ST.JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

III SEMESTER **COMPUTER SCIENCE**  TIME:4HRS/WEEK

CS 3602 (3) **DATABASE MANAGEMENT SYSTEMS** MAX.MARKS:100

w.e.f. 20-21 admitted batch-“20AH” **SYLLABUS**

**COURSE OBJECTIVES:** To enable the students to:

* Understand the different issues involved in the design and implementation of a database system.
* To understand and use data manipulation language to query, update, and manage a database.
* To introduce the concepts of transactions and transaction processing.

**COURSE OUTCOMES:**

Upon successful completion of the course, a student will be able to:

* Develop and design database application and therefore enhance entrepreneurship skills.
* Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
* Design and implement a Database Schema for a given Problem-domain.
* Apply Normalization Techniques on given Database Design to avoid Anomalies.
* Understand various transaction processing and concurrency control mechanisms.

**UNIT I : OVERVIEW OF DATABASE MANAGEMENT SYSTEM:** Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Various Data Models, Components of Database Management System, three schema architecture of data base, costs and risks of database approach.

**UNIT II : ENTITY-RELATIONSHIP MODEL**: Introduction, the building blocks of an entity relationship diagram, classification of entity sets, attribute classification, relationship degree, relationship classification, reducing ER diagram to tables, enhanced entity-relationship model (EER model), generalization and specialization, IS Arelationship and attribute inheritance, multiple inheritance, constraints on specialization and generalization, advantages of ER modelling.

**UNIT III : RELATIONAL MODEL:** Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra, relational calculus, tuple relational calculus, domain relational Calculus (DRC), Functional dependencies and normal forms upto 3rd normal form.

**UNIT IV : STRUCTURED QUERY LANGUAGE:** Introduction, History of SQL Standard, Commands in SQL, Data Types in SQL, Data Definition Language, Selection Operation, Projection Operation, Aggregate functions, Data Manipulation Language, Table Modification Commands, Join Operation, Set Operations, View, Sub Query.

**UNIT V : PL/SQL:** Introduction, Shortcomings of SQL, Structure of PL/SQL, PL/SQL Language Elements, Data Types, Operators Precedence, Control Structure, Steps to Create a PL/SQL, Program, Iterative Control, Procedure, Function, Database Triggers, Types of Triggers.

**PRESCRIBED TEXT BOOKS:**

* Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill ,6e.
* Database Management Systems by Raghu Ramakrishnan, McGrawhill ,3e

**REFERENCE BOOKS:**

* Principles of Database Systems by J. D. Ullman
* Fundamentals of Database Systems by R. Elmasri and S. Navathe
* SQL: The Ultimate Beginners Guide by Steve Tale.

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ST.JOSEPH’S COLLEGE FOR WOMEN (AUTONOMOUS), VISAKHAPATNAM

III SEMESTER **COMPUTER SCIENCE** TIME:2HRS/WEEK

CS 3652 (2) **DATABASE MANAGEMENT SYSTEMS LAB** MAX.MARKS:50

w.e.f.20-21 admitted batch-“20AH” **PRACTICAL** **SYLLABUS**

**OBJECTIVES :**

To enable the students to:

* Describe the basics of SQL and construct queries using SQL.
* Know query languages associated with relational models

**COURSE OUTCOMES:**

After Completion of this course the student would be able to:

* Design and implement a database schema for a given problem.
* Design queries using SQL.
* Apply PL/SQL for processing database.

1. Draw ER diagram for hospital administration

2. Creation of college database and establish relationships between tables

3. Relational database schema of a company is given in the following figure.



**QUESTIONS TO BE PERFORMED ON ABOVE SCHEMA :**

1. Create above tables with relevant **Primary Key, Foreign Key and other constraints**

2. Populate the tables with data

3. Display all the details of all employees working in the company.

4. Display **ssn, lname, fname, address** of employees who work in department no 7.

5. Retrieve the **Birthdate and Address** of the employee whose name is 'Franklin T. Wong'

6. Retrieve the name and salary of every employee

7. Retrieve all distinct salary values

8. Retrieve all employee names whose address is in ‘Bellaire’

9. Retrieve all employees who were born during the 1950s

10. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)

11. Retrieve the names of all employees who do not have supervisors

12. Retrieve SSN and department name for all employees

13. Retrieve the name and address of all employees who work for the 'Research' department

14. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.

15. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.

16. Retrieve all combinations of Employee Name and Department Name

17. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan’ either as a worker or as a manager of the department that controls the project.

18. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.

19. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.

20. Select the names of employees whose salary does not match with salary of any employee in department 10.

21. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.

22. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.

23. Find the sum of the salaries and number of employees of all employees of the ‘Marketing’ department, as well as the maximum salary, the minimum salary, and the average salary in this department.

24. Select the names of employees whose salary is greater than the average salary of all employees in department 10.

25. Delete all dependents of employee whose **ssn is ‘123456789’**.

26. Perform a query using alter command to drop/add field and a constraint in Employee table.

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