Lok Jagruti Kendra University
University with a Difference

Diploma in Information Technology

LJ Polytechnic

Course Code: 025040303

Database Management System

Programme / Branch Name			Diploma in Information Technology			
Course Name	Database Management System				**Course Code**	025040303
Course Type	HSSC	BSC	ESC	PCC	OEC	PEC

Legends: HSSC: Humanities and Social Sciences Courses BSC: Basic Science Courses
ESC: Engineering Science Courses PCC: Program Core Courses
OEC: Open Elective Courses PEC: Program Elective Courses

1. Teaching and Evaluation Scheme

Teaching Hours / Week / Credits				**Evaluation Scheme**			
L	**T**	**P**	**Total Credit**	**CCE**	**SEE (Th)**	**SEE (Pr)**	**TOTAL**
3	0	4	5	50	50	50	150

Legends:
L: Lectures T: Tutorial P: Practical
CCE: Continuous & Comprehensive Evaluation
SEE (Th): Semester End Evaluation (Theory)
SEE (Pr): Semester End Evaluation (Practical)

2. Prerequisites

- ✓ Students should have basic knowledge about computer including windows and Linux
- ✓ Students should have fundamental knowledge about set theory, simple file records concept
- ✓ Basic problem-solving capability

3. Rationale

Database Management Systems (DBMS) are vital components of modern information systems. The students will develop the skills to design database system and develop application programs to manage & retrieve data from different perspectives using Structured Query Language (SQL). The course focuses on the fundamentals of knowledge of database management system and relational database management systems, and the current developments in database theory and their practice.

4. Objectives

- ✓ This course aims to help the students to attain the following industry-identified competency through various teaching-learning experiences.
  - Designing and Implementation of database management system.
  - Development of programming & coding ability using ‘SQL’.

5. Contents

Unit No.	Unit Name	Topics	Learning Outcomes	% Weightage	Hours
1	**Introduction of Database Management System**	1.1. Introduction: Basic terms of database, Need of Database, Operations on Database, Applications of Database, Tools of Database 1.2. Data Administrator (DA) & Database Administrator (DBA) 1.3. Data Dictionary 1.4. Data Warehouse 1.5. File-oriented System & Database Management System	• Basics of Database • Fundamentals of DBMS • Functions and responsibilities of DBA • Basics of Data Dictionary and Data Warehouse • Merits and demerits of Database Management System	20	8
2	**Database Architecture**	2.1.Introduction 2.2.Database Architecture 2.3.Data Independence 2.4.Mapping 2.5.Types of DBMS	• Fundamentals of Database Architecture • Data independence and its types • Data Mapping • Types of DBMS	20	8
3	**Structured Query Language (SQL)**	3.1. Introduction 3.2. Datatypes 3.3. SQL Commands 3.4. DUAL table and SYSDATE 3.5. SQL Operators 3.6. SQL Functions 3.7. SQL Constraints	• Basics of SQL • Perform different types of SQL Commands • Execute various SQL Operators and Functions • Execute various ORACLE clauses • Implementation of Domain Integrity, Entity Integrity Constraints, Referential Integrity Constraint	25	10
4	**Relational Model**	4.1.Introduction 4.2.Structure of Relational Model 4.3.Set Operations 4.4.Keys 4.5.Relational Algebra 4.6.Sub Queries	• Design of Relational Model • Implementation of Set Operation using SQL • Implementation of Keys using SQL • Perform Sub Queries	20	8

		4.7.Joins	• Implementation of Joins		
5	**Entity-Relationship Model**	5.1.Introduction 5.2.Basic terms of E-R Model 5.3.Design E-R Model 5.4.Problems with E-R Model 5.5.Basics of Enhanced E-R Model 5.6.Specialization 5.7.Generalization	• Design E-R Model • Problems with E-R Model • Concept of Specialization and Generalization	15	8
				Total Hours	**42**

6. List of Practicals / Exercises

The practical/exercises should be properly designed and implemented in an attempt to develop different types of skills so that students can acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

Sr. No.	Practicals / Exercises	Key Competency	Hours
1	Implement SQL queries to perform various DDL, DML, DQL Commands.	Basics of Structured Query Language Commands.	6
2	Implement various SQL Operators such as Arithmetic, Logical and Relational Operators.	Several Operators of Structured Query Language.	4
3	Implement SQL queries using Numeric functions: abs, ceil, cos, cosh, exp, floor, power, mod, round, trunc, sqrt etc.	Various Numeric functions using SQL.	4
4	Implement SQL queries using Character Functions: initcap, lower, upper, ltrim, rtrim, translate, replace, substring etc.	Various Character functions using SQL.	6
5	Implement SQL queries using Conversion Functions: to-char, to-date, to-number and Miscellaneous functions like uid, user, nvl, vsize etc.	Various Conversion functions using SQL.	6
6	Implement SQL queries using Date functions: add-months, months-between, round, nextday, truncate, greatest, new-time etc.	Various Date functions using SQL.	6
7	Implement SQL queries using Aggregate (Group) functions: min, max, sum, count, avg etc.	Various Aggregate functions using SQL.	6
8	Implement various types of constraints using SQL.	Constraint of Structured Query Language and its types.	4
9	Implement GROUPBY and HAVING clauses using SQL.	Implementation of various clauses using SQL.	4

10	Implement Sub Queries using SQL.	Concept of Sub Queries using SQL.	4
11	Implement Set Operations such as UNION, INTERSECT, MINUS using SQL.	Several Set Operations using SQL.	4
12	Construct an E-R diagram for a functional system.	Various E-R Concepts	2
		Total Hours	**56**

7. Suggested Specification Table for Evaluation Scheme

Unit No.	Unit Name	Distribution of Topics According to Bloom's Taxonomy					
		R %	U %	App %	C %	E %	An %
1	Introduction of Database Management System	30	40	30	-	-	-
2	Database Architecture	30	30	40	-	-	-
3	Structured Query Language (SQL)	20	25	40	5	5	5
4	Relational Model	20	35	30	5	5	5
5	Entity-Relationship Model	30	40	15	5	5	5

Legends: R: Remembering U: Understanding
App: Applying C: Creating
E: Evaluating An: Analyzing

8. Textbooks

1) Database System Concept, Design and Applications by S.K.Singh, Latest Edition, Pearson Education.
2) SQL-PL/SQL by Ivan Baryons, Latest Edition, BPB Publication.

9. Reference Books

1) An Introduction To Database Systems by C.J date, Latest Edition, Addison Welsley Publication.
2) Database System Concepts, Silberschatz, Korth and Sudarshan, Latest Edition, McGraw Hill Education.
3) Oracle 11g: Complete reference, Kevin Loney, Latest Edition, McGraw Hill Education.
4) Mastering SQL, Martin Gruber, Latest Edition, BPB Publication.

10. Open Sources (Website, Video, Movie)

1) https://www.coursera.org/learn/database-management
2) https://www.sqlcourse.com/
3) https://www.tutorialspoint.com/dbms/index.htm
4) https://nptel.ac.in/courses/106/106/106106220/