Riphah International Colleges

A Project of Riphah International University

Course Outline

Course Information	Course Title	**Database Management System**		
	Course ID	CMS-114	Course Type	Core
	Credit hours	3(2+1)	Hours per week (C-L)	(2+3)
	Program(s)	ADP-ITM, Comp-System	Preferred Semester	2nd
	Session	Spring-2025	Version	1.0

Course Description

Database Management System is an important course in the computer science field and it is required to understand the information requirement of an organization and to build a database for that organization. It provides a basic theoretical level of understanding databases and creating a computerized database application for a business. The purpose of this course is to understand the real information requirements of a business and to implement that in computerized database applications. This course is designed to give a thorough understanding of databases. It enables students to practically deal with database-related issues based on solid concepts and theory.

Course Objectives (CO)

The objective of this course is to enable students to understand;

No.	Objective	Relation with PEO
CO1.	Understand Database Management System & its role in different ICT systems.	
CO2.	Analyze the database requirements of any Organization. Provide conceptual design for it.	
CO3.	Implement a physical database for different organization datasets.	
CO4.	Construct Sophisticated queries for database development & Manipulation	
CO5.	Understand the latest technology used for a robust & efficient DBMS.	

Course Learning Outcomes (CLO)

At the end of this course students will be able to;

No.	Outcome	Relation with PLO	BT Level	PLO Level
CLO1.	**Understanding** the basic database structure, database administrator roles & duties.			
CLO2.	**Analyzing** an information storage problem and derive an information model expressed in the form of an entity relation diagram			
CLO3.	**Applying** understanding of the relational data & normalize the tables to 3rd normal form			
CLO4.	**Transform** an information model into a relational database schema and use a data definition language to implement the schema using a DBMS.			

Lecture type	**Class room Lectures, Lab Sessions, Project Presentation**					
Prerequisites						
Follow up Courses						
Textbook	Title	Edition	Authors	Publisher	Year	ISBN
	Database management Systems		Raghu Ramakrishnan			ISBN-13: 978-0072465631
Reference Books	Modern Database Management	11th	Fred McFadden, Jeffrey Hoofer, Mary Prescott,	Prentice Hall	2012	10: 0132662256
	Introduction to oracle 9i SQL		Nancy GreenBerg Priya Nathan	Oracle Corporation	2001	
Reference Material	A Fundamental Study of Database Management System	3rd	Imran Saeed, Tasleem Mustafa, Tariq Mahmood	IT Series Publications		
Course Software or Tool	SQL Server, Xampp Server (MySQL), Oracle 10g Express					

Assessment Criteria (100%)	Assessment	Weight	Used to attain CLO
	Assignments & Presentations	10%	1,3,4
	Quiz & Project	10%	1,2,3
	Lab	15%	3,4
	Mid Term	25%	1,2,3
	Final-Term	40%	1,2,3,4

Methods of Evaluation	Quizzes, Assignments, Mid/Final exam, Lab, Project
Notes	Labs are managed and evaluated separately

Database management System Course Contents

Week No.	Topic	Lecture No.	Lecture Contents	Relation with CLO	Lecture Material	Class Activity	Tasks
W1	The Database Environment and Development Process	L 1,2	• Introduction to database • Basic Concepts and Definitions • Traditional File Processing System • The Database Approach • Components of Database Environment • The Range of Database Applications • The Database Development Process	CLO 1	"Database Management Systems" by Raghu Ramakrishnan		
W2	Modeling Data in the Organization	L 3,4	• Introduction to database models • The E-R Model • Modeling the Rules of the Organization • Modeling Entities and Attributes • Modeling Relationships	CLO 1	"Database Management Systems" by Raghu Ramakrishnan	Assignment 1	
W3	The Enhanced E-R Model	L 5,6	• Introduction • Representing Super types and Subtypes • Transforming ER-Schema to ER-Model	CLO 2	"Database Management Systems" by Raghu Ramakrishnan	Quiz 1	
W-4	The Enhanced E-R Model	L 7,8	• Specifying Constraints in Super type/Subtype Relationship • Practice of E-R Model	CLO 3	"Database Management Systems" by Raghu Ramakrishnan		

Week No.	Topic	Lecture No.	Lecture Contents	Relation with CLO	Lecture Material	Class Activity	Tasks
W5	Logical Database Design and the Relational Model	L 9,10	• Logical Database Design Process • Introduction • The Relational Data Model • Integrity Constraints • Transforming EERDs into Relations	CLO 3	"Database Management Systems" by Raghu Ramakrishnan"	Assignment 2	
W-6	Normalization of ER-Model	L 11,12	• Database Normalization • Practice of Normalization using different case studies	CLO 2,3	"Database Management Systems" by Raghu Ramakrishnan" & Different real-time case studies	Quiz 2	
W7	Physical Database Design and Performance and partitions	L 13,14	• Introduction to Physical Database Design Process • Designing Fields • De-normalizing and Partitioning Data • Designing Physical Database Files	CLO 4	"Database Management Systems" by Raghu Ramakrishnan"		
W-8	Indexing, Optimal Query Optimization	L 15,16	• Using and Selecting Indexes • Designing a Database for Optimal Query Performance	CLO 4	"Database Management Systems" by Raghu Ramakrishnan"		

Week No.	Topic	Lecture No.	Lecture Contents	Relation with CLO	Lecture Material	Class Activity	Tasks
W9	**MID TERM**						
W10	Introduction to SQL	L 17,18	• SQL Environment • Defining a Database in SQL • Inserting, Updating and Deleting Data • Internal Schema Definition in RDBMS • Processing Single Tables	CLO 1	"Database Management Systems" by Raghu Ramakrishnan"		
W11	Advanced SQL	L 19,20	• Introduction • Processing Multiple Tables • Tips for Developing Queries • Ensuring Transaction Integrity • Data Dictionary Facility • Enhancements and Extensions to SQL • Triggers and Routines • Embedded SQL and Dynamic SQL	CLO 2	"Database Management Systems" by Raghu Ramakrishnan"	Quiz 3	Assignment 3
W12	Database Application Development	L 21,22	• Introduction • Client/Server Architecture • Databases in Two-Tier Architecture • Three-Tier Architectures • Web Application Components • Databases in Three-Tier Architecture • Key Consideration in Three-Tier and XML	CLO 3	"Database Management Systems" by Raghu Ramakrishnan"		
W13	Data Warehousing	L 23,24	• Introduction • Data Warehouse Architecture • Characteristics of Data Warehouse Data	CLO 1,2	"Database Management Systems" by Raghu	Assignment 4	Quiz 4

Week No.	Topic	Lecture No.	Lecture Contents	Relation with CLO	Lecture Material	Class Activity	Tasks
					Ramakrishnan"		
W14	Data Warehousing	L 25,26	• The Derived Data Layer • The Star Schema • Variations of the Star Schema	CLO 4	"Database Management Systems" by Raghu Ramakrishnan"	Assignment 5	Quiz 5
W15	Data and Database Administration	L 27,28	• The Roles of Data and Database Administration • The Open-Source Movement and Database Management • Managing Data Security • SOX and Databases	CLO 1	"Database Management Systems" by Raghu Ramakrishnan"	Database Project Submission	
W16	Backup and Recovery	L 29,30	• Database Backup and Recovery • Data Dictionaries and Repositories	CLO 2	"Database Management Systems" by Raghu Ramakrishnan"	Database Project Evaluation and Presentation	
W-17	Database performance and Tunning	L 31,32	• Overview of Tuning the Database for Performance	CLO1,2	"Database Management Systems" by Raghu Ramakrishnan"	Database Project Evaluation and Presentation	
W-18	**Final Term Exam**						

LAB CONTENTS

Week No.	Topic	Lab Contents	Activity	Relation with CLO
W1.	Introduction	• Introduction to Database • Different DBMS • Oracle/SQL-Server Installation	All activities are system related tasks	CLO-1
W2.	Understanding of DDL, DML	• Create Table • Alter Table • Truncate Table • Drop Table • Insert Table • Update Table • Delete Table	Semester Project initiation	CLO-3
W3.	Arithmetic Expression, Column Aliases, Concatenation	• Selecting all columns of all rows • Selecting specific columns of all rows • Arithmetic Expressions • Null values • Column Aliases • Concatenation Operator • Literal Character Strings • Eliminating Duplicate Rows	Assignment 1 Quiz 1	CLO-3
W4.	WHERE Clause, Comparison Conditions (Between IN Like),	• Limiting Rows Using a Selection • Using the WHERE Clause • Character Strings and Dates • Comparison Conditions		CLO-3
W5.	Logical Conditions, Rules of Precedence, Descending and ascending order	• Logical conditions • Rules of Precedence using Parentheses • The ORDER BY Clause • Default Ordering of Data • Reverse the Default Order • Sorting by Column Aliases • Sorting by Multiple Columns	Assignment 2	CLO-1,3

W6.	Constraints, Unique, not null, primary key, foreign key	• Constraints • NOT NULL Constraint • UNIQUE Constraint	Quiz 2	CLO-1,3
W7.	Primary key, foreign key	• PRIMARY Key • FOREIGN Key • CHECK Constraint • DEFAULT Constraint		CLO-1,3
W8.	Understanding of Joins. Cartesian Product, Equijoin, non-Equijoin, Self joins, outer joins	• Joins • Cartesian product • Equijoin		CLO-3
W9.		**Mid Term Examination**		CLO 1-3
W10.	Understanding of Joins. Cartesian Product, Equijoin, non-Equijoin, Self joins, outer joins	• Non-Equijoin • Outer joins • Self joins		CLO-3
W11.	Functions	• Functions • Built in functions in oracle/SQL • Character Function • Number Functions	Assignment 3	CLO-1,3
W12.	Functions	• Date Functions • Conversion Function • General Functions • Elements of Date Format	Quiz 3	CLO-1,3
W13.	Sub Query uses	• Subquery • Subquery uses • Types of subquery • Single row subquery • Multiple row subquery	Assignment 4	CLO-1,3
W14.	Understanding of Views, Stored Procedures	• Create View • Check the oracle view • Drop View • Create Stored Procedures • Execute stored procedure	Quiz 4	CLO-3

		• Drop Stored Procedures		
W15.	Triggers	• Create Triggers (DDL, DML) • Disabling or Enabling a Single Trigger • Drop Stored Procedures	Completion of Semester Project	CLO-3
W16.	Normalization & Forms and Reports	• First normal Form (1NF) • Second normal Form (2NF) • Third normal Form (3NF). • Forms • Reports		CLO-1,3
W17.	**Lab Papers**			**All CLOs**
W18.	**Final Examination**			**All CLOs**