University of Management and Technology

School of Commerce and Accountancy
Quaid e Azam Campus

Course Outline

Course Title: Introduction to **Database Systems** **(CS334)**	
Program	ADP(CS)
Credits Hours	3
Duration	15 Weeks / 30 Sessions
Prerequisites	
Resource Person	
Contact/Email	

Course Goals:

1. Students should be able to understand the Database System environment
2. Students should be able to Design and Implement a Relational database for real life problems
3. Students should be Expertise in writing SQL queries
4. Students should have Good concepts of modeling techniques (ERD)
5. Students should be able to suggest a Centralized Distributed system according to organizational needs
6. Students should be able to design and implement solutions for the small business organizations

Teaching-Learning Methodology:

Note: Select methodologies as per nature of the course.

- Lectures

- Recommended Text/Supplementary Texts

- Handouts

- Case Studies

- Skill Development Exercises

- Project Report/Term Paper

- Any other Teaching Tool…………………………………………

Recommended Text Book:

1. "Database Systems" Design, Implementation, Management   5th -10th   Edition
   By: Peter Rob and Carlos Coronel

2. **Distributed Database Management Systems**   **2nd Edition**
   By: M. TAIMER

Assessment & Evaluation:

*Note: **Please Specify the Weightage you want to assign to assignments and Final Project/ Project presentation/Presentation.***

Quizzes	**15%**
Assignments	
Final Project	20%
Project Presentation/Presentations	
Mid Term	**25%**
End Term Exam	**40%**
Total:	**100**

SEHEDULE OF ACTIVITIES

Note: Please fill the tasks/activities column according to your course plan

Week	Contents/Topics to be Taught	Tasks/Activities
1	**File Systems and Databases: Introducing the Database; Why Database Design is important, A practical approach to Database Design. Historical roots of the database; Files and File system, A File system Critique; File System Data Management, Structural and Data dependence, Field Definitions and Naming Conventions, Data Redundancy.** Database Systems: Database system Environment, Types of Database Management Systems, DBMS Functions, Managing the Database System, Database Design and Modeling.	Course Outline Distribution
2	**Database Models: Hierarchical Model, Network Model, Relational Model, Entity Relationship Data Model, Object-Oriented Model, The Evolution of Data Models; Database Models and the Internet.** **Introduction to RDBMS: A logical view of Data; Entities and Attributes, Tables and their Characteristics, Keys.**	
3	SQL: Writing Basic SQL Statements; SELECT Statement, Arithmetic Expressions, Operator Precedence, Null Value, Column Alias, Concatenation Operator, Display table Structure Integrity Rules: Entity Integrity, Referential Integrity Relational Database Operators: Data Dictionary and System Catalog.	Quiz 1
4	SQL: Restricting and Sorting Data; WHERE Clause, Comparison operators, Logical operators, ORDER BY clause, ASC order, Desc Order Entity Relationship (E-R) Modeling: Basic Modeling Concepts; Data Models; Degrees of Data Abstraction; Conceptual Model, Internal Model, External Model, Physical Model.	
5	SQL: Single Row Functions; Character Functions; Case Conversion, Character manipulation, Date Functions Entity Relationship (E-R) Model: Entities, Attributes, Relationships, Connectivity and Cardinality, Relationship Strength (Existence Dependency), Relationship	Assignment 1

	Participation, Relationship Strength and weak entities, Relationship Degree.	
6	SQL: Single Row Functions; Data type conversion Functions, General Functions	Assignment 2
	Entity Relationship (E-R) Model: Composite Entities, Entity Super types and subtypes, Comparison of E-R Modeling Symbols.	
7	SQL: Displaying Data from Multiple Tables, Equi-Join, Non-Equi Join, Outer Join, Self Join	Quiz 2
	Developing an E-R Diagram: Challenge of Database Design, Conflicting Goals.	
8	SQL: Aggregating Data Using Group Functions; Group Functions, GROUP BY clause, HAVING clause	
	Transform E-R Diagram into Database Structure: General Rules Governing Relationships Among Tables.	
9	SQL: Sub queries, Types of Sub queries, single row sub query, Group functions in sub query, HAVING clause in sub query, Multiple row sub query, multiple row comparison operator	
	Normalization of Database Tables: Need for Normalization, Conversion to First Normal Form, Conversion to Second Normal Form.	
10	SQL: Sub queries; Multiple Column Sub queries, pair wise comparison, Non-pair wise comparison, Null Value in a sub query, Sub query in From Clause.	
	Normalization: Conversion to Third Normal Form, Boyce-Codd Normal Form (BCNF).	
11	SQL: Manipulating Data, Creating and Managing Tables; the INSERT statement, UPDATE statement, DELETE statement, CREATE table statement, ALTER Table statement, DROP table statement, RENAME statement, TRUNCATE table statement	Quiz 3
	Normalization and Database Design: Higher Level Normal Forms, De-Normalization	
12	SQL: Defining Constraints, Column Level and Table Level, NOT NULL Constraint, UNIQUE Key Constraint, PRIMARY Key Constraint, FOREIGN Key Constraint, CHECK Constraint.	
	Transaction Management and Concurrency Control: What is a Transaction; Evaluating Transaction Results, Transaction Properties, Transaction Management with SQL, Transaction Log, Transaction Types.	

13	**SQL: Creating views; Simple view, Complex views, CREATE View statement, Rules for DML operations, WITH CHECK OPTION clause, Denying DML operations, DROP view Statement** **Concurrency Control with locking Methods: Lost Updates, Un-committed Data, Inconsistent Retrievals, Dirty Data, Fuzzy Read, Scheduler. Lock Granularity, Lock Types, Two-Phase Locking to Ensure Serializability, Deadlocks.**	
14	**Concurrency control with Time Stamping Methods: Concurrency control with optimistic Methods. Database Recovery Management; Transaction Recovery, Architectural Considerations, Recovery information.** **SQL: Producing Readable Outputs with SQL* PLUS, other Database objects**	Quiz 4
15	**DDBMS: Evolution, Advantages & Disadvantages. Distributed processing and distributed databases.** **What is a DDBMS? Components.** **DDBMS: Levels of data processed distribution, Distributed database transparency features, Distribution transparency, Transaction transparency, Performance transparency and query optimization.**	Assignment 4 Presentations (if any)
16	**END TERM EXAMINATION**	