa'. 15. Find the minimum, maximum, average and sum of costs of parts. 16. Display total price of parts of each color. 17. Display Parts details which are supplied in Surat city. 18. Find all the distinct costs of parts. 19. Display supplier details which are ordered more than 10 in quantity. 20. Find the branch and the number of suppliers in that branch for branches which have more than 2 suppliers.

	21. List the suppliers who supplied parts on '1st May 2024', '12 Jan 2023', '17 Dec 2024'. 22. List all parts except 'NUT' and 'BOLT' in ascending order of costs. 23. Display all parts that have not been supplied so far. 24. Display the supplier names who have supplied 'green' part with cost 500 Rupees AND 'red' part with cost 400 Rupees. 25. Display the Supplier details where parts were supplied in the month of Jan.
Set 2	**Consider the following Schema:** Dept(Dno, Dname, Dlocation, MgrID) Employee(EmpId, Name, DOB, Address, Gender, Salary, Deptno) Create the above tables with Primary Key Constraint and Foreign key Constraint. Also apply other constraints: 1. Update Dept table with Dname as UNIQUE Constraint. 2. Add Check Constraint on salary should be between 20000 rs to 500000 rs.
	Solve the following Queries:
	1. Rename the table dept as department. 2. Add a new column PINCODE with not null constraints to the existing table DEPT. 3. All constraints and views that reference the column are dropped automatically, along with the column. 4. Rename the column DNAME to DEPT_NAME in the dept table. 5. Change the datatype of column Dlocation as CHAR with size 20. 6. Update the record of 'Geeta', set Address= 'Ring Road Bombay' and phoneno = '11223344'. 7. Display all the fields of the employee table. 8. Retrieve employee number and their salary where salary should be in range of Rs 5000 to Rs 15000. 9. Retrieve the average salary of all employees of 'Accounts Department'. 10. Retrieve departmentwise total salary of employee. 11. Display details of employee whose name is AMIT and salary greater than 50000; 12. Rise 10 percent salaries of every employee working in the 'Research' Department. 13. Find the sum of the salaries of all employees of the 'Sales' department, as well as the maximum salary, the minimum salary, and the average salary in this department. 14. Retrieve the employee details with their manager name. 15. Retrieve the name of each dept and number of employees working in each department which has at least 2 employees. 16. Retrieve the name of employees who were born in the year 1990's.

Set 3	**PL/SQL Programs** 1. Write a PL/SQL block to add two numbers. 2. Write a PL/SQL block for Fibonacci series. 3. Write a PL/SQL block for the greatest of 3 numbers. 4. Write a PL/SQL block for area and circumference of a circle. 5. Write a PL/SQL block to display the supplier details where the branch is 'Mechanical'. 6. Create a view of sales_staff that references the employees working in department 5. 7. Create a view to display Supplier details in the ascending order of the city. 8. Create a cursor to display the SID and city of the supplier where SID=101. 9. Create a cursor to display the SID and City of all suppliers and then print the count of suppliers. 10. Write a cursor to select the five highest paid employees from the table.
Set 4	**PL/SQL Programs on Triggers, Procedures and Functions** 1. Create a trigger to perform Audit Log all changes to the Employee table in an audit table. 2. Create a trigger for Updating Manager's Department in the MgrID of Dept table if a manager is reassigned to a different department. 3. Create a trigger that will not allow us to add a new department on Sunday. 4. Write a procedure to transfer an employee from one department to another. 5. Write a PROCEDURE to increase the cost by Rs.1000 for part whose PID is passed as an argument. 6. Write a procedure to update the city of a supplier whose SID and city are passed as arguments and the procedure returns the name of the supplier whose city is updated. 7. Write a function to return the total number of suppliers. 8. Write a function to return the PID of the part, for which the part name is passed. 9. Write a function to find the sum total of costs of all parts. 10. Write a function to retrieve the name of the manager for a given department.
Set 5	**Consider the following schema:** Create the following tables with Primary Key Constraint and Foreign key Constraint. Doctor (Dno, Dname, Specialization, Clinic_Addr) Medicine (Mno, Mname, Type, Content, Manufacturer) Disease (Disease_Name, Symptom1, Symptom2, Symptom3) Treatment (Tno, Dno, Disease_Name, Mno, Dosage, Avg_Cure_Time)
	Solve the following Queries:
	1. Display records of each table in ascending order.

	2. Count the total number of doctors which have not given any treatment. 3. Display all Chennai doctors who treat cancer. 4. Remove disease "polio" from the disease table as well as the treatment table. 5. Delete all those treatment related to liver of Dr. Shah. 6. Create index on dno, Disease name in the treatment table. 7. Display details of doctors who treat migraines. 8. What is the maximum dosage of "penicillin" prescribe by the doctor for the treatment of any disease? 9. Display total number of disease treated by every doctor. 10. Which doctor have no treatment for "depression"? 11. Create a view which contains the treatment and doctors details. Make sure that no body is allowed to modify any detail in the view. 12. Write a PL/SQL block to print the following report (Symptoms wise print total number of medicine given. 13. Write a trigger which does not allow to insert or update treatment table if AVG_CURE_TIME is less than 1.
Set 6	**Consider the following schema:** Screen (Screen_Id, Location, Seating_Cap) Movie (Movie_Id, Movie_Name, Date_Of_Release) Current (Screen_Id, Movie_Id, Date_Of_Arrival, Date_Of_Closure) Create the above tables with Primary Key Constraint and Foreign key Constraint. Also apply other constraints: 1. Add check constraint in screen_id must start with letters 'S'. 2. Add check constraint in location can be any one of 'FF', 'SF', or 'TF.
	Solve the following Queries:
	1. Get the name of movie which has run the longest in the multiplex so far. 2. Get the average duration of a movie on screen number 'S4'. 3. Get the details of movie that closed on date 24-november-2004. 4. Get the full outer join of the relations screen and current. 5. Write a PL/SQL function which will count total number of day's horror movie last longer. 6. Write a PL/SQL procedure that will display movie which is going to release today. 7. Write a trigger which will not allow to insert/update in current table if Date_of_arrival is less than date_of_closure.
Set 7	**Consider the following schema:** Customer(Cid, Fname, Lname, City, Country, Phone)

	Order (Oid, Odate, Onumber, Cid, Ototalamount) Create the above tables with Primary Key Constraint and Foreign key Constraint.
	Solve the following Queries:
	1. List the number of customers in each country. Only include countries with more than 100 customers. 2. List the number of customers in each country, except China, sorted high to low. Only include countries with 5 or more customers. 3. List all customers with average orders between Rs.5000 and Rs.6500. 4. Create a trigger that executes whenever country is updated in CUSTOMER table. 5. Create a function to return customer with maximum orders. 6. Create a procedure to display month names of dates of ORDER table. The month names should be unique.
Set 8	**Consider the following schema:** Empmast (Empno, Empnm, Empadd, Salary, Date_Birth, Joindt, Deptno) Dept (Dno, Dname) Create the above tables with Primary Key Constraint and Foreign key Constraint.
	Solve the following Queries:
	1. Write a PL/SQL block which takes as input Department name and displays all the employees of this department who has been working since last five years. 2. Write a PL/SQL block to print salary slip in a proper format. Rules for calculating salary are listed below: a. Rules: HRA = 15% of basic b. DA = 50% of basic c. Medical = 100 d. PF = 8.33%of basic

Suggested Specification table with Marks (Practical):

%Distribution of Marks					
R Level	**U Level**	**A Level**	**N Level**	**E Level**	**C Level**
20	20	60	0	0	0

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

Sr. No.	Title of book /article	Author(s)	Publisher and details like ISBN	Year of publication	Publication Edition
1	SQL, PL/SQL – The Programming Language of Oracle	Ivan Bayross	BPB Publications	2010	4th

Sr. No.	CO Statement After learning this subject, students will be able to	Marks % Weightage
CO-1	Implement relational database schemas using SQL with primary keys, foreign keys, constraints, and normalization techniques.	30
CO-2	Apply various SQL commands to manipulate and retrieve data efficiently, including joins, sub-queries, and aggregate functions.	30
CO-3	Develop advanced database programming solutions using PL/SQL, including stored procedures, functions, triggers, and cursors, package, views.	40

Mapping with POs:

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PO 13
CO-1	3	3	3	2	2	1	0	0	0	0	0	0	0
CO-2	3	3	3	2	1	1	1	0	1	0	0	0	0
CO-3	3	3	3	2	1	1	1	2	0	1	0	0	0
Rationale*													

Rationale*: Explaining why it is matching this particular program outcome