AMITY UNIVERSITY
UTTAR PRADESH

Course Title: **RELATIONAL DATABASE MANAGEMENT SYSTEM** **Credit Units: 04**

L	T	P/S	SW/FW	TOTAL CREDIT UNITS
2	-	2	2	4

Course Code: CSIT661
Course Level : PG

Course Objectives:

The primary aim of the subject is to provide the students a deeper understanding of the relational database model by exposing them to a variety of important issues of data base management, e.g., database design, physical storage, query optimization, database recovery, concurrency control, security and data integrity.

Pre-requisites: Basic Concept of software programming and Data Structure.

Course Contents/Syllabus:

	Weightage (%)
Module I: Introduction to DBMS Introduction to DBMS; Architecture of DBMS; Components of DBMS; Traditional data Models (Network; Hierarchical and Relational); Database Users; Database Languages; Schemas and Instances; Data Independence	**15**
Module II: Data Modeling Entity sets attributes and keys; Relationships (ER); Database modeling using entity; Weak and Strong entity types; Enhanced entity-relationship (EER); Entity Relationship Diagram Design of an E-R Database schema Object modeling; Specialization and generalization. Relational Database Model: Basic Definitions; Properties of Relational Model; Keys; Constraints; Integrity rules; Relational Algebra; Relational Calculus.	**20**
Module III: Relational Database Design Functional Dependencies; Normalization; Normal forms (1^{st}, 2^{nd}, 3^{rd}, BCNF); Lossless decomposition; Join dependencies; 4^{th}& 5^{th} Normal form; QBE.	**15**
Module IV: Query Language SQL Components (DDL, DML, DCL); SQL Constructs (Select…from…where…. Group by…. Having…. Order by…); Nested tables; Views; correlated query. PL/SQL: Introduction; Basic block; Structure of PL/SQL program; Control Statements; Exception handling; Cursor Concept;	**15**

Procedure; functions and triggers.	
Module V: Database Security and Authorization	**10**
Basic security issues; Discretionary access control; Mandatory access control; Statistical database security.	
Module VI : Transaction Management and Concurrency Control Techniques	**15**
Transaction concept; ACID properties; Schedules and recoverability; Serial and Non-serial schedules; Serializability; Concurrency Problems; Concurrency Techniques: Locking Protocols, Timestamping Protocol, Multiversion Technique; Deadlock Concept – detection and resolution.	
Module VII: Backup and Recovery	**10**
Database recovery techniques based on immediate and deferred update; ARIES recovery algorithm; Shadow pages and Write-ahead Logging	

Student Learning Outcomes:

After completion of this course, student will be able to:

Describe and give examples of relational database model and related concepts.
Apply the basic goals and functions of databases and their applications.
Demonstrate the basics of query languages and how to manipulate and manage a database using SQL
Demonstrate entity relationship analysis to develop E-R diagram for a given real life problems.
Demonstrate the concept of normalization.
Demonstrate an understanding of database security, transaction failure and recovery
Prepare a practical database management project

Pedagogy for Course Delivery:

Subject will be taught on the basis of lectures delivered in the class room, practical lab sessions and implementing the database design in the lab to solve some real life problem. It also includes discussing some case study covering different module.

Lab/ Practicals details:

1. Create the following(s) table
   Salespeople with fields snum, sname, city, commission
   Orders table with fields onum, odate, snum, amt
   Customers table with fields cnum, cname, city, rating, snum
2. Display name & city of salesman where city is “Pune
3. Display the numbers of sales persons, with orders currently in the orders table without any repeats.
4. Display all customers where city is ‘Mumbai’ rating is more than 100.

5. Display all customers where city is either ‘Pune’ or ‘Mumbai’
6. List all customers not having city ‘Pune’ or rating more than 100
7. Display all customers excluding those, with rating less than equal to 100, unless they are located in ‘Nagar’
8. Display all sales persons names starting with character ‘G’, the 4th character is ‘A’ & the rest of characters will be any.
9. Find all records from customers table where city is not known i.e. NULL.
10. Assume each salesperson has a 12% commission on order amt. Display orderno, snum, commission for that order.
11. Display the count of snum in order table without duplication of snum.
12. Display the counts of all orders for Feb05
13. Display the maximum outstanding amount as blnc+amt
14. Display details of orders order number & date wise
15. Display customers highest ratings in each city.
16. Write a query that totals the orders for each day & places the results in descending order.
17. Add a column current _bal in orders table for current balance
18. Increase commission of all sales persons by 200.
19. Display each order number followed by the name of customer who made it.
20. Calculate the amount of salespersons commissions on each order by a customer with a rating above 100.
21. Write a query that uses a sub-query to obtain all orders for the customer named ‘Gopal’.
22. Write a query that produces the names & ratings of all customers who have above-average orders
23. Create a union of two queries that shows the names, cities 7 ratings of all customers. Those with a rating of 200 or greater will also have ratings “high rating”, while the others will have the words “low rating”.
24. Write a command that produces the name & number of each salesperson & each customer with more than one current order. Put results in alphabetical order.
25. Create an index that would permit each salesperson to retrieve his or her orders grouped by date quickly.
26. Create a view that shows all of the customers who have highest ratings.
27. Create a view that shows number of salespeople in each city.
28. Write a PL/SQL program to display the number in reverse order
29. Write a PL/SQL program to find the factorial of a given number
30. Write a PL/SQL program to generate 3utest3at series
31. Write a PL/SQL code block to calculate the area of a circle for a value of radius varying from 3 to 7.Store the radius and the corresponding values of calculated area in an empty table named areas, consisting of two columns radius & area table name: areas radius area
32. Write a PL/SQL code block that will accept an account number from the user, check if the users balance is less than minimum balance,only then deduct rs.100/- from the balance. This process is fired on the acct table.

Assessment/ Examination Scheme:

Theory L/T (%)	Lab/Practical/Studio (%)	Total(%)
75	25	100

Theory Assessment (L&T):

Continuous Assessment/Internal Assessment					End Term Examination
Components (Drop down)	**Mid Term**	**Assignment**	**Quiz/ Presentation**	**Attendance**	**EE**
Weightage (%)	10	10	5	5	70

Lab/ Practical/ Assessment:

	Continuous Assessment/Internal Assessment					End Term Examination		
Components (Drop down	**Lab Record**	**Mid Term**	**Attendance**	**Continuous Performance**	**Viva**	**Practical**	**Viva**	
Weightage (%)	10	10	5	10	5	40	20	

Text & References:

Elmasri & Navathe," Fundamental of Database Systems", Pearson Education, Fifth Edition, 2009
Korth & Sudarshan," Database System Concepts",TMH, Sixth Edition, 2010
C.J.Date," An Introduction to Database System", Pearson Education, Eighth Edition, 2009
Bipin C Desai," Introduction to Database Systems", Galgotia, Revised Edition, 2010

Any other Study Material:

Kevin Loney & Geroge Koch ,"Oracle 9i :The Complete Reference", TMH Edition 2002
Ivan Bayross," SQL,PL/SQL The Programming Language Of Oracle", BPB Publications,Third Revised Edition, 2009